INFLUENCE OF MANAGEMENT CONTROL SYSTEM INFORMATION ON KNOWLEDGE CONVERSION SKILLS

Silvana Mannes [1]
Ilse Maria Beuren [2]

ABSTRACT

This study analyzes the influence of the use of information from management control systems on knowledge conversion skills, mediated by organizational slack. For this, a survey was conducted in companies benefiting from The Good Law, Law No. 11,196, of November 21, 2005, in the base year of 2015, and was attended by 123 managers of these companies. This law grants exemptions to companies focused on research and development of technological innovation. To test the hypotheses, the structural equation modeling technique was applied. The results revealed that the score keeping use positively influences organizational slack and knowledge conversion skills, while the comprehensive use positively influences only organizational slack. They also revealed that organizational slack mediates the relationship between comprehensive use and knowledge conversion skills. In contrast, no significance was found when inserting the mediating variable between score keeping use and knowledge conversion skills. This suggests the complementarity of MCS and a dual role in directing organizational objectives and strategies and monitoring the achievement of goals. It contributes to the conflicting results observed in the literature, presenting new implications in the use of MCS and in the effects of slack to facilitate knowledge creation. The findings can also guide companies in sustaining their business with the knowledge creation within the scope of the work, defining policies for the formation of organizational slack at an adequate level, and directing the use of information from the MCS to their strategies.

Keywords: Management control systems; Knowledge conversion skills; Organizational slack.

[1] Mestranda do Programa de Pós-Graduação em Contabilidade da Universidade Federal de Santa Catarina – UFSC. Endereço: Universidade Federal de Santa Catarina, Campus Reitor João David Ferreira Lima, s/n, Bairro Trindade. CEP 88040-900 – Florianópolis, SC – Brasil. E-mail: silvanamannes@yahoo.com.br. Telefone: 55(48)3721-3891.
https://orcid.org/0000-0002-7608-1519

[2] Doutora em Controladoria e Contabilidade pela FEA/USP. Professora do Programa de Pós-Graduação em Contabilidade da Universidade Federal de Santa Catarina – UFSC. Endereço: Universidade Federal de Santa Catarina, Campus Reitor João David Ferreira Lima, s/n, Bairro Trindade. CEP 88040-970 – Florianópolis, SC – Brasil. E-mail: ilse.beuren@gmail.com. Telefone: 55(48)3721-3891.
https://orcid.org/0000-0003-4007-6408

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1

INFLUÊNCIA DO USO DE INFORMAÇÕES DOS SISTEMAS DE CONTROLE GERENCIAL NAS HABILIDADES DE CONVERSÃO DE CONHECIMENTO

RESUMO

Este estudo analisa a influência do uso de informações dos sistemas de controle gerencial nas habilidades de conversão de conhecimento, mediada pela folga organizacional. Para isso, uma *survey* foi realizada em empresas beneficiadas pela Lei do Bem, Lei nº 11.196, de 21 de novembro de 2005, no ano-base de 2015, e contou com a participação de 123 gestores dessas empresas. Essa lei concede isenções para empresas voltadas à pesquisa e desenvolvimento de inovação tecnológica. Para o teste das hipóteses, aplicou-se a técnica de modelagem de equações estruturais. Os resultados revelaram que o uso *score keeping* influencia positivamente a folga organizacional e as habilidades de conversão de conhecimento, enquanto que o uso abrangente influencia positivamente apenas a folga organizacional. Revelaram ainda que a folga organizacional medeia a relação entre uso abrangente e habilidades de conversão de conhecimento, enquanto que entre uso *score keeping* e habilidades de conversão de conhecimento não se encontrou significância ao inserir a variável mediadora. Isso sugere complementariedade dos SCG e um duplo papel no direcionamento dos objetivos e estratégias organizacionais e no monitoramento do alcance das metas. Contribui-se com os resultados conflitantes observados na literatura, apresentando novas implicações no uso dos SCG e nos efeitos da folga para facilitar a criação de conhecimento. Os achados também podem orientar as empresas na sustentação de seu negócio com a criação de conhecimento no âmbito do trabalho, definindo políticas de formação da folga organizacional em nível adequado e direcionar o uso das informações dos SCG para as suas estratégias.

Palavras-chave: Sistemas de controle gerencial; Habilidades de conversão de conhecimento; Folga organizacional.

1 INTRODUÇÃO

Management Control Systems (MCS) can be understood as mechanisms used according to the organization's objectives (Malmi & Brown, 2008). The information provided by the MCS represents a vital control mechanism in organizations. It can be analyzed in two dimensions, design and use (Ferreira & Otley, 2006), impacting organizational performance (Guenther & Heinicke, 2019). Vandenbosh (1999) points out that managerial information contributes to identifying and solving problems, assisting in monitoring performance, and keeping managers updated (Vandenbosch, 1999).

Among the various approaches to using MCS information in the literature, a widely disseminated is that of Vandenbosch (1999), which includes: score keeping, improving understanding, focusing organizational attention, and learning and legitimizing decisions. The score keeping use figures as more mechanistic, to monitor and follow what is foreseen by the organization (Vandenbosch, 1999). The others use the information to identify deficiencies, legitimize the actions of

managers, and model results (Wee, Foong & Tse, 2014). Beuren, Santos and Bernd (2021) grouped these dimensions in score keeping use and comprehensive use. The argument is that score keeping use is more focused on monitoring, while comprehensive use, which covers the other dimensions, is more flexible and directed to innovation, a perspective also adopted in this study.

Chenhall (2005) points out that MCS operate as reservoirs of information to produce knowledge and innovation, crucial factors for organizational survival (Batac & Carassus, 2009; Kloot, 1997). Thus, it is assumed that the use of MCS information can also trigger skills aimed at creating knowledge. However, attention should be paid to the control orientation so that it leads to achieving the organization's objectives (Henri, 2006). Vandenbosch (1999) found an influence of the use of MCS information on the competitiveness of companies.

To remain competitive, organizations need to timely create knowledge (Yang et al., 2009). Knowledge creation is seen as a key variable for organizations seeking to innovate and remain competitive, so it is considered a central issue in most companies (Darroch, 2005). In this sense, knowledge conversion skills are focused, on the argument that the combination of knowledge supports the ability to generate innovation and competitiveness (Farnese, Barbieri, Chirumbolo & Patriotta, 2019; Nonaka, 1994; Yang et al., 2009).

It is also assumed that the relationship between the use of MCS information and knowledge conversion skills can be intensified by organizational slack. Organizational slack represents the availability of resources at a higher level than is currently necessary for the organization's operations (Cyert & March, 1963; Nohria & Gulati, 1996). In this study, organizational slack is addressed from the perspective of Mallidou et al. (2011), which comprises: human resources (availability of human resources greater than the immediate need), physical resources (availability of physical resources not used immediately or for the possibility of growth), and time resources (time for developing activities, learning, and complying with deadlines).

Lawson (2001) argues that different ways of using MCS have distinct implications for organizational slack. The behavioral perspective on slack assumes that it favors generating new ideas and information (Augsdorfer, 2005; Beck & Beuren, 2015; Lawson, 2001; Richtnér & Ahlstrom, 2006). The assumption is that higher levels of slack are related to higher levels of new ideas and sources of information (Sharfman & Dean Jr., 1997). Previous studies on organizational slack reveal research gaps regarding the emphasis given to organizational resources when conceiving it as a promoter of new ideas and information or a waste of resources (Agrawal, Catalini, Goldfarb & Luo, 2018; Beck & Beuren, 2015; Lawson, 2001).

