

Information technology governance: legitimation, theorization and field trends

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Abstract

Purpose – investigate and analyze the aspects of legitimation, theorization and trends for the evolution of research in information technology governance (ITG) in Brazil, according to researchers familiar with the matter.

Design/methodology/approach – By means of a qualitative and quantitative research of exploratory-descriptive approach, the Delphi method was applied using a questionnaire supported by content analysis.

Findings – ITG is an increasingly interdisciplinary research field, with significant help from other fields of knowledge, such as administration, computer science and engineering. The main means of ITG publication are periodicals (MISQ, JMIS, JISTEM RESI), scientific events (AMCIS, ECIS, HICSS, EnANPAD, CONTECSI) and researchers, such as Peter Weill and Edimara Mezzomo Luciano. Best practice models are the most significant theoretical frameworks, and the main trend of research are on emerging technologies such as cloud computing and Internet of things (IoT) in the context of ITG.

Research limitations/implications – To the unavailability of some researchers to participate in the second phase of the Delphi research performed, as well as the non-completion of a third Delphi round. Likewise, the “Block B (open answer questions)” it was not contemplated in the second phase for a new collection of answers, which could partially change the results presented here.

Practical implications – The results show important insights for ITG researchers that can allow new researches about its applications, jointly reflecting on relevant aspects for the advancement of this research field.

Social implications – There are several research contributions to broaden the discussion and the evolution of this new scientific field in Brazil and that can be grouped for each set of stakeholders: academia and related researchers; the practicing community of business managers and private and public organizations; the academic legitimizing bodies; the non-academic legitimating bodies and researchers from other areas of knowledge.

Originality/value – ITG is a concept that emerged as part of corporate governance (CG), which has evolved as an emerging theme and is expanding in the international academic arena. However, the current stage of



legitimation, theorization and trends of ITG in the Brazilian researches are lacked greater understanding, in order to provide better targeting for new researches.

Keywords Information technology governance, Information technology, Legitimation, Theorization, Trends

Paper type Research paper

1. Introduction

Information technology governance (ITG) is an emerging theme that is expanding in the international academic arena, as pointed out by [Khan and Wood \(2015\)](#); at a national level, the topic is quite stable ([Freitas, Marcolin, Becker & Martens, 2018](#)). Incidentally, ITG is always present at the main international and national congresses, with a significant number of research groups involved ([Luciano, Macadar & Wiedenhof, 2015](#)), as it is signaled as a strategic subject for executives worldwide ([Kappelman *et al.*, 2017](#)).

ITG is a concept that emerged as part of corporate governance (CG) and has become a major IT issue ([Van Grembergen & De Haes, 2010](#)). It is no coincidence that the notion of “IT alignment with business”, one of the ideas associated with ITG, ranks among the top five IT management concerns in the world ([Kappelman, Nguyen, McLean, Maurer, Johnson, Snyder & Torres, 2017](#)). Such situation is perceived through the existence of several practical guides for the implementation of ITG, as well as through the expansion of several empirical studies on the matter ([De Haes, Van Grembergen & Debreceeny, 2013](#)).

Given the new unified understanding between IT and business, ITG’s traditional view may no longer hold true, and it is necessary to speed up and automate decision-making processes, create more agile and collaborative communities and engage with one another at a high-level strategy. As the boundaries between IT and business are drawing closer, ITG’s traditional view may be outdated in today’s organizations, requiring further research on the subject ([De Lone, Migliorati & Vaia, 2018](#)).

The objective of our study is to *investigate and analyze the aspects related to legitimation, theorization and trends in the evolution of ITG research in Brazil according to researchers familiar with the matter*.

Considering the opinion of some leading scholars in this area, our paper broadens current knowledge on ITG by identifying opportunities for improvement and by influencing policymaking, resource allocation, research agendas and other guidelines for research.

The present paper aims to answer the following research question: *What are the main aspects of legitimation, theorization and trends in the evolution of ITG research in Brazil according to researchers familiar with the matter?*

2. Literature review

Seminal authors such as [Weill and Ross \(2006\)](#) state that ITG is related to decision-making responsibilities and behavioral aspects for better use of IT in organizations. ITG also focuses on the definition and implementation of relational processes, structures and mechanisms, such as attention to regulatory and compliance issues ([Van Grembergen & De Haes, 2010](#)).

