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Paper Title	Author(s)	Guide Page	Page No.
HOT-fit Evaluation Framework: Validation Using Case Studies and Qualitative Systematic Review in Health Information Systems Evaluation Adoption	<i>Maryati Mohd Yusof</i>	32	359
Remembering and Recalling: The ERP System as an Organizational Memory	<i>Gunilla Myreteg</i>	33	366
Environmental Scanning Practice of Enterprise 50: Small Medium Enterprise (E50 SMEs) in Malaysia	<i>Roslina Othman and Siti Rohimi Hamedon</i>	34	373
Understanding Financial and non-Financial Information to Assess Listed Johannesburg Stock Exchange (JSE) Companies' Performances	<i>Elmarie Papageorgiou and Herman de Bruyn</i>	34	383
Designing a Model for Evaluating the Information Technology Level in Organizations by Fuzzy TOPSIS	<i>Shabnam Pasandide, Abbas Toloie Eshlaghi, and Reza Radfar</i>	35	394
Can eGovernment Systems Bridge the Digital Divide?	<i>Elias Pimenidis, Lazaros Iliadis, and Christos Georgiadis</i>	36	403
Contributions to the Measurement and Management of Intellectual Capital – an Accounting Perspective	<i>Rui Alexandre Pires and Maria do Céu Gaspar Alves</i>	37	411
Executive Information Systems (EIS) Implementation for Education Management – a Conceptual Framework	<i>Rozilawati Razali and Mahamsiatus Kamaruddin</i>	38	420
The ISD Process as a Live Routine	<i>David Sammon, Tadhg Nagle and John McAvoy</i>	39	428
Using Geographic Information to Assess Urban Environmental Indicators in the City of Lisbon	<i>Teresa Santos, Sérgio Freire and José António Tenedório</i>	39	436

Contributions to the Measurement and Management of Intellectual Capital – an Accounting Perspective

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Abstract: intellectual capital (IC) represents a set of strategic assets, with an intangible nature, which contributes to the creation of competitive advantages and sustainable value, and therefore should be identified, measured, managed and published by organizations. The research carried out has shown the importance of IC for a sustainable success of an organization but also the paucity and the poverty of means to measure IC and to efficiently manage these important resources. The paper reviews the theoretical and empirical IC literature and has as main purpose to obtain an enhanced understanding of the contributions of management control and accounting systems for IC measurement and management, and particularly about the relationship between strategic management accounting practices (SMAP) and IC. Thus, specific objectives of this study are: addressing the definition of intellectual capital, identifying the main components of IC; understanding the role of management control and accounting in the measurement and management of IC and, addressing the relationship between IC and SMAP. The literature review was done using different sources. First, we used the ProQuest search keys on “Intellectual capital”, “Intangible assets” and “Strategic management accounting practices”. Then a manual search was done covering some of the major journals in the field. Next, we searched the sites FASB and IASB concerning statements and reporting relative to IC. Finally, we conducted a world-wide web search. In the particular case of SMAP it is visible that they enable the identification and management of some IC resources as the ability of innovation, production structures (with e.g. target costing), management of quality systems (with e.g. quality costing) and relationships with suppliers and customers (with e.g. the value chain costing).

Keywords: intellectual capital; human capital; structural capital; relational capital; management control and accounting; strategic management accounting practices

1. Introduction

The organizational environment has recently suffered several changes. Among them are the globalization of business, the increased physical mobility (people and products) and financial (capital), the continuous innovation, the increased competition, the increased customer demands and sophistication of information technologies and communication (Haldma and Lääts, 2002; Bukh *et al.* 2005; Löfsten and Lindelöf, 2005; Cuganesan *et al.*, 2007, Tayles *et al.*, 2007; Ferreira, 2008).

These changes have forced organizations to constantly change and adapt to their surroundings in order to maintain competitive positions. To this purpose, they have turned to new sources of value creation, including research and development, innovation, competence and employees skills, information technology, development of processes based on knowledge and the ability to attract and retain business partners (Cañibano *et al.*, 2000; Starovic and Marr, 2003; Zambon, 2003, RICARDIS, 2006; García-Meca and Martinez, 2007).

For while the traditional competitive advantages result from the collection and use of tangible resources, such as long-term heavy machinery, competitive advantages are now associated with intangible assets based on knowledge (Bontis, 2001; Widener, 2006; Cuganesan *et al.*, 2007; Marr, 2008).