Given the above, this study aims to analyze the influence of MCS information on knowledge conversion skills, mediated by organizational slack in companies benefiting from The Good Law. Law No. 11,196, of November 21, 2005, known as The Good Law, aims to offer tax subsidy in deducting the sum of expenditures for Brazilian companies focused on research and development of technological innovation (RD&I), to support innovation and, consequently, knowledge creation in these organizations.

The relevance of the study is to investigate the interaction of the use of information (score keeping and comprehensive) of MCS with the knowledge

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3

conversion skills in companies benefiting from incentives to develop technological innovation. It is also analyzed whether this relationship is reinforced by inserting organizational slack (human, physical, and time resources). Thus, the discussion regarding the influence of MCS in knowledge creation through organizational slack is broadened, considering a more comprehensive taxonomy of MCS use. The literature on organizational slack is also expanded since some studies did not contemplate the different facets of slack, such as Bourgeois (1981), who used only financial resources to measure organizational slack. Mallidou et al. (2011) point out that the use of only financial measures in the analysis of organizational slack ignores other relevant dimensions of slack, which influence the behavior and income of companies.

In this perspective, we contribute to the literature by trying to resolve conflicting issues related to the use of MCS information and organizational slack in companies that constantly seek innovations and, therefore, need knowledge creation. We seek to understand the role of organizational slack in these companies, whether or not it favors knowledge creation, given the different perspectives related to slack (Agrawal et al., 2018; Beck & Beuren, 2015; Lawson, 2001). Agency cost-based theories tend to suggest the negative impact of slack, while organizational theories (e.g., behavioral theory) advocate the positive impact of slack (Lee, 2012).

The research results also contribute to management practice since they can guide companies to achieve a better performance of innovation, promote knowledge conversion skills, highlight their policies related to organizational slack, and use MCS information. The study may also be timely in the organizations studied by directing managers to review their guidance on the use of MCS information to create organizational knowledge to support technological innovation, to which tax benefits are extended.

The social contribution of this research is also noteworthy, whose theme is related to the benefit that knowledge creation grants to society since it contributes to the evolution of products and processes, ensures the competitiveness of organizations, boosts innovations and provides economic growth. The results of the research instigate the expansion of collaboration and knowledge through the enhancement of the identified facilitating factors.

2 THEORETICAL REVIEW AND JUSTIFICATION OF HYPOTHESES

2.1 Use of management control system information and organizational slack

Malmi and Brown (2008, p. 290) define MCS as "systems, rules, practices, values and other activities management put in place to direct employee behaviour" to pursue organizational objectives. The information provided by the MCS represents a relevant control mechanism in organizations, being analyzed in two dimensions: (i) design, which consists of the technical characteristics, and; (ii) use, which refers to the forms of application and conduct of managers to achieve organizational objectives (Ferreira & Otley, 2006; Henri, 2006). A typology of use of managerial information that has been consolidated in the literature is the one initially proposed by Simon, Guetzkow, Kozmetsky e Tyndall (1954), improved by Vandenbosch (1999), and later used in empirical studies (e.g., Beuren et al., 2021; Wee et al., 2014).

Vandenbosch (1999) groups managerial information into four dimensions: score keeping, improving understanding, focusing organizational attention and learning, and legitimizing decisions. The score keeping helps to review measures and monitor results, comparing them with the planned, therefore, a more mechanistic conception and related to standardized reports is easier to compare (Vandenbosch, 1999). Improving understanding aims to analyze results, identify deficiencies, and build scenarios, point out advantages and disadvantages of the information system to support problem-solving (Vandenbosch, 1999). In focusing organizational attention and learning, information is used to provide a common scenario in the organization, which can support managers in training or controlling it (Vandenbosch, 1999). The legitimizing decisions dimension assumes that managers seek to legitimize and justify their actions through the use of information, reinforcing their beliefs, and formulating strategies to improve competitive advantage (Vandenbosch, 1999; Wee et al., 2014).

Wee et al. (2014) adopted this typology relating it to organizational learning, and they confirmed the positive association. Based on this typology, Beuren et al. (2021) examined the effects of the use of information (score keeping use and comprehensive use) of MCS on individual performance mediated by organizational learning. The results showed significance and statistically confirmed the relationships investigated. The grouping of the dimensions of this typology made by these authors also substantiates the present study.

The effects of MCS information can be impacted by the constitution of organizational slack, either by its functionality or dysfunctionality (Bourgeois, 1981; Lawson, 2001; Tan & Peng, 2003). Organizational slack represents the availability of resources at a level higher than that required by the organization for the purposes of its operations (Cyert & March, 1963; Nohria & Gulati, 1996). For Bourgeois (1981), slack is a resource cushion, making it easier for companies to adapt to internal and external threats. Lawson (2001) points out that slack, according to its nature, leads to different organizational resources.

Mallidou et al. (2011) point out that organizational slack can consist of human resources (availability of human resources greater than what is needed immediately), physical resources (availability of physical resources not used immediately or for the possibility of growth), and time resources (time for the development of activities, learning, and compliance with deadlines), a perspective adopted in this study.

Previous research has analyzed how MCS impact and motivate the creation of organizational slack and found that more flexible control can have positive impacts on slack creation (Sharfman & Dean Jr., 1997; Schoute & Wiersma, 2011; Tan, 2003). Sharfman and Dean Jr. (1997) observed that organizational slack is positively associated with flexibility. Tan (2003) found that slack provides managers with flexibility and can use it to develop organizational strategy. Schoute and Wiersma (2011) found that the creation of organizational slack is more present when used for communication and planning and less usual in coordination and evaluation.

Zhor (2018) identified that control supports the definition of the adequate level of slack and that when the organization obtains a less formalized environment, there is more possibility of slack creation. In this way, MCS information can make the use of resource slack more efficient. Thus, it is postulated from the

literature findings that the use of MCS information in a less mechanistic way, in order to agree on the necessary and adequate level of slack in organizations, positively influences organizational slack. In turn, in a more mechanistic way, as in the case of score keeping, it can negatively influence the slack creation. Thus, the first hypothesis is formulated:

H1a: There is a negative influence of the score keeping use of MCS information on organizational slack.

H1b: There is a positive influence of the comprehensive use of MCS information on organizational slack.

2.2 Use of management control system information and knowledge conversion skills

Knowledge conversion skills or organizational knowledge creation refer to continuous modifications between tacit and explicit knowledge through four basic patterns of knowledge creation: socialization (from tacit to tacit), externalization (from tacit to explicit), combination (from explicit to explicit), and internalization (from explicit to tacit) (Nonaka, 1994). Tacit knowledge is not easily explained or visible, it is associated with ideas, values, and emotions. In contrast, explicit knowledge can be expressed in its entirety, it is usually found in documents (Nonaka, 1994; Richtnér & Åhlström, 2010).