[Stremel \(2017\)](#) states that the development of new institutional spaces occurs through a network of researchers, research groups, scientific associations, academic disciplines and curricula, journals and specific scientific events, leading to the construction of programs or lines of research. Graduate studies dedicated to a particular research topic thus legitimize a new field of research. Moreover, making history known, as well as understanding its evolution and its relationship with other disciplines that support its development, is an important role for this institutionalization ([Ilott, 2016](#)).

With the polarization of ITG concepts in administration, computing and engineering ([Ilott, 2016](#)) in an international and in the national context ([Magalhães, Ohashi, Silva, Gaspar &](#)

Cardoso, 2017), there are five areas of evaluation defined by CAPES, namely: “Engineering III”, “Computer Science”, “Interdisciplinary”, “Engineering IV” and, most notably “Public and Business Administration, Accounting Sciences and Tourism”.

Dissemination and discussion of ITG findings related to management are usually held at events organized by the National Association of Graduate Courses in Administration (ANGRAD [1]) or the National Association of Graduate Studies and Research in Administration (ANPAD [2]), such as EnANGRAD and EnANPAD.

Regarding computer science, we mention the importance of the Brazilian Computer Society (SBC [3]); the most important forums are the Congress of the Brazilian Computer Society (CSBC [4]), as well as the Brazilian Symposium on Information Systems (SBSI [5]).

According to Araújo, Ralha, Graeml and Cidra (2015), SBSI differs from ANPAD events, because even though both congresses have the same research object, IT at SBSI focuses on technological aspects, while research in ANPAD is more focused on management issues and the organizational and social transformations arising from IT.

On the other hand, in CAPES’ “Engineering III” evaluation area, which includes courses such as production engineering and production and systems engineering, the Brazilian Association of Production Engineering (ABEPRO [6]) brings ITG researchers together. Its main scientific event is the National Meeting of Production Engineering (EnEGEP [7]), with specific scope on ITG.

In the recently instituted “Interdisciplinary” area of knowledge, the III course is called “Engineering, Technology and Management”. In this area, one finds the programs computer science, business and administration, information systems and knowledge management. Some of these programs have unique lines of research regarding ITG. The Brazilian Society of Knowledge Management (SBGC [8]) would be the closest relation to this “Interdisciplinary” axis, yet without incorporating ITG.

ISACA is the most relevant non-academic legitimizing body in the national and international scenario regarding ITG. As a global nonprofit association, ISACA has more than 140,000 professionals in 180 different countries and four chapters established in Brazil. ISACA is responsible for COBIT, which is considered one of the main good-practices ITG models (Lunardi, Dolci, Maçada & Becker, 2014).

According to Luciano, Wiedenhof & Macadar (2015), the year of 2004 marks the beginning of ITG discussions in Brazil. This was the year in which an important book by Weill and Ross (2006) was published, entitled “IT Governance”, which is considered one of the main works to date on the matter. The translated version was published in Brazil two years after the official release. Meanwhile, the first studies on the topic were presented in congresses across the country, such as CONTECSI. The first national journals that approached ITG, RESI and JISTEM, also released their first editions in 2002 and 2004, respectively.

Moreover, the use of theories in scientific research is a recommendation to increase the legitimacy of the ITG area (Salvador & Joia, 2017), since analyzing the use and role of theories in a given area of knowledge is a way of understanding the genesis of this field and discussing points that can be further explored (Luciano, Macadar & Wiedenhof, 2015). Some of the most common theories used in ITG are: contingency theory, transaction cost theory, agency theory and institutional theory (Jacobson, 2009).

Incidentally, it appears that ITG is still an incipient subject because most studies accomplished are either exploratory and/or descriptive; that is, studies focused on understanding or describing the related phenomena, rather than providing wider explanations (Luciano, Wiedenhof & Moron, 2015; Lobler, Lehnhart, Vale & Tagliapietra, 2015). Moreover, one observes the large number of qualitative studies, especially considering case studies (single or multiple). There is a need expand specific ITG lines of research in Brazil in academic journals and conferences (Luciano, Wiedenhof & Moron, 2015).

