# Contributions of the balanced scorecard as a support instrument in strategic decision-making: a bibliometric study

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**Abstract:** Despite the existence of various studies and literature reviews conducted around the balanced scorecard theme, it is considered important to undertake an in-depth update of the state of the art on this subject. To achieve this purpose, our research aims to conduct a bibliometric study to analyse the contributions of the balanced scorecard as an instrument to support strategic decision-making. To this end, we conducted a comprehensive state-of-the-art survey from an advanced search based on the Web of Science. 1,768 articles, published between 1992 and 2021, were considered for this purpose. The analysis is done using innovative software for bibliometric analysis – R. Bibliometrix. We note that most publications deal with the combination of the balanced scorecard with management systems such as the quality management system and the performance evaluation system and, more recently, with big data algorithms.

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# 1   Introduction

The highly competitive environment in which organisations are included inevitably leads to the promotion of a set of changes which are necessary to improve processes of optimising resources and seeking improvement of results and value creation (Almeida et al., 2014). As Kaplan (2012) points out, ways of measuring an organisation's results, in addition to achieving the goals and objectives set, also support the decision-making process concerning adjustments and measures that are necessary to implement in the organisation.

An understanding of how the balanced scorecard (BSC) has evolved from its creation in 1992 to the day is crucial. This includes a holistic view of the organisation from four perspectives – financial, clients, internal processes, learning and growth – through a balance between financial and non-financial indicators, between the indicators of occurrence (lagging indicators) and trend indicators (leading indicators). It aligns short-term organisational performance with strategy and is the factor that triggers our bibliometric study on the BSC theme. How has the BSC been able to keep up with and adapt to the constant transformations that organisations have undergone over almost 30 years? The concept associated with the BSC is indeed widespread both in the academic sphere (Banchieri et al., 2011; Hoque, 2014; Lueg and Silva, 2013; Perkins et al., 2014) and in the business sphere, as a multidimensional management tool (Kaplan and Norton, 1992; Rigby and Bilodeau, 2009, 2011, 2013). It has triggered many studies in different organisations, such as those in the public and private sectors, large companies and small and medium-sized enterprises (SMEs) belonging to the most diverse sectors of activity (Hasan and Sethi, 2017; Hoque, 2014; Madsen, 2015; Lueg, 2015a, 2015b; Lueg and Silva, 2013; Madsen and Stenheim, 2015). However, the BSC is little disseminated by public sector organisations, given their continuing reluctance to adopt typical private sector management tools, which may misstate the mission of such organisations, as well as due to the greater complexity of public institutions compared to those of companies (Niven, 2003; Pinto, 2008), in particular in terms of the legal framework that conditions their operations.

Over the last ten or 15 years, it can be seen, through the review of the BSC literature, that research on BSC has grown significantly (Banchieri et al., 2011; Hoque, 2014; Lueg and Silva, 2013; Perkins et al., 2014), with attention focused on the implementation process, design and use (Brudan, 2005; Lawrie and Cobbold, 2004; Speckbacher et al.,

2003) to the detriment of the benefits it brings to organisations that decide to implement it.

Taticchi et al. (2010) conducted a study from 1970 to 2008 and found that the BSC stood out in the articles published on the theme of performance measurement and management. In addition, the BSC is one of the four most prevalent concepts in the area of strategic management, with significant development in recent years, in addition to continuing to be a relevant and timely topic (Madsen and Stenheim, 2015).

In Portugal, few bibliometric studies have been carried out; one of the last, and most important, was carried out by Quesado et al. (2019) and covers the period from 2014 to 2018, considered one of the most fertile periods in publications on the BSC. Quesado et al. (2019) report the existence of few bibliometric studies on the BSC, most of which come from Brazil (Almeida et al., 2014; Assis and Teixeira, 2015; Banchieri et al., 2011; Bento and Tondolo, 2017; Catapan et al., 2013; Chaves et al., 2012; Ensslin et al., 2014; Ferreira and Diehl, 2013; Júnior et al., 2014; Montenegro and Callado, 2018; Oliveira et al., 2017; Picoli et al., 2012; Veroneze et al., 2017).

Our study aims to cover the period between 1992 and 2021, although the latter is incomplete. It follows the evolution of the concept itself, through the systematisation of the associated keywords, namely performance, balanced scorecard, and BSC, in the journals that published the most scientific articles on the BSC, the most cited authors, the authors who published the most and their affiliations, among others, to position the upcoming scientific research. Using the Web of Science (WoS) database we looked for trends in studies in the BSC area, generating knowledge about the theme and understanding its evolution as a management tool and, later, as a performance evaluation tool. From our bibliometric study, we found that in 2008, 2010, 2017 and 2020 the number of annual publications on the theme of the BSC exceeded 100 in internationally renowned journals (WoS), demonstrating growing interest in the BSC and its potential as a strategic management system (Chavan, 2009).

For all these reasons, the main importance of this article is the provision of statistical data that allow the robustness of the study of the BSC theme, aiming to be of use to those who wish to carry out future studies in this area of knowledge. The article follows the following structure: in addition to this introduction, the theoretical framework presents the evolution of the concept of the BSC from 1992 to the present day, the methodology and methods that guided the investigation and the main results obtained. Finally, the final considerations, limitations of the study and clues for future investigations are presented.

## 2 Theoretical framework

### 2.1 BSC: evolution of the concept from 1992 to the present

The genesis of the BSC was in 1992, by the hand of Kaplan and Norton, following a research project called "Measuring Performance in the Organization of the Future", which involved 12 US companies and culminated in the article entitled "The Balanced Scorecard – measures that drive performance" (Rua and Silva, 2016). Kaplan and Norton found that the financial indicators used in performance evaluation were ineffective and obsolete, and did not allow the creation of economic value in the future (Kaplan and Norton, 1992, 1993, 1996a, 1996b). The inability to evaluate performance based exclusively on financial indicators stems from an accounting information system that

cannot respond promptly (Kaplan, 1983, 1984, 1985) and is no longer useful and relevant to the decision-making process (Oliveira and Rua, 2019). The information produced must ensure an "integration of operational management with strategic management" [Oliveira and Rua, (2019), p.19], because "the conflict between the need to build competitive capacities and the inability of traditional accounting and financial systems has given rise to a new synthesis: the Balanced Scorecard" [Kaplan and Norton, (1996a), p.7]. The integration of non-financial indicators, namely those related to the quality of services, level of satisfaction and retention rate of customers and employees, competence and motivation of human resources, and capacity for innovation and adaptation (Figge et al., 2002; Santos, 2008) allow us to identify the strategic elements of an organisation more clearly, enhancing the success of its intervention in crucial areas of business strategy (Rua and Silva, 2016).

As Russo (2015) and Silva (2012) argue, traditional management control systems based exclusively on financial indicators only give us information about the results of the past, which is incompatible with strategic objectives.

Numerous studies carried out in the 1980s and 1990s were unanimous in pointing out the insufficiency of financial indicators and the need to use non-financial indicators in the evaluation of performance (Eccles, 1991; Johnson and Kaplan, 1987; Kaplan, 1983, 1984; Neely, 1999; Simons, 1995). According to Simões and Azevedo (2011), it was in the 1990s and during the first decade of the 21st century that research began to focus on non-financial indicators (Ittner and Larcker, 1998; Neely et al., 2005) and performance measurement systems and their connection to strategy (Bhimani and Langfield-Smith, 2007; Chenhall, 1997, 2005; Chow et al., 2006; Dixon et al., 1992; Harrison et al., 1997; Hassabelnaby et al., 2003; Hemmer, 1996; Ittner and Larcker, 1997, 1998, 2003; Ittner et al., 2003a, 2003b; Jazayeri and Scapens, 2008; Kasurinen, 2002; Malina and Selto, 2004; Neely et al., 1994; Neely, 1999; Neely and Kennerley, 2002, 2003; Rangone, 1997; Surysekar, 2003; Tuomela, 2005; Vaivio, 1999a, 1999b, 2004). Similarly, Divandri and Yousefi (2011) state that the BSC is a strategic planning instrument and a holistic management system adopted by for-profit and non-profit organisations, private and public, belonging to the most diverse sectors of activity, whose purpose is the alignment of business with the vision and strategy of the organisation, and to improve internal and external communication and monitor the performance of the organisation.

To Calhau (2009, p.8), the BSC "is an efficient measurement system, a strategic management model and a mode of communication" and is a management system that allows the translation of the vision and strategy of organisations into action (Scholey, 2006). In this regard, Kaplan and Norton define the BSC as "a set of measures that gives top managers a fast but comprehensive view of the business" [Kaplan and Norton, (1992), p.71]; and further "The scorecard puts strategy and vision, not control, at the centre. It establishes goals but assumes that people will adopt whatever behaviours and take whatever actions are necessary to arrive at those goals" (p.79).

In the early days of the development of the concept, Kaplan and Norton (1992) conceived the BSC as a performance measurement system, but with a fundamental intervention in the implementation of the strategy, which later evolved into a strategic management system (Kaplan and Norton, 1996a,c, 2000, 2001a, 2001b). According to Kaplan and Norton (2008), the BSC consisted of an integrated management system that aimed to:

1 develop the strategy

2 translate the strategy

3 plan operations

4 monitor and learn

5 test and adapt the strategy.

Figure 1 shows the BSC's integrated management system.