Socialization occurs through training and activities through which individuals acquire knowledge through observation and experience. Outsourcing is more focused on dialogue, creation of concepts, and models. The combination refers to the design of documents, databases, and similar ones. Internalization refers to the sharing of technical knowledge, aimed at learning by doing (Richtnér & Åhlström, 2010). This model assumes that knowledge is conceived by the continuous interaction between tacit and explicit knowledge and that this interaction transforms existing knowledge into new knowledge (Richtnér & Åhlström, 2010).

In this perspective, information is a course of communications, messages that can modify, add, or reformulate knowledge (Machlup & Mansfield, 1983). In turn, knowledge is conceived by the flow of information, and information is a means for knowledge creation (Nonaka, 1994). Therefore, information, such as the MCS, tends to play an important role in creating knowledge and in the innovation of mental models in organizations (Choe, 2004). The information contributes to: (i) ensuring the generation of knowledge throughout the organization; (ii) communicating and disseminating this knowledge throughout the organization; and (iii) planning actions and coordinating their implementation (Kohli & Jaworski, 1990). Chenhall (2005) argues that MCS are mechanisms that allow the development of organizational capacities through information collection. Simons (1995, 2000) points out that the information from the MCS stimulates experimentation and the search for new ideas and opportunities.

Previous studies show that the combination of knowledge results in innovation (Farnese et al., 2019; Nonaka, 1994) and that this reflects on organizational competitiveness. Vandenbosch (1999) found a negative relationship between score keeping use and the perception of organizational competitiveness, and a positive relationship between the other dimensions.

Different conclusions are found in the literature when seeking the effects of MCS in knowledge creation. There are findings that the use of more mechanistic and monitoring-oriented MCS can restrict activities aimed at creating knowledge and innovation, while more flexible and informal use connects people and promotes the creation of new ideas, knowledge, creativity, and interaction (Demartini & Mella, 2014; Fagerlin & Lövstål, 2020; Simons, 1995).

On the other hand, Beuren et al. (2021) and Wee et al. (2014) found a positive influence, both from comprehensive use and score keeping use in organizational learning, emphasizing that the use of MCS leads to generating new knowledge, which will be interpreted and shared. The double control role addressed in the study by Tessier and Otley (2012) is highlighted here, which both controls are desirable and complementary in the organization. Still, one should consider the intensity with which each one is used in accordance with management intentions.

Richtnér and Åhlström (2010) examined how informal control affects knowledge creation and found that as top management increases informal control, more explicit knowledge is emphasized, which denotes that informal control focuses on explicit rather than tacit knowledge. Thus, it is argued that if such control is practiced improperly, it can affect knowledge creation and, consequently, the innovation of the organization, which reinforces the dual role of control.

Based on the theoretical support that the flow and use of MCS information can facilitate the knowledge creation of the organization, the second hypothesis is postulated:

H2a: There is a positive influence of the score keeping use of MCS information on knowledge conversion skills.

H2b: There is a positive influence of the comprehensive use of MCS information on knowledge conversion skills.

2.3 Organizational slack and knowledge conversion skills

Organizational slack can be conceived as wasteful and dysfunctional but can also be seen as a means of favoring the dissemination of knowledge and new ideas in the organization (Sharfman & Dean Jr., 1997; Tan & Peng, 2003). According to Sharfman and Dean Jr. (1997), there is a relationship between higher levels of slack with higher levels of new ideas and information. However, there are interpretations of slack as being dysfunctional and inefficient, creating unnecessary expenses, and preventing organizational performance (Tan & Peng, 2003).

Previous studies, such as Richtnér, Åhlström and Goffin (2014), examined the impact of changes in organizational slack for knowledge creation in new product development projects. It was observed that greater slack favored knowledge creation, while reduced slack caused negative impacts, interrupting work on the development of new products. They concluded that organizational slack is desirable for knowledge creation that requires time and available resources, even at the risk of wasting resources.

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7

Some studies (Nohria & Gulati, 1996; Tan, 2003; Zhor, 2018) point out that slack follows the inverted "U" format from the perspective of organizational results, and little slack discourages experimentation due to uncertainty, while a very high level of slack can decrease the degree of organizational discipline. Yang et al. (2009) found that the optimal level of budgetary slack to bring benefits to the organization follows the inverted "U" format, suggesting that an adequate level of slack is intermediate.

Given the different approaches to the conception of organizational slack in the literature, in the present study, it is assumed that slack favors organizational results because it allows the experimentation and dissemination of ideas and knowledge, characteristics inherent to innovative companies. Thus, the third hypothesis is formulated:

H3: There is a positive influence of organizational slack on knowledge conversion skills.

2.4 Use of management control system information and knowledge conversion skills mediated by organizational slack

The relationship between MCS information and knowledge conversion skills may involve other variables. Organizational slack has been studied as an intervening variable that moderates and mediates relationships (e.g., Lee, 2012; Wang, Wang & Xu, 2021) to identify its impacts on organizational strategies.

It is worth remembering that organizational slack is addressed in the literature with different views on its effects on organizations (Agrawal et al., 2018; Sharfman & Dean Jr., 1997; Tan & Peng, 2003; Zhor, 2018). Nohria and Gulati (1996) mention that managers seek to enhance the use of organizational resources. Thus, slack is usually seen as dysfunctional and inefficient. However, limitations of creativity, the flow of ideas, and knowledge creation may occur with mitigating organizational slack (Amabile & Conti. 1999).

The MCS information can provide managers with ideas of the acceptable level of organizational slack (Zhor, 2018), and to what extent organizational slack can bring new flows of idea generation and new information (Sharfman & Dean Jr., 1997). This implies that the use of MCS information is promising for creating organizational knowledge. It can also impact slack creation at an adequate level and bring benefits, such as knowledge creation.

Thus, it assumes that organizational slack is a mediator in the relationship between the use of MCS information and knowledge conversion skills. This proposition stems from the evidence that the use of MCS information influences organizational slack (Tan, 2003; Zhor, 2018) and that slack influences knowledge conversion skills (Sharfman & Dean Jr., 1997). Thus, the fourth hypothesis is formulated:

H4: Organizational slack mediates the relationship between the use of MCS information and organizational slack.

The theoretical model of the research is illustrated in Figure 1, from the formulation of the hypotheses, through theoretical and empirical evidence presented in the literature.
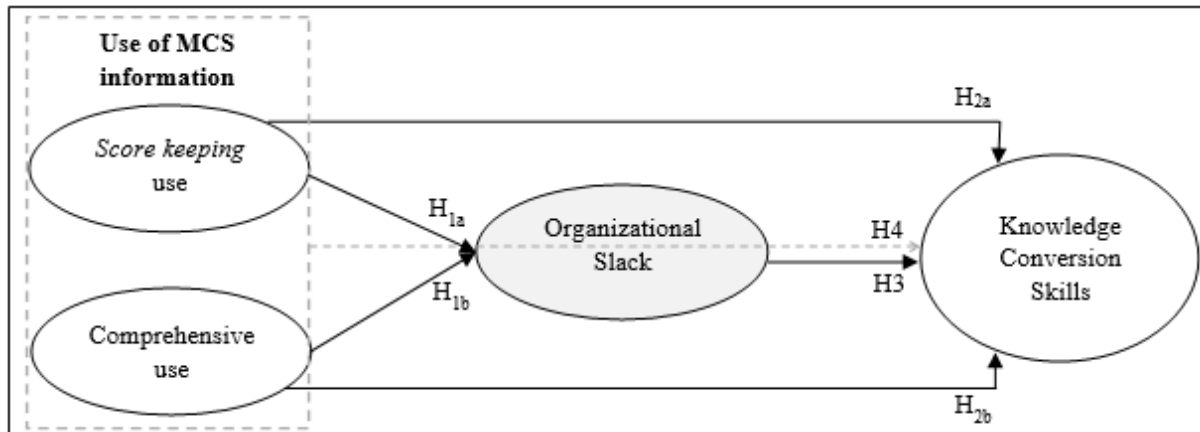
Note: The dotted line refers to the mediation relationship (indirect effect).
Figure 1. Theoretical research model
Source: Prepared by the authors.