Recent papers developed on ITG encompass aspects related to technological and business changes, both in the local and international scenario (Luftman, Derksen, Dwivedi, Santana, Zadeh & Rigoni, 2015), as well as new IT, IT organization formats and ITG (Peppard, 2016; Pick, 2015; Tiwana & Kim, 2015). In this sense, IT is permanently intertwined with all aspects of business (Peppard, 2016; Tiwana & Kim, 2015).

By the end of the second decade of the 21st century, some trends arose: SMAC platforms (Luftman, Derksen, Dwivedi, Santana, Zadeh & Rigoni, 2015), Internet of things (IoT), intelligent agents, artificial intelligence, robotics and cybernetics, global IT, telematics, virtual worlds, bioinformatics, unplugged computing, computational thinking, digital convergence, adaptive systems, among others. Luftman, Derksen, Dwivedi, Santana, Zadeh and Rigoni (2015) also signal the top five management concerns of global executives, namely: (1) IT business alignment; (2) commercial agility; (3) reduction/control of commercial costs; (4) commercial productivity and (5) security/privacy.

Pick (2015) discusses how these technologies can directly affect ITG. This new reality also brings about some new problems regarding support, compatibility and, most importantly, information security management. ITG must adapt to the prevailing environment and organizational culture.

Tiwana and Kim (2015) agree with such statements. The authors recruited 105 companies for their study, identifying the increasingly strategic role of IT. As result, they verified that it is necessary to carry out interdepartmental knowledge transfer with ideas that come from areas other than IT itself, but which at first are apparently irrelevant to a particular task. However, the authors state that some IT decisions are no longer made by the IT unit itself. Thus, one should understand the differences between IT strategic agility and the governance of the various IT activities.

3. Methods and instruments

Our study uses both qualitative and quantitative methods through an exploratory and descriptive approach. We also made use of the Delphi technique through an electronic questionnaire, which was supported by content analysis.

According to Marcial and Grumbach (2015), the application of this method helps the elaboration of a collective discourse, with the restatement of the instrument and the general opinion expressed by the group to the same individuals. The participant in a new Delphi round could analyze whether he/she would keep the same answer, or change his/her opinion; the individual might even express something absolutely contrary to what was previously stated. We seek, then, to achieve greater consensus of the group of experts as a whole.

In a preliminary phase, the instrument was validated with five researchers who also participated in the first phase. Several experts were invited to take part in the research, considering their relationship with ITG, whether in scientific productions, supervisions, or even their relation to graduate programs in various areas of knowledge. All respondents were doctors and only a few were related to undergraduate programs. In addition, 41 researchers took part in the first phase, and 22 of them participated equally in the second phase (53.7%). Thus, our sample fits this type of method (Worrell, Di Gangi & Bush, 2013). In addition, data was collected and tested between March and April 2018.

Questions were categorized into two parts: Part A had three five-point Likert scale questions. The expert had to rate each assertion according to the answer that best represented his/her opinion, ranging from 1 (strongly disagree) to 5 (strongly agree). Another option was available to the respondents (9: "Unable to form an opinion") in order to avoid research bias. The criterion for consensus was established considering a 80% agreement rate on the two main measures (options 4 or 5), as suggested by Gracht (2012).

As no agreement was found on some of the Part A statements, a second round was carried out to better understand the opinion of the consulted community. However, we decided not to carry out a third phase due to a possible exhaustion.

Different statistical analyses were performed, such as fashion and frequency of each concept obtained for each of the assertions. The final results of the second round are shown in the tables below, except for the answers marked as 9 (“Unable to form an opinion”).

While established agreement was attributed to the percentage of total respondents in relation to the degree of agreement (options 4 or 5), “Disagreement” was related to the lower values corresponding to 1 and 2. Finally, the “Mode” represents the most frequent response obtained in the Likert scale. The unaccounted percentage between “Agreement” and “Disagreement” relates to the amount of items marked with option 3 (“Neither agree nor disagree”).

Part B was composed of nine essay questions. It allowed respondents to describe the three main items and not only the main aspect requested for each question. Thus, the valid percentage always refers to the total number of respondents, excluding blank answers. Therefore, the sum in the rows for each table may exceed 100%. As these questions were open-ended, we decided not to hold a new round for Part B.