**Figure 1** Closed cycle of the integrated management system
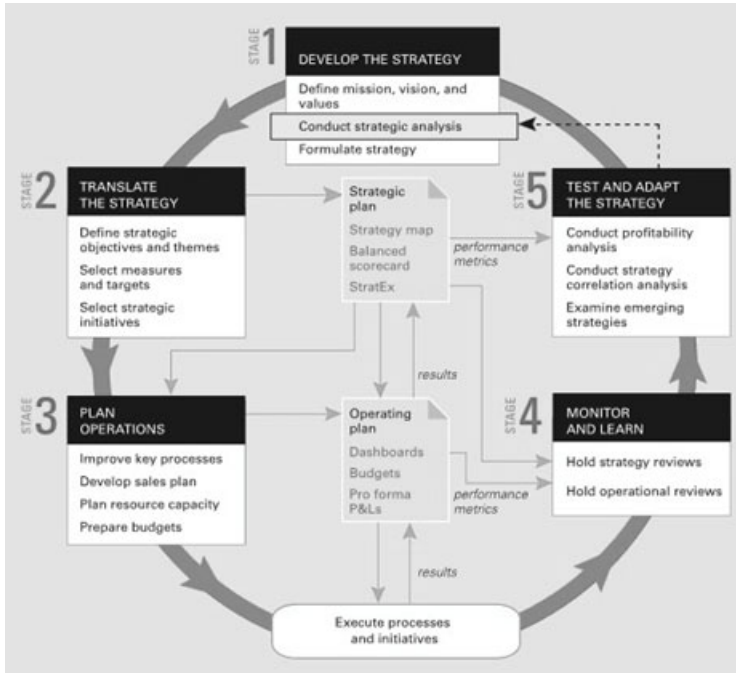


*Source:* Kaplan and Norton (2008)

Thus, the BSC is distinct from other performance evaluation systems because it integrates strategic management practices, the implementation of which is carried out in the organisation as a whole, using financial and non-financial indicators and results indicators – lagging indicators – and trend indicators – leading indicators (Lueg, 2015a). For Simões and Azevedo (2011, p.4) "the result indicators reflect the objectives associated with the defined strategies and are sometimes shared by companies in the same sector (...), for example, profitability, market position, customer satisfaction, among others. The indicators of performance generating factors reflect the options taken by a given entity or business unit, such as the selected market segments, the quality policy adopted, the generators of financial performance, the way of carrying out activities and processes, among others". It is from this global and holistic view of the organisation that critical success factors are defined, outlining four perspectives (financial, customers, internal processes and learning and knowledge) that through cause-and-effect

relationships allow us to chart the most appropriate path for the sustained and balanced growth of the organisation (Figge et al., 2002; Kaplan and Norton, 1996a).

Carvalho and Azevedo (2001, p.62) state that "the balanced scorecard represents a positive development on the tableau de bord and other control and performance evaluation frameworks for the following reasons":

1    the BSC begins to systematically include intangible, non-financial and qualitative factors related to the competitive situation and capacity for innovation

2    the variables and indicators used in the BSC are more closely linked to strategically important aspects, giving less importance to details

3    the BSC strikes a balance and provides weighting between financial and non-financial measures

4    the BSC considers causal relationships between the four perspectives presented, generating a chain of actions and decisions in all, leading to the fulfilment of the strategy.

We can summarise that the path of the BSC concept has, over the years, passed through three distinct phases: the first in which it was seen as a performance measurement system; the second, as a management system focused on strategy; and the third and last as an integrated strategic management system (Aidemark, 2001; Ax and Bjørnenak, 2005; Braam and Nijssen, 2004; Braam et al., 2007; Braam, 2012; Brudan, 2005; Hansen and Mouritsen, 2005; Lawrie and Cobbold, 2004; Madsen, 2012; Modell, 2009; Perkins et al., 2014; Speckbacher et al., 2003).

The BSC's latest developments go far beyond what was originally designed for this strategic management instrument. Currently, it combines a set of strategies and operations incorporated into an increasingly broad management system, with a more comprehensive and holistic view of the organisation and able to be applied according to the perspective chosen by the organisation [Hoque, (2014), p.36].

**Table 1**     BSC benefits

| Focus on management | • It helps managers concentrate on what is important in the long run |
|---|---|
| | • Helps managers prioritise and make decisions |
| Balancing | • Balanced and holistic view of the organisation's performance |
| Communication and visualisation | • Common language |
| | • Common frame of reference |
| | • Facilitates discussions |
| Alignment of objectives | • Helps improve goal congruence |
| | • Increased awareness of the organisation's long-term goals |
| Cultural and motivational tool | • It changes the way the organisation 'thinks' |
| | • Captures the attention of the members of the organisation |
| | • Motivational effects as a result of more explicit goals and incentives |
| Catalyst for organisational change | • Rhetorical tool that can be used to justify organisational changes |
| | • Well-known concept |

*Source:*    Madsen and Stenheim (2014, p.85)

**Table 2**     Quotes on how the BSC improves focus on management

| | |
|---|---|
| Prioritisation of decision-making | "I would say that it has also been a good tool for planning and prioritizing initiatives in the future." |
| | "First of all, it helped us focus on specific things. The structure helps us prioritize. As a result of the BSC, we become more focused on strategy. " |
| | "The company is now more focused. Before we had many activities in various directions." |
| Structure | "In situations with a lot of uncertainty, we can make the wrong decision in the context of panic or under pressure. We haven't been in this situation in a few years, and that's part of the BSC effect." |
| | "We focus on certain key areas that are used for BSC analysis." |
| | "First of all, I would say that I think we now have a more structured way of defining our strategy." |
| Broader focus | "Art is not just about profit and difficult things." |
| | "Focus not only on finance, but also on customers, processes and employees and see the relationship between strategic objectives within these areas." |
| Long-term vision | "It is primarily the ability to understand long-term goals." |
| | "Our experience tells us that we are more focused on our development over time." |
| | "In addition, we get a focus on value drivers, on what really creates value. It makes us take a stand. It was a wake-up call for the organization." |
| | "I think it was helpful to know where we're going." |
| | "The effect translates in terms of an overview of the most important areas. We received an early warning before things go wrong, and we have been able to change course before this affects customer and employee satisfaction or financial results." |

*Source:* Madsen and Stenheim (2014, pp.85–86)

Madsen and Stenheim (2014) gathered the benefits perceived by organisations about the use of the BSC in management, as well as gathered a set of citations that aims to illustrate how this instrument improves the performance evaluation system of organisations (Table 1 and Table 2).

By aligning the company's operational performance and strategy, the BSC interconnects the objectives and initiatives with each other and with the organisation's strategy through strategic maps (Kaplan and Norton, 2000, 2001a, 2004). These clearly describe the objectives and performance generators in each of the BSC's perspectives, as well as the cause-and-effect relationships that are established between the objectives and the performance generators, and between the various performance perspectives (Simões and Azevedo, 2011). As Kaplan and Norton (2004, p.11) state, "a strategy represents map how the organization creates value".

For Lucianetti (2010), the main merit of the BSC is precisely in the use of strategic maps, because they allow obtaining insights onto business processes and verify how they create value, contributing to the discussion and development of strategies aligned with action (Alvarez et al., 2019; Jarzabkowski et al., 2007; Whittington, 2003). Figure 2 shows the strategic map of the BSC according to Kaplan and Norton (2000).

**Figure 2**    Strategic map
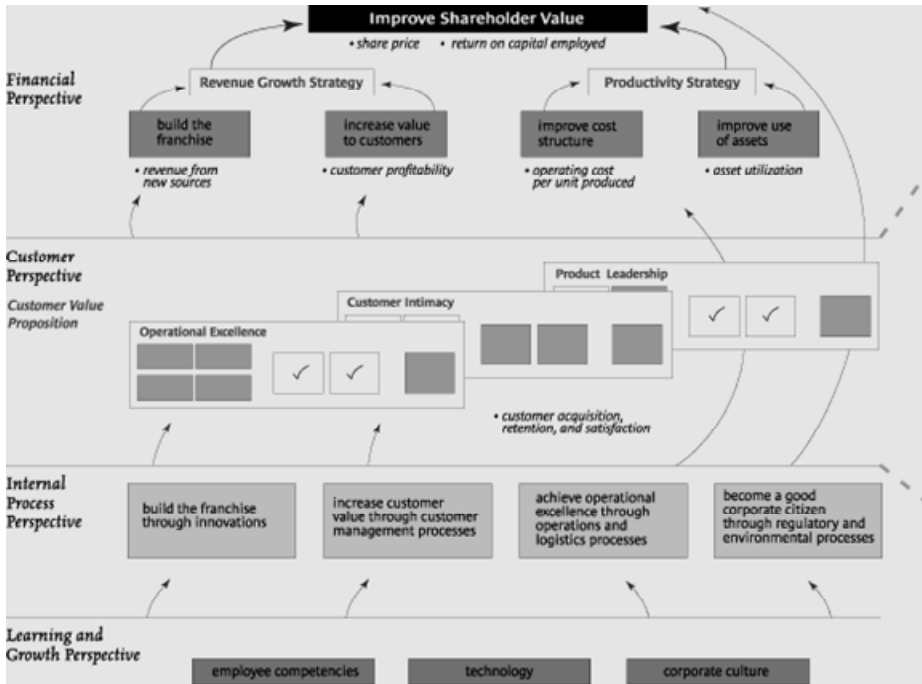
Despite the potentialities of the BSC stated throughout this study, there is still some critical literature which points out flaws and problems, especially in the implementation phase (Antonsen, 2014; Hoque, 2014; Kasurinen, 2002; Madsen and Stenheim, 2014; Modell, 2012; Nørreklit et al., 2008; Wickramasinghe et al., 2007) and on technical and conceptual issues. This includes understanding and interpreting the concept and developing a technical structure to support the BSC, in addition to the resistance and lack of collaboration of the different groups of individuals in the organisation (Madsen and Stenheim, 2014).

Rompho (2011) synthesised the results obtained from interviews and observations made with various organisations about the critical success factors of the BSC (Table 3).