As shown in Figure 1, the study proposes that the score keeping use of MCS information has a negative impact on organizational slack (H1a) and a positive impact on knowledge conversion skills (H2a); that the comprehensive use has a positive influence on organizational slack (H1b) and knowledge conversion skills (H2b); that organizational slack positively influences knowledge conversion skills (H3); and that organizational slack mediates the relationship between the use of MCS information and knowledge conversion skills (H4).

3 METHODOLOGICAL PROCEDURES

3.1 Population and sample

A survey was conducted in the companies benefiting from The Good Law, Law No. 11,196, of November 21, 2005. This law grants exemptions to companies focused on research and the development of technological innovation. The mapping on the Ministry of Science, Technology, Innovations and Communications (MCTIC) website resulted in 957 benefited companies in the base year of 2015. There was no information available about the companies after 2015 when the data were collected. Only in December 2019, the government published the name of the companies that used tax incentives for the base year of 2016.

The selection of this sample resulted from the assumption that they are innovative companies since The Good Law proposed to fiscally encourage a set of companies to intensify technological innovation, a context that stimulates the development of knowledge creation. From the list of benefited companies, we sought to identify them and their managers in the professional network *LinkedIn*. In this search, 1,526 professionals were identified, and it was decided to maintain three to five respondents per company, and preference was given to positions at strategic levels. A total of 686 professionals accepted the invitation to participate in the study. The questionnaire link was sent on the *QuestionPro* platform from September 2019 to January 2020, resulting in 123 valid responses.

3.2 Constructs and research instrument

The research theoretical model comprises three constructs, measured with instruments supported by previous studies, with statements on a five-point Likert scale, according to Table 1.

Table 1
Research constructs and questions

Constructs	Statements
Use of MCS information (Wee et al., 2014, who adapted the statements from Vandenbosch, 1999)	Indicate how often you use information (financial and non-financial) from your organization's Management Control Systems for each of the following situations, considering the scale from 1 (very low) to 5 (very high).
	Improve Understanding 1. Identify the interdependence of business units. 2. Identify weaknesses. 3. Assess the impact of an external event. 4. Explore options.
	Focus Attention 5. Highlight problem areas. 6. Signal to prevent threats to the organization.
	Score Keeping 7. Monitor progress toward goals. 8. Assess achievements for critical success factors. 9. Compare results to expectations.
	Improve Learning 10. Identify the weaknesses of the existing strategy. 11. Formulate new strategies. 12. Improve the competitiveness of products/services.
Organization al slack (Adapted from Mallidou, 2011)	Indicate to what extent the following statements represent your organization's routine, considering the scale from 1 (strongly disagree) to 5 (strongly agree).
	Human Resources 1. We have sufficient staff to carry out the work demanded. 2. We have enough staff to provide quality service.
	Physical Resources 3. We have adequate space to carry out our work. 4. We have private space to discuss strategic/confidential information and for meetings. 5. We use this designated space to discuss plans or new knowledge.
	Indicate how often the statements below represent your organization's routine, considering the scale from 1 (never) to 5 (almost always).
	Time Resources 6. We have time available to do something extra for our customers. 7. We have time available to talk to someone (colleague or superior) about our customers. 8. We have time available to research something, for example, in magazines, books, or on the internet. 9. We have time available to talk to someone (colleague or superior) about some novelty/innovation in the area.
Knowledge conversion skills (Huang & Wang, 2002).	Indicate your degree of agreement/disagreement regarding your stance in the organization where you work in relation to each of the following statements, considering the scale from 1 (strongly disagree) to (5 strongly agree).
	Internalization 1. After hearing a new idea or concept, I tend to compare it with my experience to help me understand the meaning. 2. I better understand the thoughts of others by repeating what they said and asking them, "Is that what you mean?" 3. I tell others what I think to make sure that my understanding is the same as theirs.

	4. When I finish saying something, I ask the other person if it is necessary to repeat it to make sure that they understand exactly what I meant to say. 5. When communicating with others, I give them time to think about what we have just discussed.
	Externalization 6. When others cannot understand me, I am usually able to give them examples to help explain. 7. Most of the time, I can transcribe some of the disorganized thoughts into concrete ideas. 8. I can use converted language to describe professional or technical terms to help with team communication. 9. I often use analogies when expressing abstract concepts. 10. When I express abstract concepts, I tend to explain with examples. 11. I help others to clearly express what they have in mind by encouraging them to continue what they are saying. 12. When others cannot express themselves clearly, I usually help them clarify their points.
	Socialization 13. I actively share my experience with others in the team discussion. 14. In my work team, my colleagues and I share life or work experience with each other. 15. During group discussions, I try to find out from other opinions, thoughts, and other information. 16. I usually bring some concepts, thoughts, or ideas during discussions. 17. I often encourage others to express their thoughts. 18. Before the team discussion, I collect the necessary information and show it to my colleagues. 19. I like to meet the people I am going to work with before entering into a joint project.
	Combination 20. During the discussion, I tend to help organize ideas and draw conclusions to facilitate the discussion. 21. When I encounter problems, I often use my experience to help solve problems. 22. After each event, I have a habit of organizing and summarizing what happened. 23. During the discussion, I organize everyone's thoughts in my mind. 24. I like to collect new information and connect new and old knowledge to develop new concepts. 25. I like to organize ambiguous (dubious) concepts in the structure.

Source: Prepared by the authors.

The use of MCS information was measured by the instrument of We et al. (2014), who adapted it from the study of Vandenbosch (1999) to the accounting context. The instrument consists of twelve statements and comprises the dimensions score keeping, improving understanding, focusing organizational attention and learning, and legitimizing decisions. Exploratory factor analysis (EFA) grouped these dimensions into *score keeping* and comprehensive use (improving understanding, focusing organizational attention and learning and legitimizing decisions). This grouping is justified because the *score keeping* use is more focused on monitoring, while comprehensive use, which covers the other dimensions, is more flexible and directed to innovation (Beuren et al., 2021). The latent variables were accessed using a multiple scale, so an exploratory analysis of the questions that compose them was initially performed, with *varimax* rotation and the Kaiser normalization criterion. The model demonstrated an acceptable level of

adequacy (KMO<0.5) and good internal consistency (a<0.8).

Organizational slack was investigated, focusing on the organization's routine through the research instrument adapted from Mallidou et al. (2011), originally applied to health care employees. The instrument measures the slack in relation to human, physical, and time resources, totaling 9 statements. The model demonstrated an acceptable level of adequacy (KMO<0.5) and good internal consistency (a<0.8).