4. Result analysis and discussion

4.1 Delphi respondent profile

A total of 33 educational institutions were recruited for this study; we considered one to three researchers from each institution. With the exception of the Northern Region (which did not participate in the survey), all other Brazilian regions were represented, with respondents from nine different states of the federation, most of them from São Paulo, Rio de Janeiro and Rio Grande do Sul.

The experts were classified according to two broad areas of knowledge. The first is Applied Social Sciences (ASS) from graduate programs in the following areas established by CAPES: “Public and Business Administration, Accounting Sciences and Tourism”, “Economics” and “Urban and Regional Planning/Demography”. The second area was “Exact and Earth Sciences/Engineering/Multidisciplinary” (OUT), with academics involved in the following CAPES’ subareas: “Computer Science”, “Engineering III”, “Engineering IV” and “Interdisciplinary”.

While ASS had the participation of 28 respondents (68.3%), OUT had 13 respondents (31.7%), considering only the first phase of the Delphi survey. With an average of sixteen years of doctoral degree, 30 researchers were doctors for over ten years (graduated in 2007 or before) (73.2%), and the remaining 11 became doctors between 2008 and 2016 (26.8%).

4.2 Analysis and discussion of part a results (Likert-scale questions)

Table 1 shows the answers obtained for Question 1 regarding the main CAPES’ assessment areas that support ITG in Brazil.

Of all six questions in “Part A”, question 1 is the only one where there was no agreement in both phases of Delphi research neither in any of the assertive components of this question.

Item	CAPES assessment areas	Agreement	Disagreement	Mode
1.1	Public and business administration, accounting and tourism	71.4%	14.3%	5
1.2	Computer sciences	60.0%	25.0%	4
1.3	Engineering III	45.0%	35.0%	2 and 5
1.4	Engineering IV	35.3%	29.4%	3
1.5	Interdisciplinary (Camera III)	70.6%	17.6%	4

Table 1.
CAPES assessment
areas that support ITG
in Brazil

In the second phase, in relation to CAPES assessment areas with their respective graduate programs adhering to ITG, the following were cited, in order of priority: 1.1) Public and Business Administration, Accounting and Tourism with 71.4% agreement and the only area with a mode of 5 (strong agreement). Two areas presented a mode of 4 (partial agreement): 1.5) Interdisciplinary (Camera III) with 70.6% agreement and 1.2) Computer Science, with 60.0% agreement. Finally, the two remaining areas were 1.3) Engineering III with 45.0% agreement and a tied mode of 5 and 2 (strong agreement vs. partial disagreement) and 1.4) Engineering IV with 35.3% agreement and mode of 3 (neutral).

By assessing the results by area of operation, considering the ASS subgroup, the order presented was identical to the sequence verified in the general ranking, with the following agreement results: 1.1) Public and Business Administration, Accounting Sciences and Tourism (78.6%); 1.5) Interdisciplinary (Camera III) (75.0%); 1.2) Computer Science (46.2%); 1.3) Engineering III (30.8%); and finally 1.4) Engineering IV (25.0%).

The order changes drastically in the OUT subgroup, with the following percentage of agreements: 1.2) Computer Science (85.7%); 1.3) Engineering III (71.4%); a tie of 60.0% between 1.4) Engineering IV and 1.5) Interdisciplinary (Camera III); and lastly 1.1) Public and Business Administration, Accounting and Tourism (57.1%).

In fact, we noticed different positions expressed by researchers from the two groups considered (ASS and OUT). ITG is understood as a subject of the profile of the researcher who investigates it.

Moreover, we found that ITG is studied in five of the 49 assessment areas officially approved by CAPES, with greater or lesser notion among them. Such diagnosis enables discussions under different approaches. It is clear that ITG is exclusive to a single area of knowledge, thus becoming a research field more closely related to Administration or Interdisciplinary areas.

Results previously obtained by Magalhães, Ohashi, Silva, Gaspar & Cardoso (2017) are corroborated, highlighting “Public and Business Administration, Accounting Sciences and Tourism” as the most prominent area when considering ITG.