**Table 3**    Critical BSC success factors

| Critical success factor | Suggestions from the literature | Study results | |
|---|---|---|---|
| | | *Interview* | *Observation* |
| Design of the BSC | Not too many nor too few measures [Kaplan and Norton, (2001a), p.360]. You need only some critical indicators since SMEs have one quantity limited from resources (Hvolby and Thorstenson, 2000). | Respondents can remember all current indicators in the balanced scorecard, suggesting that there are not too many indicators. | There are only 24 measures in the four traditional perspectives on the balanced scorecard. The number is in the range suggested by Kaplan and Norton (1996c). |

**Table 3** Critical BSC success factors (continued)

| *Critical success factor* | *Suggestions from the literature* | *Study results* | |
|---|---|---|---|
| | | *Interview* | *Observation* |
| Mission clarification | The mission of organisation must be clearly described (Kaplan and Norton 1996a, 2001a; Tenhunen et al., 2001). | Respondents can declare the mission of organisation properly and can explain how that mission is built. | Mission and strategy are the main themes of the monthly meeting, which is why it is clearly communicated to all employees. |
| Senior management commitment | The top administration must fully support the implementation of the balanced scorecard (Kaplan and Norton, 2001a). | The manager-owner is totally committed. This is backed by interviews with employees. | When performing one meeting once a month, especially towards update or the balanced scorecard, the manager-owner is committed to the use of this tool in the organisation. |
| Employee engagement | Employees should be involved in steps of the project and implementation (Kaplan and Norton, 2001a; Tenhunen et al., 2001). | Respondents indicated that this is not the problem because there are only 12 employees in this organisation and all have been involved at all stages. | During the design and implementation phase, all employees were intimately involved. Suggestions were always welcomed and there was no resistance from staff. |
| Communication process | The balanced scorecard must be communicated to the whole organisation (Kaplan and Norton, 2001a). | | |
| Development process | The process development must not be very long (Kaplan and Norton, 2001a) and must be clear and resource-efficient. | Respondents indicated that the stage of development is fast and is not a problem. | The step design and development took only four weeks, similar to the literature (see Andersen et al., 2001) |
| Availability of time and resources | Without sufficient time and resources, the balanced scorecard cannot be successfully implemented (Tenhunen et al., 2001). | Respondents believed that the necessary resources are provided to make the BSC work and therefore not an issue. | There is one meeting a month. An employee is also solely responsible for analysing the balanced scorecard. So, lack of time and resources is not a big issue in this organisation. |
| Uses of hardware and software system | Appropriate uses of hardware and software systems can help make BSC implementation successful (Fernandes et al., 2006). | Respondents indicated that only Microsoft Excel is used for data analysis and is good enough for currently available data. | There are not many indicators in the BSC, so little data is collected and analysed. Just simple calculations are sufficient at this stage, so Microsoft Excel is an appropriate data analysis tool. |

*Source:* Rompho (2011, pp.50–51)

At the same time, through a survey of the existing literature, Rigby and Bilodeau (2009, 2011, 2013) showed that the concept is widely used, considering that it has useful and undeniable benefits and registering a considerable degree of satisfaction over these almost three decades, which reveals the durability of the concept (Hoque, 2014).

In Tables 4 and 5 we compiled the benefits and strengths of the BSC and its key contributions as a strategic performance management system.

**Table 4**      BSC benefits and strengths

| *Benefits* | *Strengths* |
|---|---|
| It establishes a business model and translates it into indicators; facilitates consensus across the enterprise, not only management, but also on how to achieve it. | Organisational consensus in relation to the strategy facilitates the consensus of the whole company, clarifying and translating the mission and strategy in terms of management for the entire organisation. |
| It clarifies how day-to-day actions affect not only the short term, but also the long term (easily applicable to daily work control). | Translation of the strategy in operational terms: it communicates the strategic objectives in practical terms and allows them to be linked to each other through cause-and-effect relationships. |
| Once the BSC is in action, it can be used in the communication of the company's plans, directing efforts in one direction, avoiding dispersion. | Relationship between strategy and budget: it allows the budget to connect to the strategy by allocating adequate resources in order to achieve the objectives. |
| Comparing current plans and results helps the management team reevaluate and adjust strategy and action plans. It can be used as a tool to 'learn the business'. | Comparison of plans and results in order to evaluate and adjust strategic objectives, indicators and action plans. |
| Support for organisational objectives and strategies. | It can be used by any type of entity. |
| Structure and procedures based on systemic design (complements financial measures with non-financial measures): structured model that defines measures for all organisational levels (operational flexibility). | It is a simple model, in accordance with the principles or fundamentals of performance measurement (it provides a broad view of how to implement a performance measurement system). |

*Source:*   Adapted from Oliva and Borba (2004) and Santos and Fidalgo (2004)

**Table 5**      BSC contributions and implications

| *Contributions* | *Implications* |
|---|---|
| Comprehensive view of the company and business, surpassing traditional methods of performance measurement (inclusion of tangible and intangible assets) focusing on critical activities for value creation. | It uses indicators to predict future effects. |
| Communication, execution and implementation of the strategy (translating the objectives defined in the strategy into concrete actions and results, allowing the company's management to focus its attention on what it considers most important to achieve the foreseen strategic objectives). This instrument is considered effective and modern whenever a change of leadership occurs. | It evaluates and adjusts both strategy and action plans through deviation analysis. |

*Source:*   Adapted from Muñiz and Monfort (2005) and Muñiz (2004)

**Table 5** BSC contributions and implications (continued)

| Contributions | Implications |
|---|---|
| Balance and alignment of objectives between different organs, departments, divisions, etc. | It allows improvements in quality and productivity with immediate effects. |
| It focuses attention on the timing of revenue and not just on cutting costs and increasing productivity to achieve greater growth. | It specifies the business model, making it easier to reach consensus across the enterprise on what the strategy is and how it should be achieved. |
| In times of change, it provides the basis or indicators for the future or to implement new strategies. | It designates those responsible for certain strategies and objectives. |
| It is a highly valued instrument as proof of a new, more effective and modern style of management when a change of leadership occurs. | It reduces traditional budget planning and processes. |
| It includes information related to the company environment (market, competition, suppliers, etc.). | It motivates and rewards employees (support for variable remuneration). |

*Source:* Adapted from Muñiz and Monfort (2005) and Muñiz (2004)

## 2.2 Strategic decision models and instruments: from classical planning to the most recent approaches

The pioneering models of strategic approach resulted initially from academic research such as the LCAG model, developed by Learned, Christensen, Andrews and Guth in the late 1950s (Harvard School) and the Ansoff Growth Vector model, developed in the late 1960s (Carnegie School) (Sousa, 2000). According to Stacey (1998), it was already in the midst of economic growth, at the end of the 1960s, that other strategic models were developed, highlighting the matrixes for managing the portfolios of activities of the three large North American consultants, namely the Boston Consulting Group (BCG) matrices, McKinsey (from the consultant of the same name) and Arthur De Little (ADL). The oil shock of 1973 and the consequent turbulence and volatility of the markets showed the rigidity of all these models and the beginning of their decline. It is in a new, more dynamic and competitive context that other models emerge that aim to respond more effectively and flexibly to renewed challenges (Sousa, 2000). Among these models, it is important to enhance the analysis of Porter's five competitive forces, the BCG2 competitive matrix, the relational strategies of the Hautes Ecoles Commerciales (HEC) group and the business excellence of Peters and Waterman (Sousa, 2000).

At the end of the 1980s, the predominance of intuition over rationality began to give way. "Organisations are moving towards a strategic approach that guarantees greater levels of immediate effectiveness and, at the same time, lays the foundations for prospective analysis". This is how "Godet's method of scenarios or prospective analysis; Hamel and Prahalad's strategic intent and competence poles; the redefinition of reengineering processes by Hammer and Champy, the strategic transformation by Gouillart, the emerging strategies of Mintzberg and Stacey" [Sousa, (2000), p.49] and the alignment of day-to-day management with the strategy within the BSC, by Kaplan and Norton (2001a).

The field of strategy (and respective decision models) is thus embodied in an evolutionary and eclectic process. Each perspective can be identified as a school, namely,

according to Mintzberg (1994), the School of Design, Planning, Positioning, Entrepreneurial, Cognitive, Learning, Power, Cultural, Environmental and Configuration. But the big question remains: to know if these perspectives represent, in fact, different processes of conceiving strategy, or if they constitute parts of the same process. On this subject, it is worth remembering Mintzberg (1994, p.98), when he warns that "strategy formation is a value judgment in design, an intuitive vision and emergent learning; it is about transformation as well as perpetuation; it needs to involve individual knowledge and social interaction, both cooperative and conflictual; it should include a before and after analysis, in addition to a during negotiation; and all this must respond to what can be a demanding environment. Try to omit any of these aspects and you will see what happens!"

Besides, the limitations of the BSC required articulation with other models, such as the analytic hierarchy process (AHP), the analytic network process (ANP) and the fuzzy cognitive maps (FCM). The AHP supports the BSC in incorporating objective and subjective measures, dividing the problem into a hierarchy of attributes and sub-attributes through a ratio scale and paired comparisons. This theory has the advantage of allowing the valuation of intangibles (Saaty, 1996). The ANP is a variant of the AHP and should be applied when there are relationships between the criteria themselves and between the criteria and the sub-criteria (Saaty, 1996). In this follow-up, several studies have articulated the AHP with the BSC, namely in the measurement of performance (Chan and Lynn, 1991; Rangone, 1996; Suwignjo et al., 2000), using the ANP whenever the decision involves the use of attributes with a dependency relationship. FCM is a modelling tool oriented towards decision systems and supports the creation, monitoring and simulation of maps, allowing the exploration of different strategic scenarios and the evolution of these scenarios over a while (Diffenbach, 1982; Ramaprasad and Poon, 1985).

## 3   Methodology

### 3.1   Methodological approach

The methodology adopted is based on a systematic literature review, carried out using a bibliographic database (Ruas and Pereira, 2014) on the theme of the BSC, providing information about what was published, who published it and where it was published, i.e. from secondary sources (Markoni and Lacatos, 2001). For this purpose, we used a bibliometric study that aims to quantify written communication (Pritchard, 1969), extracting measurable data from a statistical analysis of publications (Agarwal et al., 2016). In the same vein, Guedes and Borschiver (2005) state that bibliometric studies have the advantage of allowing the systematisation of scientific and technological information, mitigating the subjective nature of indexing and retrieval of information.

In fact, a bibliometric study, in itself, contains a set of characteristics and aims to carry out a descriptive study (Martins and Theóphilo, 2009; Richardson, 1999; Vanti, 2002) on a topic or subject by creating a profile of a set of people, events or problems, describing a phenomenon or a particular population or studying the relationships between the variables under analysis (Gil, 1999; Vergara, 2009). It is also an exploratory study that aims to extend and systematise knowledge in an area which is still underexplored through a bibliographic research that will contribute to new advances for the theme under

analysis (Quesado et al., 2019), identifying areas where little or no research has been carried out and enhancing the realisation of further studies to fill these gaps (Petticrew and Roberts, 2006).