Knowledge conversion skills were measured using the instrument of Huang and Wang (2002), using the variables externalization, socialization, and combination, with a total of 20 statements. The internalization variable was excluded from the model due to the lack of adequacy of *Cronbach*'s alpha and the Average Variance Extracted (AVE), detailed in the measurement model. After that, the model demonstrated an acceptable level of adequacy (KMO<0.5) and mean/good internal consistency (a<0.7).

3.3 Data analysis procedures

In the data analysis, descriptive analysis techniques, exploratory factor analysis, and structural equation modeling (SEM) were used, estimated from the partial least squares (PLS). Exploratory factor analysis precedes SEM, which measures the theoretical groupings that the constructs form, measured by multiple scales (Fávero & Belfiore, 2017). To analyze the hypotheses, the SEM-PLS was used, in which the direct relationships were analyzed by the path coefficients and the indirect relationships by the total indirect coefficients (Hair Jr., Hult, Ringle & Sarstedt, 2017). In the mediation analysis, the precepts of Hair Jr. et al. (2017) were followed, that the antecedent variable should influence the mediator and the mediator should influence the consequent one.

Constructs with variables (organizational slack and knowledge conversion skills) of second order make up the structural model. Still, for the measurement model, they were treated as first order. According to Bido and Silva (2019, p. 509), "a second-order latent variable is measured by two or more first-order latent variables". Organizational slack is formed by the variables human, physical, and time resources, while knowledge conversion skills are formed by the variables externalization, socialization, and combination.

4 RESULTS DESCRIPTION AND ANALYSIS

4.1 Characterization of the sample and respondents

In the sample, it is noteworthy that 90% of respondents are male, most attended graduate studies, having 73% specialization or Master of Business Administration (MBA), 15% master's, and 1% doctorate. Participants also varied in age between 28 and 64 years, and 41% of respondents are in the range of 41 to 50 years. As for the position, managers (48%) and directors (23%) prevailed. Most (65%) companies operate both in the domestic and international markets, 43% of which have been operating for more than 50 years and only 4% less than 10 years. The number of employees is dispersed, ranging from 500 to 5,000 (42%). The sector in which the companies operate is heterogeneous, emphasizing mechanics and transportation (24%) and information technology (25%). When asked which

projects the company uses the benefits of The Good Law, innovation and product development projects were mainly mentioned.

4.2 Measurement model and descriptive statistics

In the modeling of structural equations, reliability (internal and composite) and validity (convergent and discriminant) must be initially tested by the measurement model, following the assumptions of Hair Jr. et al. (2017). Table 2 shows such information and the descriptive statistics of the data.

Table 2
Measurement model and descriptive statistics

Latent variables Indicators	1	2	3	4	5	6	7	8
1. Use *score keeping*	**0.852**							
2. Comprehensive use	0.635	**0.707**						
3. HR Slack	0.401	0.404	**0.922**					
4. PR Slack	0.376	0.377	0.560	**0.868**				
5. TR Slack	0.280	0.391	0.611	0.553	**0.868**			
6. Ext. KCS	0.440	0.362	0.276	0.384	0.201	**0.767**		
7. Soc. KCS	0.298	0.360	0.329	0.327	0.333	0.708	**0.731**	
8. Com	0.461	0.357	0.350	0.413	0.318	0.654	0.681	**0.747**
Mean	4.35	3.86	3.51	4.12	3.43	4.09	3.97	3.90
Standard Deviation	0.78	1.01	0.96	1.01	1.04	0.81	0.88	0.94
Variation coefficient (%)	17.93%	26.16%	27.35%	24.51%	30.32%	19.80%	22.17%	24.10%
Mode	5	4	4	5	3	4	4	4
Average Variance Extracted (AVE) >0.50	0.726	0.726	0.851	0.851	0.851	0.588	0.588	0.588
Cronbach's alpha >0.70	0.810	0.857	0.825	0.825	0.825	0.883	0.883	0.883
Composite Reliability (CR) >0.70	0.888	0.888	0.919	0.919	0.919	0.909	0.909	0.909

Note: n=123. The diagonal elements represent the square roots of the average variance extracted, and the off-diagonal elements represent the correlations between the latent variables.
Source: Research data.

Descriptive statistics denote greater intensity of *score keeping* use compared to the comprehensive use by companies, with mode 5, on a scale from 1 to 5, considered very high, indicating that they use more information to monitor goals, monitor and analyze deviations (Beuren et al., 2021; Vandenbosh, 1999; Wee et al., 2014). In organizational slack, there is a moderate level, which, when grouped, presented a mean of 3.5. Knowledge conversion skills presented a moderate to a high level in descriptive statistics, with mode 4.

In the loadings of the statements that make up the constructs, values greater than 0.70 are recommended (Hair Jr. et al., 2017). The AVE did not meet the quality criteria for the questions "During the discussion, I tend to help organize ideas and draw conclusions to facilitate the discussion", and "I like to organize

ambiguous (dubious) concepts in the structure", both belonging to the combination variable, of the knowledge conversion skills construct, so they were removed from the model. The question "Identify the interdependence of business units" of the *improve understanding* variable of comprehensive use was also removed. After removing these, good internal consistency was found.

The convergent validity obtained by AVE presents values above 0.50, attesting to the validity and reliability of the constructs. To test the reliability of the model, the composite reliability and internal consistency of the variables (*Cronbach*'s alpha) were used, which were higher than indicated (>0.70) in the literature (Hair Jr. et al., 2017).

The discriminant validity, used to verify whether a construct is different from the others, was examined according to the precepts of Fornell and Larcker (1981). It was found that there was no high correlation between the statements and that the values of the square roots of the AVE are higher than the absolute values of the correlations between the variables, indicating that each variable is individually different from the others (Hair Jr. et al., 2017). We also analyzed the *Variance Inflation Factors* (VIF), which indicates the absence of multicollinearity between the latent variables (VIF<5), according to the criteria of Hair Jr. et al. (2017).

Therefore, the measurement model results indicate that all variables are characterized by sufficient levels of validity and reliability, which allows for the analysis of structural relationships.

4.3 Structural model and hypothesis testing

To test the hypotheses, the bootstrapping analysis was applied in the structural model, which verifies the significance of the relationships between the variables and the adequacy of the model (Hair Jr. et al., 2017), with 5,000 resamples and a bias-corrected confidence interval. The structural model was evaluated by Pearson's coefficient of determination (R^2), predictive relevance (Q^2), and effect size or Cohen's indicator (f^2). The path values, t-value, and p-value were obtained by bootstrapping, presented in Table 3.

Table 3
Results of the structural model: hypothesis testing

	Hypotheses	f^2	Structural Coefficient	t-value	p-value	Decision
H_{1a}	*Score keeping*→ use Organizational slack	0.040	0.223	1.839	0.066*	Rejected
H_{1b}	Comprehensive use→ Organizational slack	0.095	0.342	3.524	**0.000***	**Accepted**
H_{2a}	*Score keeping* use →Knowl. conv. skills	0.064	0.278	2.151	**0.032**	**Accepted**
H_{2b}	Comprehensive use→Knowl. conv. skills	0.008	0.103	0.899	0.369	Rejected
H_3	Organizational slack→Knowl. conv. skills	0.088	0.288	2.099	**0.036**	**Accepted**
H_4	SK use → Slack →Knowl. conv. skills	-	0.064	1.156	0.248	Rejected
H_4	Comp. use →Slack → Knowl. conv. skills	-	0.099	1.660	**0.097***	**Accepted**

Note: n=123. Significant at the level of ***p<0.001; **p<0.05; *p<0.10.