In the literature these resources based on knowledge, and of an intangible nature, are recognized by the name of intellectual capital (IC) (Starovic and Marr, 2003; Abeysekera and Guthrie, 2005; Abeysekera, 2006; Jørgensen, 2006; Beattie and Thomson, 2007; Tan *et al.*, 2008; Cleary, 2009; Kasztler and Leitner, 2009). Thus, the term IC is the set of strategic resources such as knowledge, information, know-how, intellectual property, reputation of products and organization, and relations with business partners that contribute to the achievement of competitive advantages and to create sustainable value (Bukh *et al.*, 2005; Cuganesan *et al.*, 2007). Or, more simplistically, the IC represents all of the intangible assets of an organization (Cleary, 2009).

Several authors (Zambon, 2003; Abeysekera, 2006; Marr, 2008) therefore consider that the IC has become increasingly important for organizations since it represents the set of resources essential to achieve strategic competitive advantages and thus determinant in the creation of value and in the success of organizations. "Success and value creation of any organization in today's economy is driven by intellectual capital" (Marr, 2008:29). It is therefore essential to identify, measure, manage, recognize and report IC. Since traditional accounting systems fail to recognize it (they just recognize some intangibles in the balance, so the book value of an organization tends to be different from its market value) (Cañibano *et al.*, 2000; Cuganesan *et al.*, 2007; Abeysekera, 2008), it is the MCA function to contribute to the identification, measurement, reporting and management of resources that constitute the IC (MERITUM, 2001; Daum, 2003; Marr, 2008).

It is especially strategic management accounting role to analyze aspects related to the IC, since it mainly aims at providing information to support strategic decisions that enhance the achievement of competitive advantages, and these features contribute to this end (Tayles *et al.*, 2002; Abeysekera, 2006; Beattie and Thomson, 2007). However, there is little literature that relates MCA to the IC or to intangibles (Tayles *et al.*, 2007). And "although IC and the measurement of IC by organizations has been an emerging area of substantial research interest, research efforts to date have led to mixed and inconclusive outcomes" (Shang and Lin, 2010:15)

In this context, the main objective of this study is to understand in general terms, the contributions of accounting and management control for measuring and managing IC, and specifically to identify the relationships between IC and SMAP. Thus, the specific objectives of this study are: addressing the definition of IC, identifying the main components of IC, understand the role of MCA in the measurement and management of IC and, addressing the relationship between IC and SMAP.

Nowadays IC resources are crucial and "it is a critical part in IC management to identify the required resources and select a suitable strategy to reduce resource gaps in response to the complicated and changing environment" (Shang and Lin, 2010:16). Thus, while studying the relationship between MCA and IC, our study makes a contribution to the existing knowledge by offering some insights about how to make IC measurable through SMAP. In addition, the analysis of the relationship between SMAP and IC resources has novelty nature and contributes to a better strategic management of IC.

Given the proposed objectives, this work is structured as follows: section 2 deals with the definition of IC and some models of IC measurement are discussed. The third section highlights the importance of MCA for the measurement and management of IC and the key tools identified in the literature as useful for measuring and managing IC. In the following section a connection is established between IC and SMAP. Finally, in section 5, we present the main findings, the limitations of the study and some suggestions for future research.

2. Intellectual capital

According to Bontis (2001) the first use of the term "Intellectual Capital" is attributed to John Kenneth Galbraith, who in a letter to the economist Michael Kalecki in 1969 wrote: "*I wonder if you realize how much those of us in the world around have owed to the intellectual capital you have provided over these past decades.*"

In general, the IC is recognized in the literature as a set of key resources for achieving competitive advantage and value creation in an era of globalization, constant technological changes and processes based on knowledge (Widener, 2006; García-Mecca and Martinez, 2007). These strategic resources, intangible in nature are related to people and can be more or less dependent on them (RICARDIS, 2006). However there are various definitions of IC contained in many studies, and there is a lack of a standard definition of IC (Chong, 2008). In this context, and to understand with some precision what constitutes IC, in this section, the definition and components of IC are discussed.

2.1 Definition of intellectual capital

The term IC is used in literature to represent a set of strategic assets, based on knowledge, with an intangible nature, (Abeysekera and Guthrie, 2005; Bukh *et al.*, 2005; Abeysekera, 2006; Jørgensen, 2006; RICARDIS, 2006; Ferreira, 2008; Tan *et al.*, 2008; Cleary, 2009; Kasztler e Leitner, 2009). "Together with physical and financial capital, intellectual capital is one of the three vital resources of

organizations" (Marr, 2008:5). However, there is still no consensus on IC concept (Starovic and Marr, 2003; Tayles *et al.*, 2007; Abeysekera, 2008).