In conclusion, our study is exploratory and descriptive in terms of objectives, it is bibliographic in the way published articles are systematised and, finally, it is qualitative in the nature of its approach to the theme (Raupp and Beuren, 2013).

## 3.2 The method – R. Bibliometrix

The methodology applied in this study consists of a bibliometric analysis and for this purpose the software R. Bibliometrix was adopted, which is based on networks of co-citations and content analysis of scientific articles (Aria and Cuccurullo, 2017). From the analysis we obtain information about the identification, evaluation and analysis of content for the selected theme, in our case the BSC, performing a systematisation of concepts, theories and practices that will be crucial to performing a replication of data if this is the purpose of the investigation (Rowley and Slack, 2004). Data collection was done through the WoS search engine (ISI WoS) that ensures the availability of data in real time and its reliability (Krippendorff, 2004, 2012).

Bibliometrix R. is a software package for bibliometric analysis written in R and is an open source, whose statistical algorithm has access to highly effective integrated data and which serves to map and analyse bibliographic data simultaneously (Dervis, 2019). This software not only gives us a visualisation of the data, but also provides accuracy and robustness in terms of the results obtained (Dervis, 2019).

As mentioned in the previous point, our objective is to contribute to a synthesis of the literature, highlighting the gaps and outlining possible clues for future research, as well as providing scientific progress on the subject under analysis through the identification of keywords, topics, authors, journals and publications of scientific importance, citations, and co-citations, among other items (Prasad and Tata, 2005; Seuring and Müller, 2008; Treinta et al., 2014).

Moreover, the bibliometric analysis of a specific theme requires a structured, meticulous and methodical research, because the delimitation of the bibliographic research process, criteria and keywords must follow a careful strategy of the documents that should be included in the systematisation of literature that is intended to be carried out (Bandara et al., 2011; Quesado and Silva, 2021).

The research carried out was based on the WoS database. It is considered one of the most internationally recognised databases, either by the number of indexed journals with the highest number of citations in different areas of research, or by the data set that it provides, along with a vast amount of relevant information on areas of study, journals, years of publication and citations of articles and authors. The keywords used in this study were 'BSC', 'performance', 'performance measurement', 'performance measures', 'performance evaluation', 'performance management', 'strategy' and 'strategic management' (Table 6). We have analysed the articles on a holistic way and neither its title nor the abstract was manually analysed in this study.

The study was carried out in October 2021 through the use of keywords, namely BSC, performance, performance measurement, performance measures, performance evaluation, performance management, strategy, strategic management. The search resulted in 71 documents published in the *International Journal of Productivity and Performance*, 50 documents in the *Measuring Business Excellence*, 32 documents in

*Total Quality Management and Business Excellence* and 30 documents published in the journal Espacios, just to highlight the most relevant ones. Table 6 shows the criteria used in the search carried out in October 2021.

**Table 6**     Search criteria

| Items | Criteria |
|---|---|
| Timeline | 1992 to 2021 |
| Database | ISI WoS |
| Keywords | BSC, balanced scorecard, performance, performance measurement, performance measures, performance evaluation, performance management, strategy, strategic management |
| Serialisation by search category | Management accounting, accounting, management accounting research, management strategic, decision, performance, productivity, benchmarking, auditing, quality |
| Serialisation by document type | Articles |
| Software used | Bibliometrix R. |
| Documents analysed | 1,768 |

*Source:*   Authors'own research

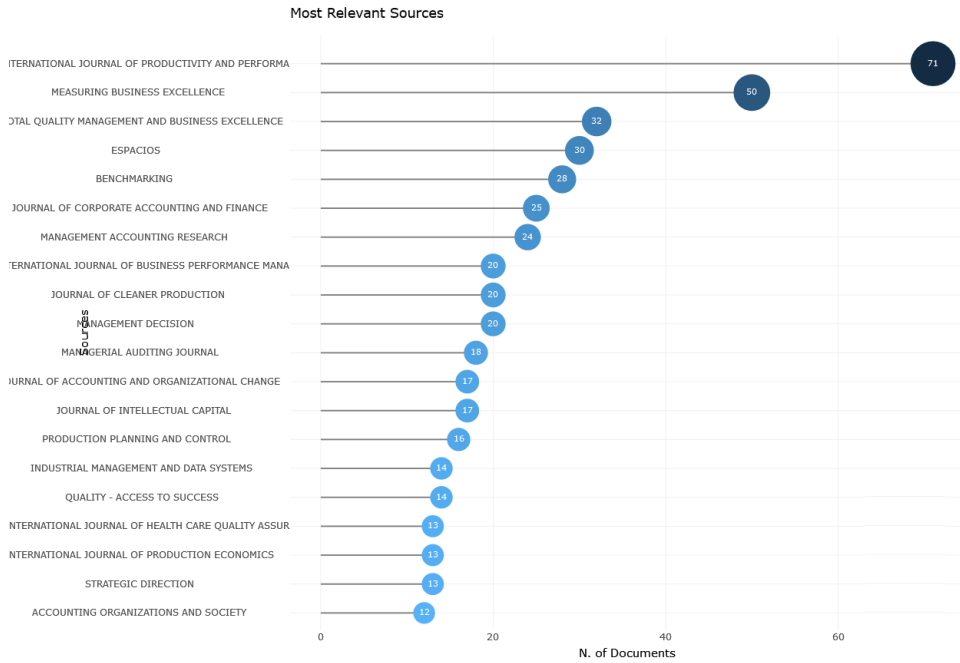### 3.3   Methodological process

After the final identification of scientific articles in the database, we proceeded to the analysis that consisted of the export of the bibliographic data to BibTeX, identifying the type of document, number of citations, distribution by year of publication, authors, research areas and titles of sources; the software R. Bibliometrix was then used, applying a set of tools in the processing of data from the series of publications under analysis (Ekundayo and Okoh, 2018) corresponding to 1,768 documents; we carried out content analysis, systematising the topics most studied by researchers and allowing the enrichment of bibliometric analysis through the creation of clusters (Seuring and Gold, 2012; Spens and Kovács, 2006). Despite its qualitative nature, it does not lose scientific value and rigor since the adoption of a structured and methodical system was met (Tranfield et al., 2003; Seuring and Gold, 2012). Finally, we defined the research paradigms, namely whether or not the article uses primary data, the nature of the study conducted (qualitative and/or quantitative) and the methodology adopted (Chen and Hirschheim, 2004; Dwivedi and Kuljis, 2008; Orlikowski and Baroudi, 1991).
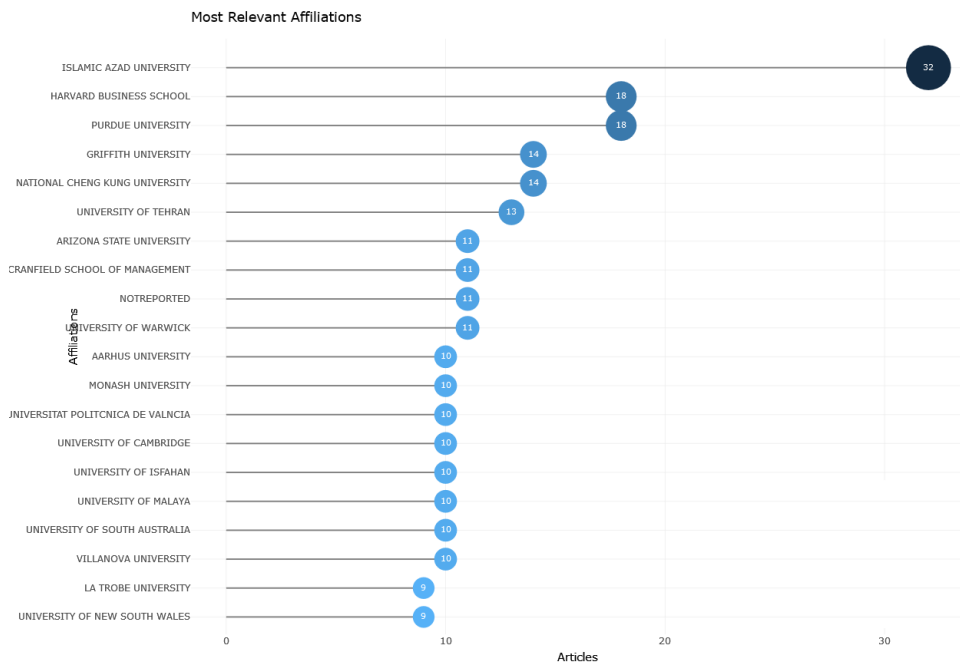
## 4   Results

### 4.1   Data collection

Over the period under analysis, between 1992 and 2021, the latter still incomplete, more than 1,750 scientific articles were produced, disseminated by several, distinct scientific journals of international reputation, in main authorship and/or co-authorship, associating the BSC to improving the performance, productivity and improvement of total quality management (TQM) systems. As we can infer from the Figure 3, the most relevant sources, in which the largest number of articles on the area under this area are concentrated, were the *International Journal of Productivity and Performance* and *Measuring Business Excellence*, with 71 and 50 articles respectively.