Table 2 shows the answers obtained for Question 2 regarding the main academic legitimizing bodies that support ITG in Brazil.

Question 2 indicates that two academic legitimizing bodies related to ITG obtained agreement from the respondents, namely: 2.5) Associations related to CAPES Interdisciplinary Assessment Area (87.5%) and 2.1) ANPAD (85.7%). The other bodies mentioned by the respondents were: 2.3) Associations related to Programs linked to the CAPES Engineering III Evaluation Area (55.6%); 2.4) Associations related to Programs linked to CAPES Engineering IV Evaluation Area (33.3%); and 2.2) Brazilian Computer Society (SBC) (31.6%).

Some academic legitimizing bodies are more active, such as ANPAD, which has become more consolidated with the promotion of different scientific congresses (EnANPAD and EnADI), or even ABEPRO in the area of “Engineering III”, which promotes EnEGEP, both with specific tracks for ITG.

However, the importance given by the respondents to CAPES “Interdisciplinary” Evaluation Area, an area larger than ANPAD itself, is considered unexpected. The only body

Item	Academic legitimizing body	Agreement	Disagreement	Mode
2.1	Associação Nacional de Pós Graduação e Pesquisa em Administração (ANPAD)	85.7%	4.8%	5
2.2	Sociedade Brasileira da Computação (SBC)	31.6%	31.6%	3
2.3	Associations related to the program “Engineering III”	55.6%	27.8%	4
2.4	Associations related to the program “Engineering IV”	33.3%	46.7%	2
2.5	Associations related to the program “Interdisciplinary”	87.5%	0.0%	4

Table 2.
Academic legitimizing body supporting ITG in Brazil

more related to the “Interdisciplinary” area would be SBGC. However, its focus is on knowledge management research, and the study of ITG in its main scientific congress, KM Brazil (Knowledge Management Brazil), is not emphatically portrayed.

Thus, it appears that there is room and demand for academic legitimizing bodies to support research in ITG, especially in the “Interdisciplinary” area, since graduate programs associated with it do not have an association to appeal and discuss research advancement, as seen in other more traditional and longer-established areas of knowledge.

Table 3 shows the answers obtained for Question 3 regarding the main non-academic legitimizing bodies that support ITG in Brazil.

Regarding non-academic legitimizing bodies, only one assertion received a degree of agreement with at least 80.0% of the answers, namely the option 3.1) ISACA, which received 83.3% of the answers. The subsequent bodies were: 3.3) IBGC with 76.2%; 3.4) IBGP with 65.0%; 3.2) Federal organs with 52.6%; and finally 3.5) ASSESPRO National with 47.4%.

As pointed out by the respondents, ISACA stood out as the most relevant non-academic legitimating body. In fact, De Haes, Van Grembergen & Debreceeny (2013) state that it is necessary to reduce the distance between academic research and practice regarding the use of models. Thus, ISACA in conjunction with other non-academic legitimizing bodies could thus support the development of applied research in ITG.

4.3 Analysis and discussion of part B results (open-ended questions)

Table 4 shows the answers obtained for Question 4 concerning the main national scientific journals devoted to ITG.

By analyzing Question 4, it appears that fifteen different national scientific journals were acknowledged, six of which were mentioned by at least five researchers. Thus, the main journals cited are JISTEM, launched in 2004 and linked to FEA/USP; and RESI, launched in 2002 and linked to the graduate programs in Applied Computing and Administration at

Table 3.
Non-academic legitimizing body supporting ITG in Brazil

Item	Non-academic legitimizing body	Agreement	Disagreement	Mode
3.1	Information Systems Audit and Control Association (ISACA)	83.3%	0.0%	5
3.2	Federal agencies like Tribunal de Contas da União (TCU) and Secretaria de Logística e Tecnologia da Informação of Ministério do Planejamento, Desenvolvimento e Gestão (SLTI/MPOG) (extinct in 2019)	52.6%	26.3%	4
3.3	Instituto Brasileiro de Governança Corporativa (IBGC)	76.2%	9.5%	4
3.4	Instituto Brasileiro de Governança Pública (IBGP)	65.0%	20.0%	4
3.5	Associação das Empresas Brasileiras de Tecnologia da Informação (ASSESPRO National)	47.4%	47.4%	2 and 4