The project MERITUM (2001) considers that IC represents all kinds of intangible assets either formally owned or used or informally established and mobilized. According to this project, the organization's IC is more than the sum of human, structural and relational resources; IC is also about how these resources are used together to create value (Marr, 2008). Thus, this definition considers some important aspects. First and foremost IC consists of intangible assets (nonphysical). Additionally, IC resources do not have to be owned by the organization, being enough that they are used by it. For example, the human resources who are working for the company are not its property (Bontis, 2001). Finally, the definition presented in the project MERITUM (2001) establishes that IC is composed by three groups of resources (human, structural and relational) and argues that beyond the individual functioning of resources it is important that they operate as a whole (to the extent that the whole is worth more than the sum of its parts) (Marr, 2008).

Based on MERITUM (2001), the project RICARDIS (2006) defines IC as the combination of human, organizational and relational resources, including intangible activities of an organization (Bontis, 2001). It is here assumed that the IC includes the knowledge, competences, experience and employees skills (human resources); the research and development activities, routines, procedures, the organization's systems and databases and intellectual property rights (activities and organizational resources); and resources related to external relations with customers, suppliers and partners in research and development (relational resources). It follows that the combination of intangible resources and activities allows an organization to transform a set of material, financial and human resources into a system capable of creating value for stakeholders (Bontis, 2001; Marr, 2008). It can be achieved when an adequate connection of the resources is established through appropriate intangible activities (MERITUM, 2002). In the project RICARDIS (2006) it is considered that for the intangibles to be considered part of the IC of an organization they have to be internalized in a lasting and efficient way and/or appropriated by the organization. This definition, which is a little more extensive than those presented in other studies, considers that the IC consists of several components (as will be outlined in the next section), and presents a set of illustrative examples of the IC. In addition, while analyzing this definition it appears that the IC is only part of the intangibles, as it indicates that only the intangibles that are internalized and/or appropriated by an organization belong to the IC.

Other authors (Bukh *et al.*, 2005; Cuganesan *et al.*, 2007) present more specific definitions. However, these definitions, based on illustrative examples, have the disadvantage of not covering all resources that can be part of the IC. Bukh *et al.* (2005), for example, define IC as knowledge resources in the form of employees, customers, processes or technology that an organization can mobilize in its processes in order to create value.

There is a diversity of IC definitions and the only common aspect in the definition of IC is related to the fact that the resources allow the creation of value and that the benefits are not extinguished in a given time (Abeysekera, 2006). In fact, these resources of strategic nature when identified and properly managed enable the acquisition of competitive advantages and a sustainable creation of value (Ferreira, 2008). Beattie and Thomson (2007) even consider that IC is now recognized as a resource that contributes most to the market value of the organizations operating in industries based on knowledge.

Apart from the lack of a consensus definition for IC, the terms "IC" and "intangibles" are still used in the literature, quite often, in an indifferent form (Beattie and Thomson, 2007). This may occur because the IC is studied in various fields of knowledge such as accounting, strategic management, and human resources management, among others (Starovic and Marr, 2003).

Thus, while in accounting research the term "intangibles" is generally used (MERITUM, 2001) in management research the term "IC" is more used. In this sense, Beattie and Thomson (2007) consider that the definitions of intangibles made by traditional accounting are limited as they only include items such as intellectual property and patents, which are recognized in the balance. So, the traditional concept of "intangible asset" refers to the set of intangibles or IC elements that may be recognized as assets in the current model of standard accounting (Starovic and Marr, 2003).

Therefore, intangibles such as relationships with customers or employees skills are excluded since these are resources that can't be controlled by the company in an accounting sense (Marr, 2008).

In this context, Beattie and Thomson (2007) argue the need for a thorough debate in order to standardize the definition of IC, which will build a more coherent body of theory (Abeysekera, 2006, 2008). In a way, Kristandl and Bontis (2007) have already initiated this debate by building a common definition for IC and intangibles (using the definitions of studies in which intangibles and IC are used as synonyms), using the approach based on resources.

As for the components of the IC it seems that there is a broad consensus about the existence of three main components (human capital, structural capital or internal, and external or relational capital) (Beattie and Thomson, 2007; Cuganesan *et al.*, 2007, Tayles *et al.*, 2007).