Cohen's classification (1988): small effect (f2=0.02), medium effect (f2=0.15), and large effect (f2=0.35).
Evaluation of the structural model (R^2): Organizational slack 0.264; Knowledge conversion skills 0.306.
Predictive relevance (Q^2): Organizational slack 0.120; Knowledge conversion skills 0.085.
Source: Research data.

Table 3 shows that the model has a coefficient of determination (R^2) of 26.4% for organizational slack and 30.6% for knowledge conversion skills. This coefficient evaluates to what extent the model explains the variance of the variables. In the predictive relevance (Q^2), the results were above zero, confirming the accuracy of the model (Hair Jr. et al., 2017). The effect size (f^2) has a large effect ($f^2>0.35$) for the relationships, except for Comprehensive Use→ Knowl. conv. skills, which had a small effect (Hair Jr. et al., 2017).

The analysis of structural coefficients indicates a significant effect for H_{1a}, but with positive coefficients, different from what was expected, which predicted a negative influence of the *score keeping* use on organizational slack. The results indicate that such use does not inhibit the slack creation in the companies surveyed. H_{1b}, which predicted a positive and significant influence of comprehensive use on organizational slack, was confirmed at the 1% level, indicating that comprehensive use stimulates the creation of organizational slack. H_{2a}, which predicted a positive influence of the *score keeping* use on knowledge conversion skills, was also accepted, at a significance level of 5%, indicating that the use of information more focused on monitoring leads to knowledge conversion skills in companies. H_{2b} did not present statistical significance, so it is not possible to confirm that the comprehensive use directly influences the knowledge conversion skills, which leads to its rejection. H_3, which predicted a positive influence of organizational slack on knowledge conversion skills, has positive and significant coefficients, which allows it to be accepted.

In line with Hair Jr. et al. (2017), the mediation analysis was conducted. There was a positive and significant relationship between comprehensive use and knowledge conversion skills through organizational slack. However, there was no statistical significance in relation to *score keeping* use. It is inferred that although *score keeping* use directly influences organizational slack and knowledge conversion skills, organizational slack does not explain the influence of *score keeping* on knowledge conversion skills, while for comprehensive use, slack mediates its relationship with knowledge conversion skills.

4.4 Discussion of results

The analysis of the influence of the *score keeping* use and the comprehensive use of MCS information on knowledge conversion skills, mediated by organizational slack, is made from the results presented in Figure 2.
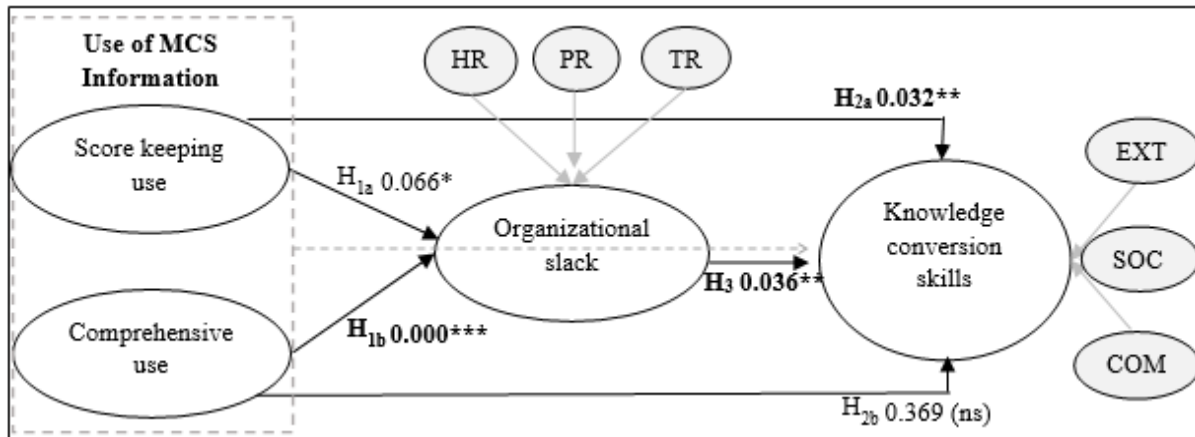
Note: n=123. Significant at the level of ***p<0.001; **p<0.05; *p<0.10; ns: not significant. The accepted hypotheses are in bold. The dotted line refers to the mediation relationship (indirect effect). Grey circles are the first-order latent variables of organizational slack and knowledge conversion skills.
Figure 2. Results of the structural model
Source: Research data.

The results show that the use of MCS information occurs in the companies surveyed in two dimensions: (i) *score keeping* and (ii) comprehensive use. Nevertheless, the *score keeping* use stood out in relation to comprehensive use. This indicates that companies use more information to monitor targets, monitor and analyze deviations (Beuren et al., 2021; Vandenbosh, 1999; Wee et al., 2014).

H_{1a}, which predicted a negative influence of the *score* keeping use on organizational slack, had the opposite effect on the results, with a positive influence on the relationship, which contrasts studies such as those by Schoute and Wiersma (2011) and Zhor (2018), that more mechanistic and goal-oriented use is less common in creating slack in the organization. This indicates that in the companies surveyed, the *score keeping* use, with a configuration more focused on monitoring goals, has not inhibited the conception of slack, suggesting complementarity of the two dimensions of MCS and may be due to the profile of companies focused on the creation of technologies, which need more flexibility and slack for innovation. Another possible explanation is the fact that the *score keeping* use has presented mode 5, indicating that companies are strongly inclined to monitor goals, which can lead to the constitution of organizational slack.

Hypothesis H_{1b}, which predicted a positive influence of comprehensive use on organizational slack, was confirmed at the 1% level. This result is consistent with the literature (Sharfman & Dean Jr., 1997; Schoute & Wiersma, 2011) that more flexible use is positively associated with slack and more suitable for planning and communication. It is also consistent with that recommended by Zhor (2018) that this use can support the adequacy of the level of slack. As the organizational slack presented a mean of 3.5, considered a moderate level, the use of MCS information supports the slack creation at an adequate level to obtain results beneficial to the companies.

The H_{2a} hypothesis predicted a positive and significant influence of the *score keeping* use on knowledge conversion skills, and was accepted at a significance level of 5%. This indicates that in these companies, the use of information more focused on monitoring towards the goals stimulates knowledge conversion skills.

This hypothesis was supported by the organizational learning of the studies by Beuren et al. (2021) and Wee et al. (2014), which found a positive and significant relationship. However, this result differs from studies such as Simons (1995) and Henri (2006), that the diagnostic use, more focused on monitoring, restricts innovation and learning.

The relationship between comprehensive use and knowledge conversion skills (H_{2b}) was not confirmed, which even having presented positive coefficients did not show statistical significance. This may be because the comprehensive use is characterized as a dual-loop learning system (Vandenbosch, 1999), more complex than the single-loop *score keeping* use (Widener, 2007). Complexity or lack of experience in certain situations can inhibit learning or knowledge creation (Widener, 2007).