Table 4.
Brazilian National scientific journals that support ITG in Brazil

Position	National scientific journals	Frequency	Percentage
1	Journal of information systems and technology management (JISTEM)	23	71.9%
2	Revista Eletrônica de Sistemas de Informação (RESI)	16	50.0%
3	Revista de Administração Contemporânea (RAC)	9	28.1%
	Revista de Administração de Empresas (RAE)	9	28.1%
5	Gestão & Produção	7	21.9%
6	Revista Brasileira de Sistemas de Informação (iSys)	5	15.6%
	9 journals mentioned by one or two researchers	11	
	Total respondents (except 9 that didn't express their opinions)	32	

UFTPR. 71.9% and 50.0% of the researchers mentioned these as the most prominent journals, respectively (corroborated by Luciano, Wiedenhof & Macadar, 2015).

Tied in third position, both with 28.1% of the indications, are the RAC journal, instituted by ANPAD in 1997; and RAE, published by FGV since 1961. The journal *Gestão & Produção*, from the Department of Production Engineering of UFSCAR, published since 1994, ranks 4th position with 21.9%. Despite ranking fifth, with 15.6%, the iSys of the graduate program in Informatics of the Federal University of Rio de Janeiro (UNIRIO) ranks first position along with JISTEM, when analyzing only the researchers from the OUT subgroup. On the other hand, RESI ties with RAE in the third position according to this group of respondents.

Table 5 shows the answers obtained for Question 5 regarding the main foreign scientific journals related to ITG.

By analyzing Question 5, it appears that 35 different foreign scientific journals were acknowledged, seven mentioned by at least four researchers. With nearly half of the nominations (44.8%), MISQ, launched in 1997 by the University of Minnesota, stands out as the leading foreign journal considered by respondents.

The Journal of Management Information Systems (JMIS), published by Taylor & Francis since 1984, closely follows MISQ with 27.6% of the researchers' responses. Incidentally, the only journal whose title pertains to ITG, IJITBAG, whose chief editors are Steven De Haes and Wim Van Grembergen of the University of Antwerp, Belgium, published by IGI Global since 2010, came in third place (24.1%).

Table 6 shows the answers obtained for Question 6, regarding the main national scientific congresses related to ITG.

The analysis of Question 6 shows nine different national scientific congresses listed, six of them mentioned by at least five researchers. The most mentioned event by researchers (66.7%) is EnANPAD, promoted annually by ANPAD. Also from the same organizing entity,

Position	Foreign scientific journals	Frequency	Percentage
1	Management information systems quarterly (MISQ)	13	44.8%
2	Journal of management Information systems (JMIS)	8	27.6%
3	International journal on IT/Business alignment and governance (IJITBAG)	7	24.1%
4	Journal of information technology (JIT)	6	20.7%
5	Journal of strategic information systems (JSIS)	5	17.2%
6	European journal of Information systems (EJIS)	4	13.8%
	International journal of Information systems	4	13.8%
	28 journals mentioned by one to three researchers	44	
	Total respondents (except 12 that did not express their opinions)	29	

Table 5.
Foreign scientific journals that support ITG in Brazil

Position	National scientific congress	Frequency	Percentage
1	Encontro da Associação Nacional dos Programas de Pós-graduação em Administração (EnANPAD)	22	66.7%
2	International conference on Information systems and technology management (CONTECSI)	21	63.6%
3	Encontro de Administração da Informação (EnADI)	18	54.5%
4	Seminários em Administração (Semead)	12	36.4%
5	Simpósio Brasileiro de Sistemas de Informação (SBSI)	7	21.2%
6	Encontro Nacional da Engenharia de Produção (EnEGEP)	5	15.2%
	3 other national congresses mentioned by up to 3 researchers	6	
	Total respondents (except 8 that did not express their opinions)	33	

Table 6.
Brazilian National scientific congresses that support ITG in Brazil

but with three-yearly periodicity, EnADI ranks third position (54.5%). By the way, 63.6% and 36.4% of respondents mentioned both events promoted by FEA/USP, CONTECSI and SemeAd in that order. SBSI came in the fifth place (21.2%).

Table 7 shows the answers obtained for Question 7, regarding the main foreign scientific congresses related to ITG.