2.2 Intellectual capital measurement

Organizations try to create and recreate tools to measure the IC using for this purpose, several models of measurement. Some are more generic, since they are used by different organizations, and others are more specific and are designed for a particular sector or organization (Bontis, 2001; MERITUM, 2001; Starovic and Marr, 2003).

Accordingly, various models of IC measurement are reported and analyzed in the literature. Some more holistic and other more analytical, some money related and others not (Zambon, 2003). Among these instruments the Market-to-book Value, the Hidden Value, the Tobin's Q, the Economic Value Added (EVATM), the Balanced Scorecard, the Skandia Navigator, the IC-Index, the Technology Broker, the Intangible Asset Monitor, the Value Added Intellectual Coefficient, and the Value Chain Scoreboard stand out (Mouritsen, 1998; Starovic and Marr, 2003; Tan *et al.*, 2008). Measurement models such as the Market-to-Book Value, the Tobin's Q, EVATM and the Hidden Value are more holistic and money related, while the Balanced Scorecard, the Skandia Navigator, the Intangible Asset Monitor and the Value Chain Scoreboard are more analytical (atomistic) and non-monetary. The Technology Broker despite being an analytical model has monetary expression. The IC-Index, in turn, is a holistic model, non-monetary, and the Value Added Intellectual Coefficient is presented as a holistic model but with monetary and non-monetary expression (Zambon, 2003).

While the Balanced Scorecard, the Skandia Navigator, the IC-Index, the Intangible Asset Monitor and the Value Chain Scoreboard are instruments that use indicators (scoreboards) related to IC and provide an alternative view of performance, the EVATM and Value Added Intellectual Coefficient are related to the return on assets methods (ROA). Models such as the Market-to-Book Value, the Tobin's Q and the Hidden Value are related to the market capitalization methods and the Technology Broker, in turn, is a direct method of IC (Zambon, 2003; Ferreira, 2008).

Some studies (Mouritsen, 1998, Tayles *et al.*, 2007, Huang and Wang, 2008) analyze the use of these tools by organizations to measure and manage intangible assets. Interestingly, they conclude that tools developed for IC measurement are not always used in organizations with intensive IC and, sometimes, they do not respond adequately to the information needs (Huang and Wang, 2008). For example, Tayles *et al.* (2007) find that measures based on value, as for example EVATM, are strongly associated with high levels of IC, while instruments such as the Intangible Asset Monitor and the Skandia Navigator (specific models of performance evaluation which are considered useful for evaluating the intangible resources) are not correlated with the IC degree. The authors also believe that it is important to use financial and non financial measures to capture the influence of intangible resources on organizational performance. This view is also shared by Daum (2003) and Marr (2008), who warn that the selected measures should take into account the organizational strategy and the value creation system. Usually, the non financial measures are more commonly associated with intangible assets (Starovic and Marr, 2003) and financial measures are more associated with physical resources, although financial measures also appear associated with intangible assets (Widener, 2006).

But beyond the IC measurement, it is essential to make its management. The identification and IC measurement without their proper IC management makes no sense (MERITUM, 2001). So, possible contributions of MCA for the IC management and measurement will be examined in the next section.

3. Management control and accounting

The traditional accounting system does not consider information on IC (Zambon, 2003; Abeysekera and Guthrie, 2005; Widener, 2006; García-Meca and Martinez, 2007; Huang and Wang, 2008) nor shows in the balance sheet the value of various intangible assets (Cañibano *et al.*, 2000). This is because there are several problems related to identification, measurement and recognition of IC elements as human resources, innovation, customers and technology (Bontis, 2001; García-Meca *et al.*, 2005; Marr, 2008). For this reason, the traditional accounting does not comply, in the whole, the main aim of showing the true economic situation of an organization and financial statements lose some usefulness (Abeysekera, 2008; Huang and Wang, 2008). The restrictive accounting rules do not allow many of the intangibles to be recognized in financial statements, especially the internally generated intangibles (Starovic and Marr, 2003; Marr, 2008). Instead many of the costs associated with IC development are traced directly to costs and reflected in the income statement (Abeysekera, 2008).