**Figure 3** Most relevant sources (see online version for colours)

Most Relevant Sources

| Sources | N. of Documents |
| --- | --- |
| INTERNATIONAL JOURNAL OF PRODUCTIVITY AND PERFORMA | 71 |
| MEASURING BUSINESS EXCELLENCE | 50 |
| TOTAL QUALITY MANAGEMENT AND BUSINESS EXCELLENCE | 32 |
| ESPACIOS | 30 |
| BENCHMARKING | 28 |
| JOURNAL OF CORPORATE ACCOUNTING AND FINANCE | 25 |
| MANAGEMENT ACCOUNTING RESEARCH | 24 |
| INTERNATIONAL JOURNAL OF BUSINESS PERFORMANCE MANA | 20 |
| JOURNAL OF CLEANER PRODUCTION | 20 |
| MANAGEMENT DECISION | 20 |
| MANAGERIAL AUDITING JOURNAL | 18 |
| JOURNAL OF ACCOUNTING AND ORGANIZATIONAL CHANGE | 17 |
| JOURNAL OF INTELLECTUAL CAPITAL | 17 |
| PRODUCTION PLANNING AND CONTROL | 16 |
| INDUSTRIAL MANAGEMENT AND DATA SYSTEMS | 14 |
| QUALITY - ACCESS TO SUCCESS | 14 |
| INTERNATIONAL JOURNAL OF HEALTH CARE QUALITY ASSUR | 13 |
| INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS | 13 |
| STRATEGIC DIRECTION | 13 |
| ACCOUNTING ORGANIZATIONS AND SOCIETY | 12 |

*Source:* Authors' own research

**Figure 4** Most relevant affiliations (see online version for colours)

Most Relevant Affiliations

| Affiliations | Articles |
| --- | --- |
| ISLAMIC AZAD UNIVERSITY | 32 |
| HARVARD BUSINESS SCHOOL | 18 |
| PURDUE UNIVERSITY | 18 |
| GRIFFITH UNIVERSITY | 14 |
| NATIONAL CHENG KUNG UNIVERSITY | 14 |
| UNIVERSITY OF TEHRAN | 13 |
| ARIZONA STATE UNIVERSITY | 11 |
| CRANFIELD SCHOOL OF MANAGEMENT | 11 |
| NOTREPORTED | 11 |
| UNIVERSITY OF WARWICK | 11 |
| AARHUS UNIVERSITY | 10 |
| MONASH UNIVERSITY | 10 |
| UNIVERSITAT POLITCNICA DE VALNCIA | 10 |
| UNIVERSITY OF CAMBRIDGE | 10 |
| UNIVERSITY OF ISFAHAN | 10 |
| UNIVERSITY OF MALAYA | 10 |
| UNIVERSITY OF SOUTH AUSTRALIA | 10 |
| VILLANOVA UNIVERSITY | 10 |
| LA TROBE UNIVERSITY | 9 |
| UNIVERSITY OF NEW SOUTH WALES | 9 |

*Source:* Authors' own research

Most author affiliations belong to the Islamic University of Azad in Iran, Harvard Business School (HBS) and Purdue University, both in the USA. As we can see in Figure 4, 32 of the articles are from authors affiliated to the Islamic University of Azad and a total of 36 of the articles are from authors of HBS and Purdue University (Figure 4).

Figure 5 presents the most relevant authors in the BSC area, in which we naturally highlight Kaplan, Na and Na, Norton, Hoque, Bourne, Neely, Bremser and Lueg, who total about 95 articles in this area and who were mentioned in the literature review of point 2 of this study.

**Figure 5**    Most relevant authors in the BSC area (see online version for colours)
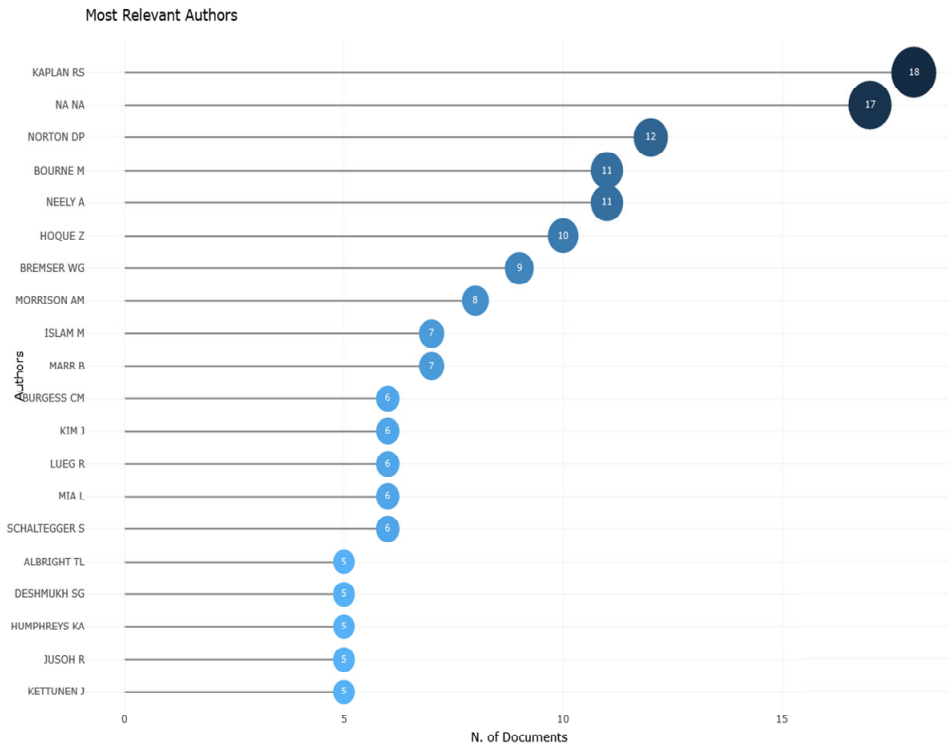


*Source:*    Authors' own research

In Figure 6, we show the impact of the most relevant authors measured through the *h-index,* also called the Hirsch index. The purpose of this index is to simultaneously measure the quality and quantity of scientific production and it is calculated by the number of publications for which an author has been cited by other authors at least the same number of times. For example, a *h-index* of 10 means that the author has published at least 10 articles and that these have been cited, by other authors, at least 10 times. We found that Kaplan stands out with an *h-index* of 17, Norton with an *h-index* of 11, Neely with an *h-index* of 10 and Morrison with an *h-index* of 8 (Figure 6).

**Figure 6** H-index of the most relevant authors in the BSC area (see online version for colours)

Author Local Impact by H index
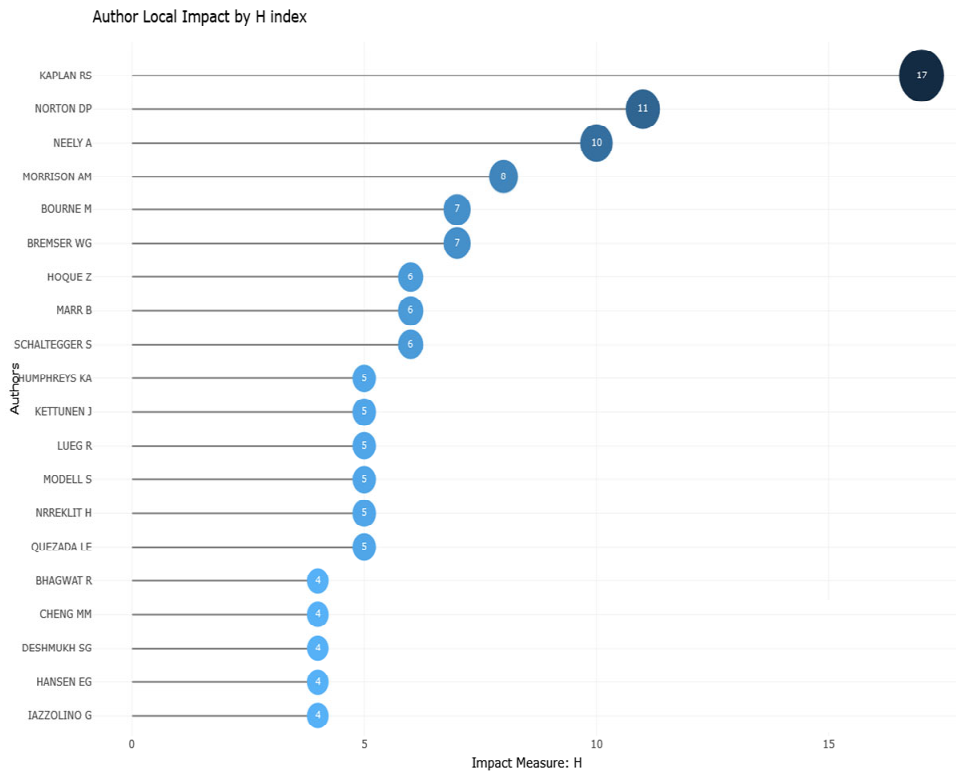


*Source:* Authors' own research

**Figure 7** Annual scientific production of articles between 1992 and October 2021 (see online version for colours)

Annual Scientific Production
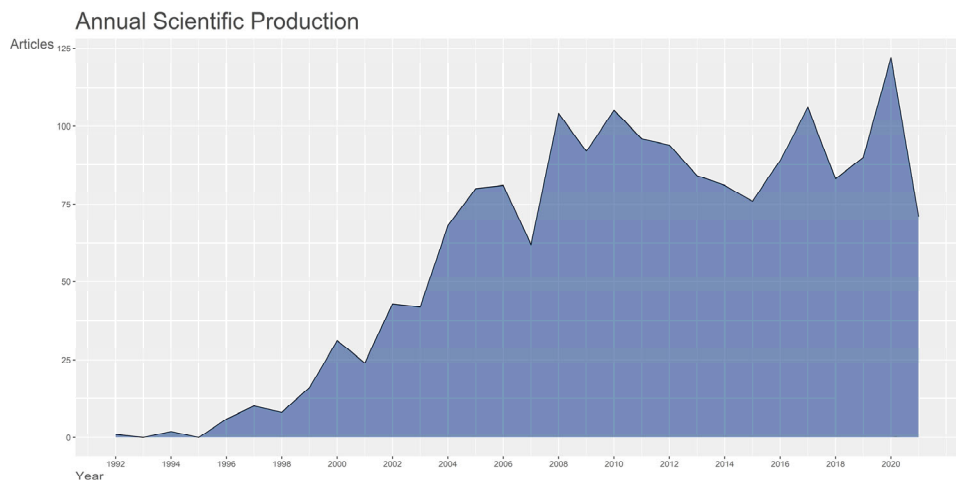


*Source:* Authors' own research

## 4.2   Evolution and characterisation of scientific production

The evolution over time of scientific production since 2008 has seen an increasing number of articles, especially in the years 2008, 2010, 2017 and 2020 as the most fruitful in terms of publication of articles on BSC, surpassing 100 publications each year. In 2021, more than 70 articles have been published by the beginning of October, leading us to conclude that the issue has aroused growing interest in the community of researchers.

Figure 7 shows the evolution of scientific production.