Hypothesis H_3, which predicted a positive and significant relationship between organizational slack and knowledge conversion skills, was accepted at a significance level of 5%. It is aligned with the precepts of Sharfman and Dean Jr. (1997) and Richtnér et al. (2014), that slack can lead to the creation of knowledge and innovation. Also, as Yang et al. (2019) and Zhor (2018) recommended, a level of slack considered adequate can bring organizational benefits. This suggests that organizational slack has leveraged knowledge conversion skills, through slack in resources capable of ensuring knowledge creation in the companies surveyed.

Finally, the mediation hypothesis (H_4), which predicted a relationship between *score keeping* and comprehensive use with knowledge conversion skills through organizational slack was partially accepted. The direct impacts of using *score keeping* and comprehensive use on knowledge conversion skills differ from indirect impacts. A positive and significant relationship was obtained between comprehensive use and knowledge conversion skills through organizational slack. However, no statistical significance was observed in relation to the *score keeping* use.

Although *score keeping* use directly influences organizational slack and knowledge conversion skills, slack does not explain the influence of *score keeping* use on knowledge conversion skills. These variables influence themselves, regardless of mediation. On the other hand, organizational slack mediates the relationship between comprehensive use and knowledge conversion skills, and comprehensive use had a strong influence on organizational slack, as well as slack had on knowledge conversion. It is understood that, although comprehensive use has not had a significant direct influence on knowledge conversion, it has fulfilled its role by adjusting an optimal level of slack, which reflects on knowledge conversion skills.

5 FINAL CONSIDERATIONS

This study analyzed the influence of the use of MCS information (*score keeping* and comprehensive) and organizational slack on knowledge conversion skills in companies benefiting from The Good Law. The results revealed a dual role of MCS, with a predominance of *score keeping* use, which focuses on a monitored and goal-oriented environment. However, strong interaction with the comprehensive use, more flexible and dynamic was observed.

The *score keeping* use had a positive influence on organizational slack,

which contrasts what is expected according to the literature. Although a monitored environment is less likely to provide slack, in the companies surveyed it has not inhibited the creation of organizational slack, which may result from the companies' strategy. Comprehensive use has shown significant results for creating organizational slack. This suggests that using the information may reveal the effectiveness of slack to include it in the company's culture. Together, these controls have maintained a level of slack considered beneficial to companies since slack positively impacted knowledge conversion skills, not characterizing a waste.

Positive relationships were also found between *score keeping* use and knowledge conversion skills. However, no statistical significance was found between comprehensive use and knowledge conversion skills. This result can be explained by the difficulty that companies encounter in using double-loop learning, as factors such as complexity and/or lack of experience in certain situations may end up inhibiting the creation of organizational knowledge (Widener, 2007). We also highlight the mediating effect of organizational slack in the relationship between comprehensive use and knowledge conversion skills, which explains this relationship, that is, the comprehensive use influences the creation of knowledge through slack. Therefore, the importance of balancing management mechanisms aligned with organizational objectives is reinforced.

Theoretical implications are observed since the literature has presented conflicting results in these relationships. There are implications mainly regarding the use of MCS information (*score keeping* and comprehensive) and organizational slack as facilitators of knowledge creation. Organizational slack was conceived as a multidimensional construct, considering different facets in its measurement and thus broadening the discussion on other relevant dimensions of slack, as highlighted by Mallidou et al. (2011). As practical implications, the dual role of the use of MCS is evident, both as a driver of organizational strategies and objectives and monitoring to achieve the goals. The findings of this research can guide companies in sustaining their business, defining policies with an adequate level of organizational slack and use of MCS information directed to organizational strategies and monitoring, such as aligning information and controls to create organizational knowledge to support technological innovation to which the tax benefits are extended.

As limitations, methodological choice and cross-sectional design questions stand out since the results are based on the respondents' perception, and subjective aspects may have influenced the moment of the answer. In the validation of the theoretical model, it was necessary to exclude some questions from the constructs, which suggests that future studies seek new constructs or other instruments for their empirical measurement. Future studies may also envision other variables that may impact these relationships. Besides, given the specific characteristics of companies, it is recommended to replicate this study in other company settings.

REFERENCES

Agrawal, A., Catalini, C., Goldfarb, A., & Luo, H. (2018). Slack time and innovation. *Organization Science, 29*(6), 1056-1073. doi: 10.1287/orsc.2018.1215

Augsdorfer, P. (2005). Bootlegging and path dependency. *Research Policy*, *34*(1), 1-11.

Batac, J., & Carassus, D. (2009). Interactions between control and organizational learning in the case of a municipality. *Management Accounting Research, 20*(2), 102-116. doi:10.1016/j.mar.2008.11.001

Beck, F., & Beuren, I.M. (2015). Folga organizacional: análise em uma perspectiva comportamental no campo empírico. *Revista Universo Contábil, 11*(4), 06-26. doi:10.4270/RUC.2015429

Beuren, I.M., Santos, V., & Bernd, D.C. (2021). Effects of using the management control system on individual performance with the intervenience of feedforward and organizational learning. *Journal of Knowledge Management*, ahead-of-print. doi: 10.1108/JKM-01-2021-0055

Bido, D.S., & Silva, D. (2019). SmartPLS 3: especificação, estimação, avaliação e relato. *Administração: Ensino e Pesquisa*, *20*(2), 1-31. doi:10.13058/raep.2019.v20n2.1545

Bourgeois III, L.J. (1981). On the measurement of organizational slack. *Academy of Management Review*, 6(1), 29-39. doi:10.2307/257138

Chenhall, R.H. (2005). Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study. *Accounting, Organizations and Society, 30*(5), 395-422. doi:10.1016/j.aos.2004.08.001

Choe, J.M. (2004). The relationships among management accounting information, organizational learning and production performance. *The Journal of Strategic Information Systems, 13*(1), 61-85. doi:10.1016/j.jsis.2004.01.001

Cyert, R.M., & March, J.G. (1963). *A behavioral theory of the firm*. Englewood Cliffs, NJ: Blackwell Publishing.

Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of Knowledge Management*, 9(3), 101-115. doi:10.1108/13673270510602809

Demartini, C., & Mella, P. (2014). Beyond feedback control: the interactive use of Performance Management Systems: Implications for process innovation in Italian healthcare organizations. *The International Journal of Health Planning and Management*, 29(1), 1-30. doi:10.1002/hpm.2177

Fagerlin, W. P., & Lövstål, E. (2020). Top managers' formal and informal control practices in product innovation processes. *Qualitative Research in Accounting & Management, 17*(4), 497-524. doi:10.1108/QRAM-02-2019-0042

Farnese, M. L., Barbieri, B., Chirumbolo, A., & Patriotta, G. (2019). Managing

Revista Contabilidade Vista & Revista, ISSN 0103-734X, Universidade Federal de Minas Gerais, Belo Horizonte, v. 33, n. 2, p. 1-23, maio/ago. 2022.

19

knowledge in organizations: a Nonaka's SECI model operationalization. *Frontiers in Psychology, 10*, 2730. doi:10.3389/fpsyg.2019.02730

Fávero, L.P., & Belfiore, P. (2017). *Manual de análise de dados: estatística e modelagem multivariada com Excel®, SPSS® e Stata®.* Elsevier Brasil.