In this sense, alternative forms are needed for the accounting treatment of IC resources (Cuganesan *et al.*, 2007). Especially since this is a set of resources that allows us to obtain competitive advantage and sustainable value, intangible assets must be properly identified, measured and managed (MERITUM, 2001; Tayles *et al.*, 2007). It is essential to make informed decisions, test and revise the organizational strategy, manage the risks associated with IC (Marr, 2008), to understand how value is created for proper allocation of resources, and provide information on IC value so that investors can evaluate the potential of organizations (Daum, 2003; Starovic and Marr, 2003). In this context, several authors (Johanson *et al.*, 2001; Mouritsen and Larsen, 2005; Widener, 2006, Tayles *et al.*, 2007) consider that for the identification, measurement and management of IC, management control and accounting (MCA) assumes a particular relevance. Tayles *et al.*, (2002) also consider that SMAP may have an essential role in providing IC information to support decision-making. For strategic decision-making purposes managers need information related to the strategic resources that contribute to the creation of competitive advantages and sustainable value. In order to contribute to this goal, Johanson *et al.*, (2001) and Mouritsen and Larsen (2005) find that the MCA system, sometimes through the adoption of SMAP, is adequate.

In this context, the next section establishes a connection between SMAP and IC, demonstrating the SMAP contribution to the identification and management of some resources that form the IC.

4. Strategic management accounting practices and intellectual capital

In developing its activities organizations use intangible assets that are essential to achieve its strategic objectives and to create sustainable value (Widener, 2006). It is therefore essential to identify, first, the strategic objectives of an organization and then the intangible resources and activities that affect these objectives, and finally to develop a set of monitoring activities and management (MERITUM, 2001; Marr, 2008). According to Marr (2008:4) *"identifying and managing the right intellectual capital is and will increasingly be the key differentiator between successful, mediocre, and failing enterprises"*. Since the monitoring of these activities and the strategic management of intangible assets that make up the IC is necessary to supply and use of financial and non financial information, related for example with customers and efficiency of operations (Bontis, 2001; Starovic and Marr, 2003), the question that arises is whether the SMAP contribute to the identification and IC management.

Tayles *et al.* (2002, 2007) consider that if the decision of having intensive IC is a strategic decision of an organization, the SMAP as tools to aid strategy can contribute to their management. This is because they can contribute to the provision of adequate information for the organizations to maintain or improve their resources and to carry out their activities in a suitable way.

According to Guilding *et al.* (2000) and Cadez and Guilding (2008), SMAP provide the information oriented to strategy, oriented to future and on the outside of the organization, also including the provision of financial and non financial information. These authors, taking into account the work of Guilding *et al.* (2000) and Cravens and Guilding (2001) identify 16 SMAP which are classified into five categories: costing, planning, control and performance measurement, strategic decision making, competitors' accounting, and customers' accounting.

The paper then presents in some detail SMAP (life cycle costing, quality costing, target costing, value chain costing, benchmarking, and competitor cost assessment, competitive position monitoring and customer profitability analysis) with the purpose to identify possible links between these practices and the resources that constitute the SMAP. Table 1 presents the SMAP identified and defined by Cadez and Guilding (2008) and the connection to some features of IC associated to them is established.

Table 1: Strategic management accounting practices and intellectual capital

Practice	Definition	IC Resources
Attribute costing	It costs the product attributes that are appealing to customers. These attributes that are the subject of costing include variables of the product performance, reliability, repairs during the product assurance period, reliability of supply and after sales service.	Customer's knowledge Customer's assistance Customer's satisfaction Trust in the organisation
Life cycle costing	It evaluates the costs based on the phases of the lifecycle of the product or service, which are the design, introduction, growth, maturity, decline and eventual abandonment.	Innovation Research and development Relationship with customer
Quality costing	It considers that quality costs are associated with the creation, identification, and prevention and remedying of faults.	Quality management and improvement Management systems Customer's satisfaction
Target costing	It is a practice used during the design process and product design, which involves the cost estimate for a target by subtracting the profit margin from the market price. Subsequently, the product is projected to the determined cost taking into account the costs of engineering and marketing.	Capacity to innovate Structure and production processes Organizational flexibility Product functionality Customer's satisfaction Marketing capacity
Value chain costing	It defines the allocation of costs for activities necessary to create, acquire, produce, sell and provide services in respect of a product or service.	Innovation Research and development Relationship with suppliers and customers Competitiveness
Benchmarking	It consists of a continuous and systematic process of comparing products, services and processes in order to identify best practices that lead to superior performance.	Functionality and product quality Internal processes Customer's satisfaction
Integrated performance measurement	Evaluation system of the performance usually focused on acquiring performance knowledge related to the requirements of customers, possibly including non financial measures. This system involves the monitoring of the critical factors to ensure customer satisfaction.	Customer's knowledge Customer's satisfaction
Strategic costing	It uses data related costs based on strategic and marketing to identify and develop strategies that enhance the achievement of sustainable competitive advantages.	Strategy Management capacities Capacities and marketing activities
Strategic pricing	It is the analysis of strategic factors in the process of setting prices. These factors include the reaction of competitors to price, elasticity, market growth, and economies of scale and experience.	Market intensity Competition in the market Experience of the organisation
Brand valuation	It consists of the financial valuation of the brand through the assessment of its strengths such as leadership, stability, market, internationalization, and support trend, combined with historical results of the brand.	Brands Market leadership Systems of information (historical results)
Competitor cost	It consists in providing regular estimates of the costs	Capacity to develop estimates