**Figure 8**     Journals and magazines with the highest number of citations (see online version for colours)



Most Local Cited Sources
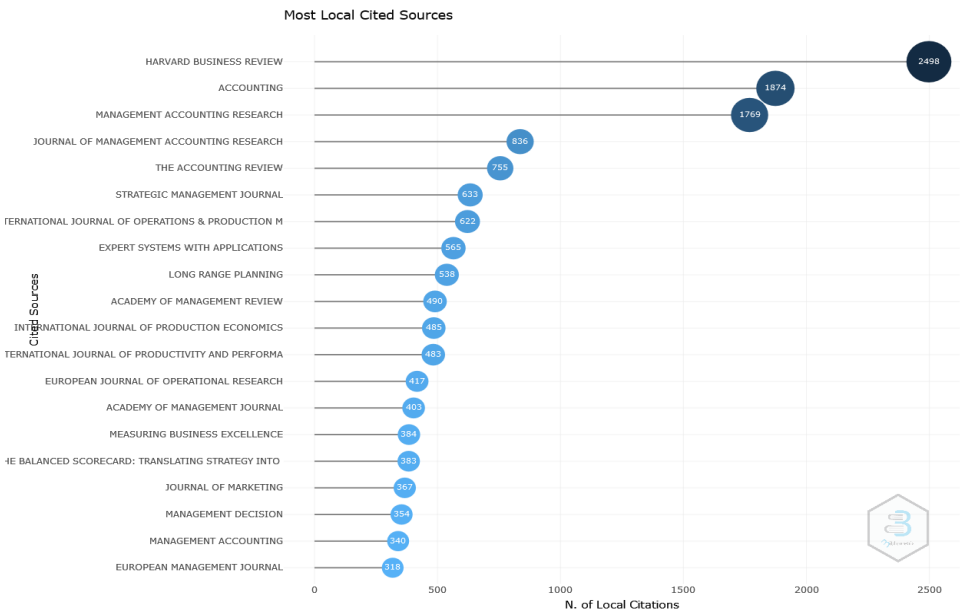
*Source:*   Authors' own research

Figure 8 shows that the journals with the highest number of citations are the *Harvard Business Review, Accounting* and *Management Accounting Research* with 2,498, 1,874 and 1,769 publications respectively, resulting in 17.21%, 12.91% and 12.19% of the total publications in scientific journals in the period under analysis.

With regard to the most relevant articles, taking into account the criterion of the highest number of citations obtained by each article, the number of articles most cited and the annual average, we present Figure 9(a), Figure 9(b) and Table 7, as can be seen below.

As for the local citations (CSF – local cited references), which consists of the number of citations present in the list of references of an article to other articles within the collection, we ascertained that the article published in 1992 by Kaplan in the HBS journal is undoubtedly the most cited among all the articles analysed, with 184 citations. The articles published by Kaplan in the following years, in 1996 and 2000, also have 145 and 135 citations, followed by Malmi with 108 citations, Eckbacher with 106 citations, Banker with 104, Norreklit with 92 and Ittner with 88 citations, just to mention the main ones.

**Figure 9**    (a) Most cited articles (local citations – CSF) (b) Most cited articles (Global citations – GLS) (see online version for colours)
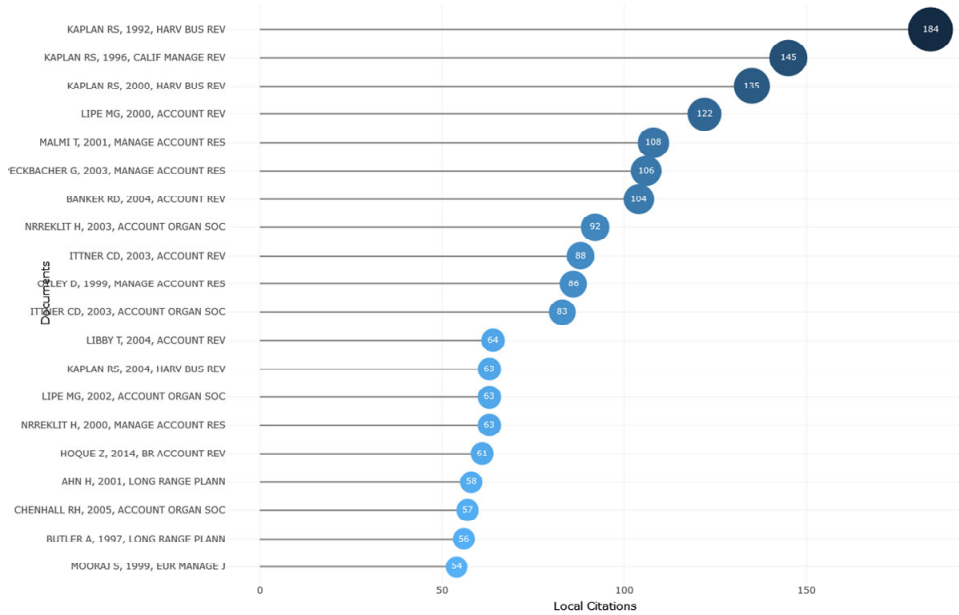


(a)
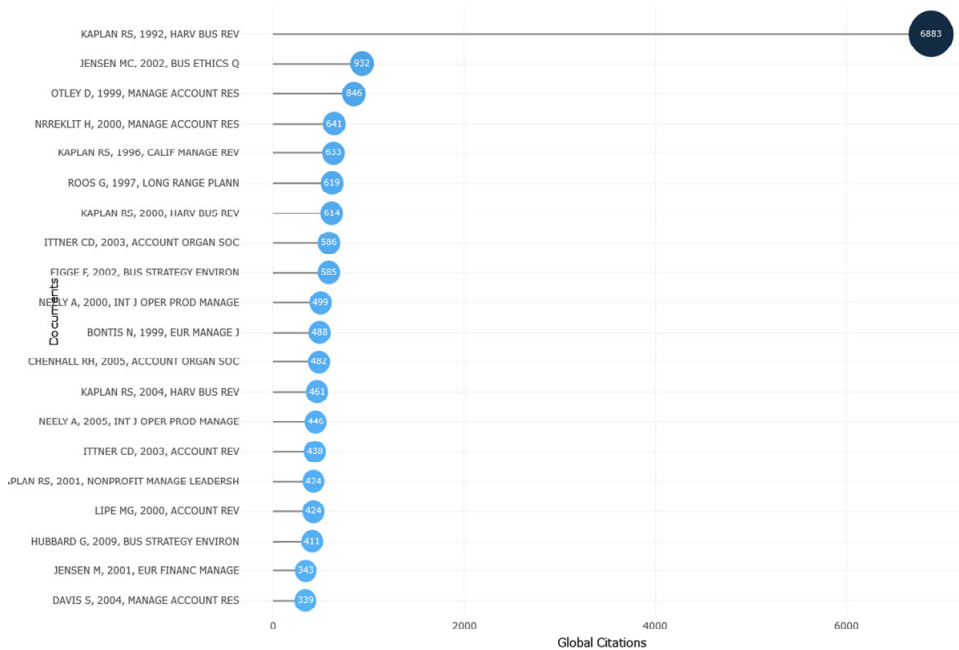


(b)

*Source:*   Authors' own research

With regard to global citations (GLS – global citation score), which consists of highlighting the total number of citations to an article in the WoS Core Collection, we once again noted the highlight on Kaplan's article, published in 1992 in *Harvard Business Review* with 6,883 citations, followed by Jensen with 932 citations and Otley with 846 citations. Undoubtedly, Kaplan continues to monopolise citations in articles published over the period 1992–2021, as can be seen in Figure 9(b).

**Figure 10**    Evolution of publications by year and by journal (see online version for colours)
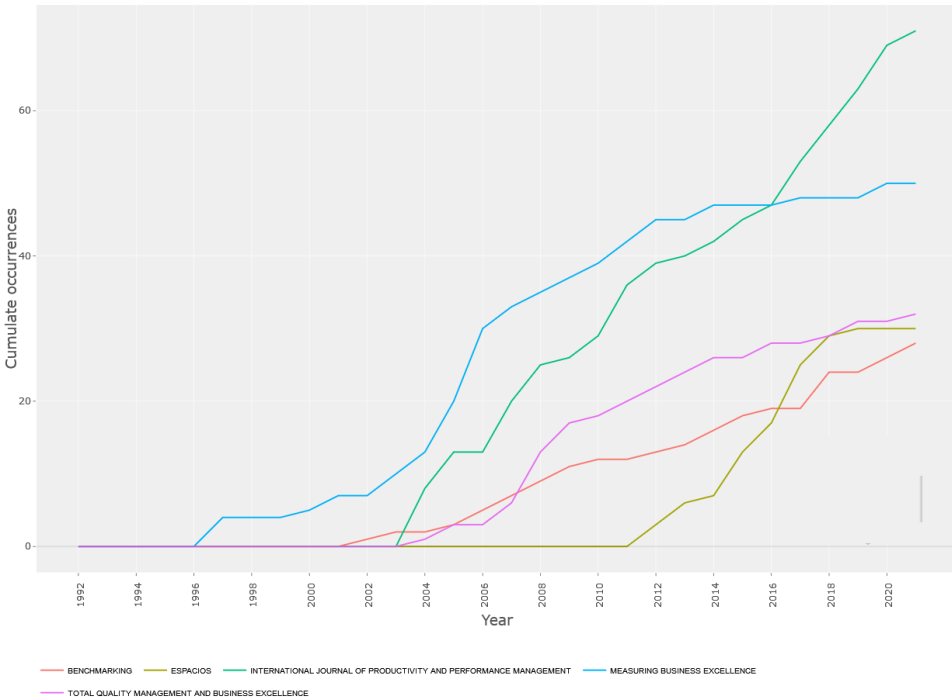


Source:    Authors' own research

As can be seen in Figure 10, which shows the number of publications per year and per newspaper between 1992 and 2021, the number of publications in the *International Journal of Productivity and Performance Management* has experienced a considerable increase, especially from 2016. As for the other journals and scientific journals, developments have been positive over the period under review, but not as significant as that which occurred for the *International Journal of Productivity and Performance Management*.