Ferreira, A., & Otley, D. (2006). Exploring inter and intra-relationships between the design and use of management control systems. In: *Social Science Research Network http://ssrn. com/abstract* (Vol. 896228). Recuperado de http://ssrn.com/abstract=896228

Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50. doi:10.1177/002224378101800104.

Guenther, T.W., & Heinicke, A. (2019). Relationships among types of use, levels of sophistication, and organizational outcomes of performance measurement systems: The crucial role of design choices. *Management Accounting Research*, *42*, 1-25. doi:10.1016/j.mar.2018.07.002

Hair Jr., J.F., Hult, G.T.M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Los Angeles: Sage.

Henri, J.F. (2006). Management control systems and strategy: A resource-based perspective. *Accounting, Organizations and Society*, *31*(6), 529-558. doi:10.1016/j.aos.2005.07.001

Huang, J.C., & Wang, S.F. (2002). Knowledge conversion abilities and knowledge creation and innovation: a new perspective on team composition. In: *Proceedings of the Third European Conference on Organizational Knowledge, Learning, and Capabilities*. Retrieved from: https://www.researchgate.net/profile/Sy_Feng_Wang/publication/22900161 1_Knowledge_conversion_abilities_and_knowledge_creation_and_innovatio n_a_new_perspective_on_team_composition/links/545a596c0cf2c46f664271 64.pdf

Kloot, L. (1997). Organizational learning and management control systems: responding to environmental change. *Management Accounting Research*, *8*(1), 47-73. doi:10.1006/mare.1996.0033

Kohli, A.K., & Jaworski, B.J. (1990). Market orientation: the construct, research propositions, and managerial implications. *Journal of Marketing*, *54*(2), 1-18. doi:10.1177/002224299005400201

Lawson, M.B. (2001). In praise of slack: time is of the essence. *The Academy of Management Executive, 15*(3), 125-135. doi:10.1109/EMR.2002.1022400

Lee, S. (2012). Corporate governance, financial slack and firm performance: a comparative research between US and UK. *Seoul Journal of Business, 18*(1).

Lei nº 11.196, de 21 de novembro de 2005. *Institui o Regime Especial de Tributação para a Plataforma de Exportação de Serviços de Tecnologia da Informação - REPES, o Regime Especial de Aquisição de Bens de Capital para Empresas Exportadoras - RECAP e o Programa de Inclusão Digital; dispõe sobre incentivos fiscais para a inovação tecnológica; altera [...]; e dá outras providências.* Recuperado em jan. 2020, de http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2005/lei/l11196.htm

Machlup, F., & Mansfield, U. (1983). *The study of information: Interdisciplinary messages.* New York, NY: Wiley.

Mallidou, A.A., Cummings, G.G., Ginsburg, L.R., Chuang, Y.T., Kang, S., Norton, P.G., & Estabrooks, C.A. (2011). Staff, space, and time as dimensions of organizational slack: a psychometric assessment. *Health Care Management Review*, 36(3), 252-264. doi:10.1097/HMR.0b013e318208ccf8

Malmi, T., & Brown, D.A. (2008). Management control systems as a package— Opportunities
and research directions. *Management Accounting Research, 19*(4), 287-300. doi: 10.1016/j.mar.2008.09.003

Ministério da Ciência, Tenologia, Inovações e Comunicações (MCTIC). *Incentivos ao desenvolvimento. Lei do Bem.* Recuperado em set. 2019, de http://www.mctic.gov.br/mctic/opencms/tecnologia/incentivo_desenvolvimento/lei_bem/OLD/Lei_do_Bem-OLD.html?searchRef=lei%20do%20bem&tipoBusca=expressaoExata

Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Journal*, 39(5), 1245-1264. doi:10.2307/256998

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37. doi:10.1287/orsc.5.1.14

Richtnér, A., & Ahlstrom, P. (2006). Influences on organizational slack in new product development projects. *International Journal of Innovation Management, 10*(4), 375-406. doi:10.1142/S1363919606001570

Richtnér, A., & Åhlström, P. (2010). Top management control and knowledge creation in new product development. *International Journal of Operations & Production Management.* 30(10), 1006-1031. doi: 10.1108/01443571011082508

Richtnér, A., Åhlström, P., & Goffin, K. (2014). Squeezing R&D: A study of organizational slack and knowledge creation in NPD, using the SECI model. *Journal of Product Innovation Management*, 31(6), 1268-1290. doi:10.1111/jpim.12139

Schoute, M., & Wiersma, E. (2011). The relationship between purposes of budget use and budgetary slack (pp. 75-107). In: Marc, J., & Epstein, J.Y.L. (eds.). *Advances in Management Accounting* (pp. 75-107). Emerald Group.

Sharfman, M.P., & Dean Jr., J.W. (1997). Flexibility in strategic decision making: informational and ideological perspectives. *Journal of Management Studies*, *34*(2), 191-217. doi:10.1111/1467-6486.00048

Simon, H.A., Guetzkow, H., Kozmetsky, G., & Tyndall, G. (1954). *Centralization vs. decentralization in organizing the controller's department*. Carnegie Institute of Technology, Graduate School of Industrial Administration. New York: Controllership Foundation, Inc.

Simons, R. (1995). *Levers of control*. Harvard Business School Publishing, Cambridge.

Simons, R. (2000). *Performance measurement and control systems for implementing strategies*. Prentice-Hall, Upper Saddle River.

Tan, J., & Peng, M.W. (2003). Organizational slack and firm performance during economic transitions: Two studies from an emerging economy. *Strategic Management Journal*, *24*(13), 1249-1263. doi:10.1002/smj.351

Tan, J. (2003). Curvilinear relationship between organizational slack and firm performance: Evidence from Chinese state enterprises. *European Management Journal, 26*(6), 740-749. doi:10.2139/ssrn.1552265

Tessier, S., & Otley, D. (2012). A conceptual development of Simons' Levers of Control framework. *Management Accounting Research*, *23*(3), 171-185. doi;10.1016/j.mar.2012.04.003

Vandenbosch, B. (1999). An empirical analysis of the association between the use of executive support systems and perceived organizational competitiveness. *Accounting, Organizations and Society*, *24*(1), 77-92. doi:10.1016/S0361-3682(97)00064-0

Wang, Y., Wang, X., & Xu, W. (2021). How does negative performance feedback affect a firm's openness in its innovation search behaviour? The moderating role of organisational slack. *Technology Analysis & Strategic Management*, 1-14. doi: 10.1080/09537325.2021.1976405

Wee, S.H., Foong, S.Y., & Tse, M.S.C. (2014). Management control systems and organizational learning: design and use. *Accounting Research Journal*, *27*(2), 169-187. doi:https://doi.org/10.1108/ARJ-05-2013-0026

Widener, S.K. (2007). An empirical analysis of the levers of control framework. *Accounting,*
Organizations and Society, *32*(7-8), 757-788. doi:10.1016/ j.aos.2007.01.001

Yang, M.L., Wang, A.M.L., & Cheng, K.C. (2009). The impact of quality of IS information and budget slack on innovation performance. *Technovation*, *29*(8), 527-536. doi:10.1016/j.technovation.2009.01.004

Zhor, S. (2018). Organizational slack resources and innovation adoption process:

The moderating effects of Management Control System (MCS). In: *Proceedings of the 2018 International Conference on e-business and Applications (ICEBA)*. doi:10.1145/3194188.3194193