assessment	of competitors in order to permit know competitors investments, cost structure, and contribute to a more efficient competition.	Management capacity Competitiveness
Practice	Definition	IC Resources
Competitive position monitoring	It analyzes the positions of competitors in the business sector through evaluation and monitoring of sales trends of competitors, market share, sales volume and costs, unit costs and return on sales. The information provided by this practice can serve as a basis for evaluating the marketing strategy of a competitor.	Relationships with the competitors Strategy Research and development Patent Image and reputation
Competitor performance appraisal	It consists in the analysis of statements published by a competitor as part of the evaluation of the main sources of competitive advantages that belong to that competitor.	Competitor's knowledge
Customer profitability analysis	It consists in the analysis of sales and costs that can be assigned to a specific customer in order to determine the outcome by customer.	Customer's knowledge Relationships with customers Marketing activities
Lifetime customer profitability analysis	It considers the extension of the timeframe in the analysis of results by customers in order to foresee the following years. This practice therefore turns on the set of future revenue flows and costs involved in maintaining a specific client.	Capacity to develop estimates Customer's knowledge
Valuation of customers as assets	It consists in determining the value of customers for the company. To determine this value we can, for instance, calculate the present value of future income flows accredited to a specific customer.	Customer's knowledge Market knowledge

5. Final remarks

Organizations today face new challenges related to globalization of businesses, increased competitiveness, and constant innovation, adoption of new technologies, increased customer demands and networking. In this context and in order to maintain its competitive position they have to tap into new sources of value creation, since the traditional sources of value related to tangible assets have lost some importance.

The knowledge resources of intangible nature, within such circumstances are strategic assets that enable organizations to meet new challenges. These knowledge resources are recognized in the literature as IC and/or intangible. Through the analysis of some definitions it is proved that there is still no consensus as to what represents the IC. However, the authors agree that the resources that are part of the IC contribute to the achievement of competitive advantages and to create sustainable value. In literature there is also some consensus on the division of IC into three components: human IC, structural IC and relational IC.

Regarding the contributions of accounting and management control for IC measurement and management, it appears that the main usefulness of these systems relates to the provision of information about resources that are part of the IC to enable its management and exploitation to achieve competitive advantages and the creation of sustainable value. In this context, several tools are used to identify, measure, manage and report IC. In the particular case of SMAP, as practice oriented to strategy, the study suggests that these practices contribute to the identification and management of some intangible assets such as innovation, research and development, production processes, management tools, customer satisfaction and analysis of relationships with customers, competitors and suppliers.

Nowadays, it is a critical part in IC management to identify the required resources and select a suitable strategy to reduce resource gaps, thus, by studying the relationship between SMAP and IC

resources, this study makes a contribution to the existing knowledge, has novelty nature and, contributes to a better strategic management of IC. This paper also extends previous literature by using a different approach in the study of IC.

For the completion of this work it matters to draw attention to some limitations that should be taken into consideration. The main limitation is related to the limited review carried out, since all works of literature review and empirical studies were not thoroughly analyzed. Moreover the analyzed studies were not collected systematically over a period of time and there is the probability that some major work might have been left out.

In this sense, this work results in some clues to future developments. The first task to be done is related to a deeper literature review that encompasses a set of reference journals in the accounting field, within a limited period of time, and that allows a relationship between the SMAP and IC. Another future development is linked to the achievement of an exploratory study, through case studies, allowing the identification of the intangible assets that are related and can be identified and managed, by different practices identified in the strategic management accounting literature by Cadez and Guilding (2008). That said, a third development relates to the realization of a quantitative study, data collection through questionnaire, which permits the establishment of wider relations between the different SMAP and the resources that are part of IC.

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