In Table 7, we justify the decision to include the year 2021 in our analysis, since it shows incisively the evolutionary trend of the number of scientific publications carried out until October and which are already quite revealing of the quality and quantity produced so far, out of a total of 467 articles.

**Table 7** Number of articles in scientific publications in the year 2021 (until October)

| Sources | Articles |
|---|---|
| *International Journal of Productivity and Performance Management* | 71 |
| *Measuring Business Excellence* | 50 |
| *Total Quality Management and Business Excellence* | 32 |
| *Espacios* | 30 |
| *Benchmarking* | 28 |
| *Journal of Corporate Accounting And Finance* | 25 |
| *Management Accounting Research* | 24 |
| *International Journal of Business Performance Management* | 20 |
| *Journal of Cleaner Production* | 20 |
| *Management Decision* | 20 |
| *Managerial Auditing Journal* | 18 |
| *Journal of Accounting and Organizational Change* | 17 |
| *Journal of Intellectual Capital* | 17 |
| *Production Planning and Control* | 16 |
| *Industrial Management and Data Systems* | 14 |
| *Quality – Access To Success* | 14 |
| *International Journal of Health Care Quality Assurance* | 13 |
| *International Journal of Production Economics* | 13 |
| *Strategic Direction* | 13 |
| *Accounting Organizations and Society* | 12 |
| *Total* | 467 |

*Source:* Authors' own research

## 4.3 *Bibliometric analysis*

One functionality of R. Bibliometrix, network analysis, is fundamental in bibliometric studies (Jalal, 2019) using algorithmic connections associated with the various attributes of the data, allowing a co-citation analysis to be performed (Aria and Cuccurullo, 2017). Networks are essential in highlighting some significant properties of the theme under analysis, namely authors and keywords related to each other.

The collected data was downloaded in the BibTeX format of the Clarivate Analytics WoS. Next, the program RStudio, version 1.2.5042 eliminated the duplicates found and created the database that culminated in the 1,768 articles.

In this approach, we found that some authors tend to emerge as correlated with each other, constituting clusters that are no more than grouped sets of author names associated with BSC publications. Figure 11 represents this correlation that is made from a factor analysis that aims to create a map through multiple correspondence analysis (MCA).

**Figure 11**   Conceptual structure based on correlation between authors (n = 1,768 articles)
(see online version for colours)
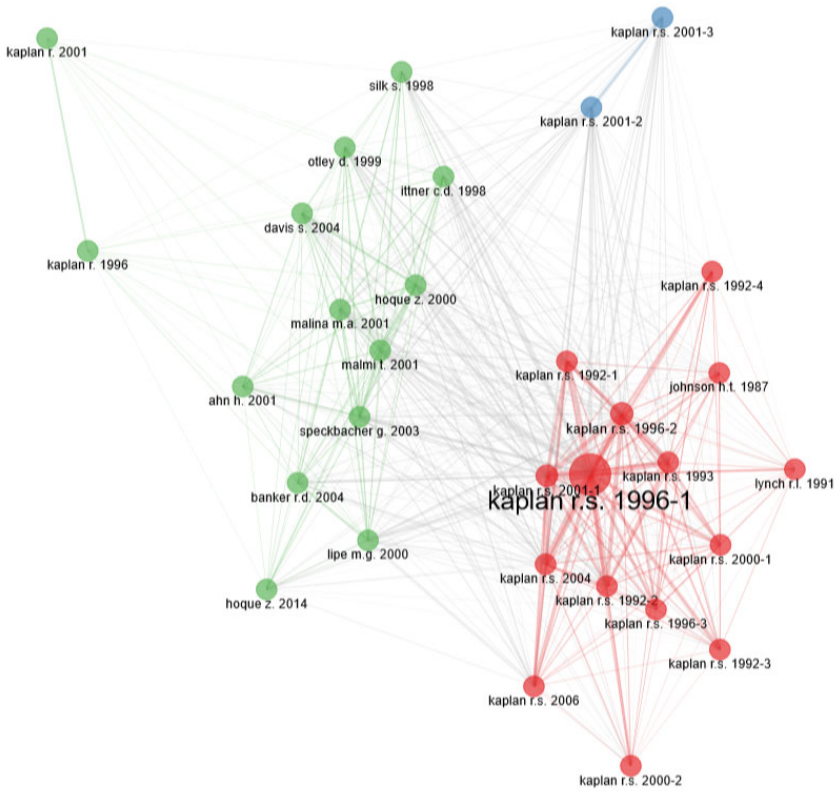


*Source:*   Authors' own research

It can be inferred from Figure 11 that the publication is indicated by a circle with reference to the last name of the first author and its year of publication. Publications appear aggregated in clusters based on their relationship in terms of citations, i.e., publications that are correlated based on direct and indirect citations, and which are therefore closer to each other. The lines between publications indicate the relationships between citations, that is, in which the publication that cites it is located below the cited publication. The lines with a darker tone represent the relationships of direct citations, while the lines with a lighter hue represent the relationships of indirect citations.

In a way, through the network we can see three clusters, red, green and blue. The red cluster highlights the first phase of the BSC which consisted of a performance measurement system and this is an example of the studies conducted mostly by Kaplan and Norton in the 1990s and early 2000s; The blue cluster, the smallest of the three, highlights the phase in which the BSC is seen as a management system focused on strategy and the green cluster highlights the BSC as an integrated strategic management system with some of the most relevant authors such as Hoque, Na and Na and Lueg at the forefront of the most recent publications on the subject under analysis (Figure 14).

In order to fully perceive the network of correlations that are established at the level of scientific collaboration between some of the most cited publications, authors and

keywords most used in this study, we built a Sankey diagram (Figure 12). The Sankey diagram allows you to visualise the most relevant authors, topics and most cited international scientific publications. The representation of this information in chart form streamlines and clarifies the interactions between the three elements. The larger the size of the coloured rectangles, the greater the importance of the publication, keyword, or author. The lines, or links, which connect publications to authors and keywords, are thicker or less thick depending on the number of links.

**Figure 12** Sankey diagram (see online version for colours)
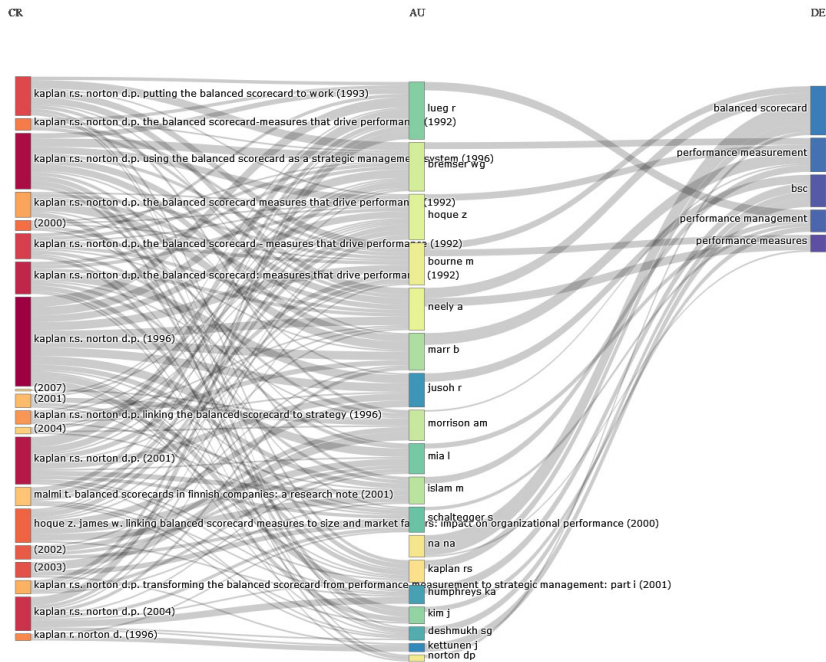


*Source:* Authors' own research

From the diagram, it can be ascertained that the most cited articles are by Kaplan, namely the "Putting the balanced scorecard to work", "Using the balanced scorecard as a strategic management system" and other publications by Kaplan and Norton. The most commonly used keyword is BSC with 1,002 occurrences, followed by performance measurement with 183 occurrences (Figure 13) and the most relevant authors are Kaplan, Na Na, Norton, Bourne and Neely (Figure 14).

Finally, in Figure 15 the production performed by the most relevant authors throughout the period under analysis is visualised, highlighting the time horizons (blue circles) in which each of them published and was most often cited by other scholars.

We also found that some authors persist throughout the period under analysis with regular publications, namely Kaplan, Norton, Na Na, Brewser, Bourne, Hoque, Schaltegger and Neely. In 2021, Lueg, Na Na and Hoque stand out with production already carried out in the context of the BSC.

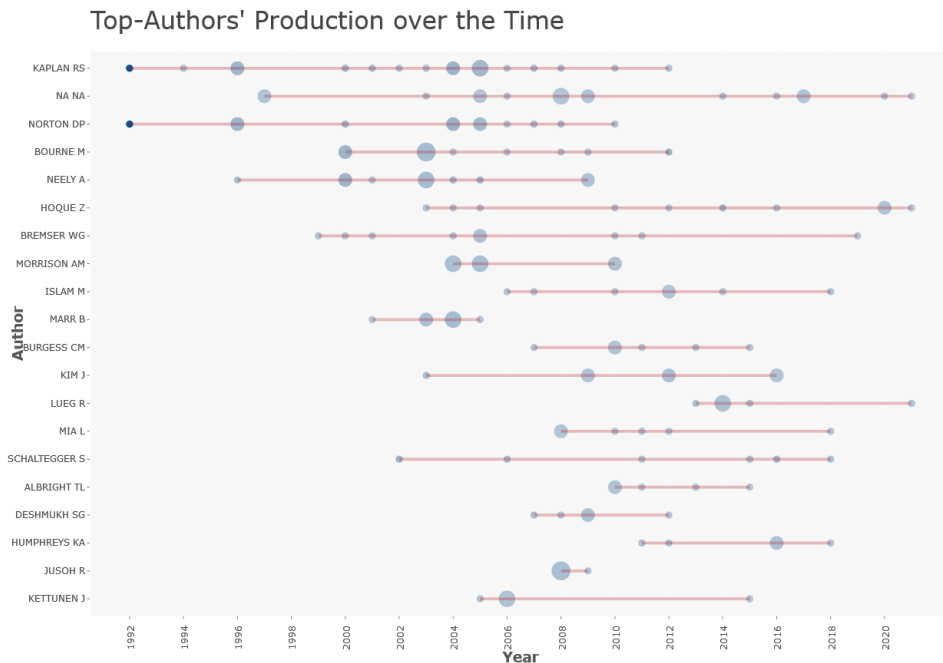**Figure 13**    Most relevant keywords (see online version for colours)
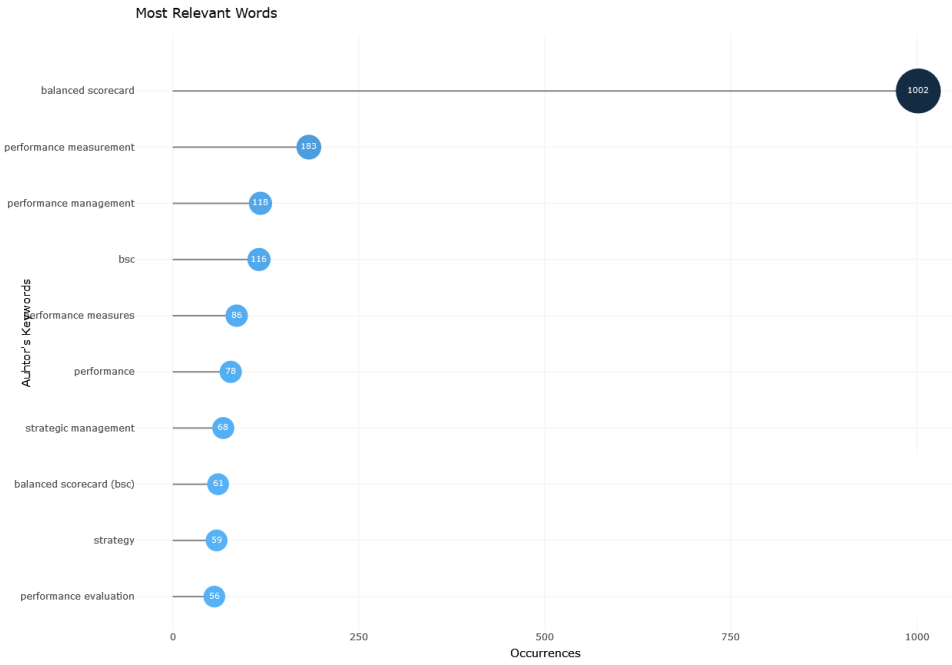


*Source:*    Authors' own research

**Figure 14**    Most relevant authors (see online version for colours)
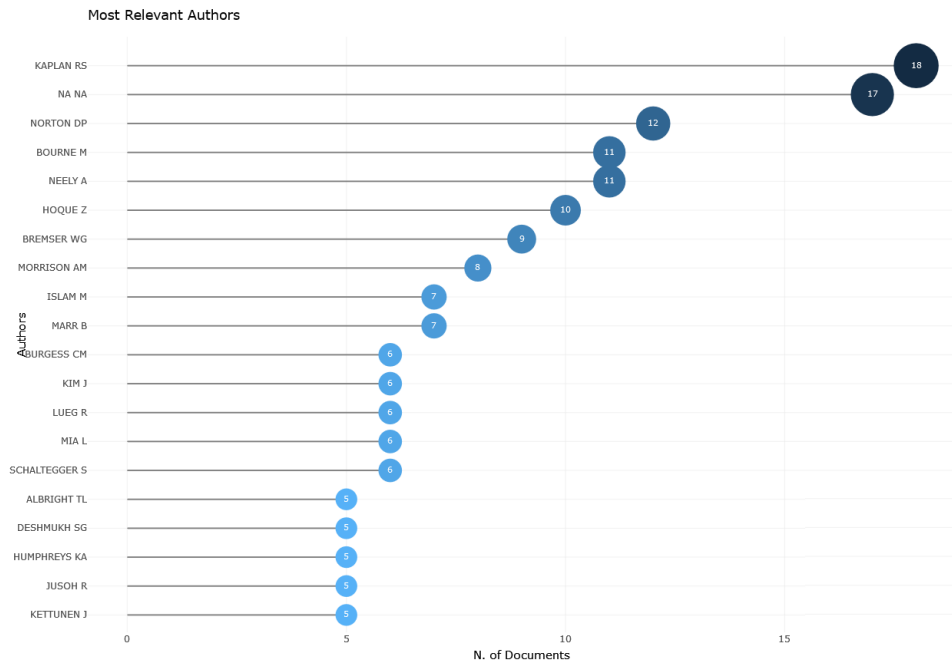


*Source:*    Authors' own research

**Figure 15** Top-authors' production over time (1992-2021) (see online version for colours)



Top-Authors' Production over the Time

*Source:* Authors' own research

## 4.4 Analysis of the most relevant production

The most diverse scientific production works are related to the BSC from the perspective of social, environmental and governance and also use management theories, such as resource-based vision (RBV), agency theory, transaction cost theory and contingency theory, to enhance BSC functionality. There is a very strong qualitative component in the articles published using single and multiple case studies, which culminate in the adaptation of the BSC to new visions and new concepts such as big data. The construction of new perspectives/dimensions in the BSC has also been one of the components addressed in the articles. Many publications continue to persist with a purely theoretical approach without any applicability or contribution to future investigations.

## 4.5 Research paradigms

In the light of the Hopper and Powell taxonomy (1985), there are three types of research in the area of strategic management accounting/management control, namely mainstream, the interpretive paradigm and the critical paradigm. The positivist line of thought is the one that predominates in management accounting articles (Chua, 1986; Hopper and Powell, 1985; Modell et al., 2007; Ryan et al., 2002) and gives precedence to quantitative data and the generalisation of results (Chua, 1986; Ryan et al., 2002). This line infers that management accounting practices are based on cause-and-effect relationships and resources are used effectively in dynamic and competitive contexts (Simões and Rodrigues, 2012).

In opposition to the positive paradigm, the interpretative perspective understands management accounting as a socially constructed phenomenon (Covaleski et al., 1996; Ryan et al., 2002). Wickramasinghe and Alawattage (2007) state that this perspective leads to management accounting being the result of meanings and perceptions. This type of research uses qualitative methods, in which the researcher has no interest in obtaining truths, but data that reflect the various interpretations, because reality is a construction made from the observations of the participants (Silva and Silva, 2013).

Research in areas related to strategic management accounting, of which the BSC is part, employs several theoretical approaches and research methods (Luft and Shields, 2003). As Major (2008) states, research in this area is more aligned with the positivist aspect (quantitative studies) and less with the interpretative aspect (qualitative studies).

However, there has been a considerable increase in publications with qualitative research (Luft and Shields, 2003), as this can contribute to the understanding of accounting and management systems (Lukka and Kasanen, 1995; Parker, 2012).

The adoption of any of these currents or research paradigms in the BSC area reinforces the robustness and quality of scientific publications, whether eminently theoretical or more directed to practice (Hopper and Powell, 1985).

## 5    Final considerations

The study carried out using the detailed bibliometric techniques of scientific production analysis allowed us to ascertain the profile of scientific production based on WoS articles between 1992 and 2021, namely the most cited and relevant publications, keywords and networks of correlations that are established at the level of the most cited and relevant authors in the literature on BSC and its impact on the scientific community. The growing number of publications in the area reveals how interesting the theme is and that it captivates increasing numbers of researchers to understand the concept and its applicability to areas as distinct as are public sector entities, SMEs and private entities in general. Kaplan and Norton continue to be the most relevant authors and also the most cited over 30 years of the BSC. We found that there is a relationship between the BSC and performance due to the considerable number of publications in journals related to the strategy, particularly the *International Journal of Productivity and Performance Management*, *Measuring Business Excellence* and *Benchmarking.*

The years 2008, 2010, 2017 and 2020 exceeded 100 annual publications, with the most explored topics establishing the relationship between the BSC and performance, strategy, performance metrics, performance assessment, performance management and strategic management, denoting a growing interest in the BSC as an instrument that can enhance value creation and improved outcomes.

Using a systematisation of the literature through a set of figures, tables and diagrams, the mapping present in this study supports future investigations through the identification of the subthemes that have been of the greatest interest in the scientific community, namely the relationship between the BSC and performance, performance evaluation metrics and the interconnection with strategy, as seen in Figure 13. That is, value creation, financial performance and the concern with improving the links between the BSC and business strategy are areas which are increasingly addressed in scientific articles. The period analysed, between 1992 and 2021, is also a positive element of our study because it considers the beginnings of Kaplan and Norton's concept, which is not

very common in bibliometric studies conducted by other researchers, going through almost three decades of existence and remaining as current a theme as it was 30 years ago and continuing to engender discussion among researchers. On the other hand, the dissemination of the profile of scientific production could help the academy in the most explored subthemes and future trends of research and also contribute to reducing the gap between academia and organisations by providing information on the level of use of the BSC in terms of application to organisations and how they can use it to their advantage.

This study has some limitations since the empirical analysis was limited to the WoS database, although it is one of the most recognised by both the academic and scientific communities. We suggest applying this approach to other databases, for example, Scopus, and adding this information to that WoS to be analysed through R. Bibliometrix and contribute to a greater knowledge of the subject. We could have analysed the type of methodology adopted by the authors in the published articles in greater depth and also obtained information about publications that narrated successful BSC implementation practices in the business environment or other public organisations, for example.

This study aims to contribute to future lines of research and to highlight gaps that can be addressed in new scientific production, in particular by pointing out new research strategies for future studies. More specifically, from our point of view, as a contribution to future investigations, we understand that the combination of the BSC with big data algorithms is a current and emerging theme that may arouse interest among the scientific community, as there is insufficient evidence in the literature and it is a field of research that lacks in-depth study. We suggest that in future studies there should be an extension of the keywords to include big data. The exploration of new areas of knowledge by the BSC could contribute to a greater theoretical and practical knowledge of the symbiosis between two such interesting themes as the BSC and Big Data.

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