By analyzing the answers given to question 7, seventeen different foreign scientific congresses were reported, five mentioned by at least seven researchers. The Americas Conference on Information Systems (AMCIS) is the main international event, as declared by 62.1% of interviewed researchers. A similar European event, ECIS, was mentioned by 44.8% of the participants. The oldest event in the area, HICSS, came in the third place (34.5%).

Table 8 shows the answers obtained for Question 8 regarding the main national researchers associated with the ITG.

Question 8 of the applied research instrument indicates that 21 different national researchers were found in association with ITG, five of them mentioned by at least three researchers.

Edimara Mezzomo Luciano, professor at PUC/RS, is considered the most prominent researcher, having been mentioned by 60.0% of her peers in Brazil. Antonio Carlos Maçada, professor at the Federal University of Rio Grande do Sul (FURG) and Director of ANPAD (2018-2020) comes in second place (50.0%). In fact, both Edimara Mezzomo Luciano and Antonio Carlos Maçada are among the ten most productive authors according to the ANPAD ADI area (Freitas, Marcolin, Becker & Martens, 2018).

Pietro Dolci, professor at the University of Santa Cruz do Sul (UNISC), was mentioned by 25.0% of respondents. Following are Luiz Luiz Albertin, professor at FGV/SP and Guilherme Lerch Lunardi, professor at FURG, represented by 15.0% of respondents' nominations. The state of Rio Grande do Sul seems noteworthy with four out of five leading researchers in ITG, except for Alberto Luiz Albertin (SP).

Table 9 expresses the answers obtained for Question 9 regarding the top foreign researchers regarding ITG.

Table 7.
Foreign scientific congresses supporting ITG in Brazil

Position	Foreign scientific congress	Frequency	Percentage
1	Americas conference on information systems (AMCIS)	18	62%
2	European conference on information systems (ECIS)	13	44.8%
3	Hawaii International conference on system sciences (HICSS)	10	34.5%
4	International conference on information systems (ICIS)	8	27.6%
5	International conference on information resources management (Conf-IRM)	7	24.1%
	12 foreign congresses mentioned by one to three researchers	24	
	<i>Total respondents</i> (except 12 that did not express their opinions)	29	

Table 8.
Brazilian National researchers who support ITG in Brazil

Position	National researchers	Frequency	Percentage
1	Edimara Mezzomo Luciano	12	60.0%
2	Antonio Carlos Maçada	10	50.0%
3	Pietro Dolci	5	25.0%
4	Alberto Luiz albertin	3	15.0%
	Guilherme Lerch Lunardi	3	15.0%
6	16 researchers mentioned by one or two respondents	19	
	<i>Total respondents</i> (except 21 that did not express their opinions)	20	

Question 9 indicates that 18 different international researchers were mentioned in the ITG area, four of them mentioned by at least three respondents. Thus, the authors of the first book translated into Portuguese on IT Governance (Weill & Ross, 2006), Peter Weill & Jeanne W. Ross, are the first and third most cited ones (68.8% and 25.0%). Both scientists are linked to the MIT Sloan School of Management.

Authors Wim Van Grembergen and Steven De Haes of the University of Antwerp, Belgium, publishers of IJITBAG, come in second and fourth place (31.3% and 18.8%).

Table 10 shows the answers obtained for Question 10 regarding the main research techniques or research approaches in the ITG area.

Sixteen different research techniques or approaches related or applied to the area of ITG were categorized, five mentioned by at least three researchers, according to a survey verified in the answers to Question 10.

In order of importance: case studies (single or multiple) (66.7%) and surveys (47.6%), followed by quantitative research (33.3%), which includes exploratory research, use of structural equations, linear regression, factor analysis, multivariate data analysis and conditional correlational analysis.

Thematic studies were suggested by 23.8% of the experts, which include the use and fulfillment of ITG, meeting stakeholder needs, evaluation and integration of models and best practices in ITG and Big Data. Subsequently, interviews, mainly with focus groups, were mentioned by 14.3% of the researchers.

Table 11 expresses the answers obtained for Question 11 regarding the main theories or theoretical frameworks of the ITG area.

A total of 22 theories or theoretical frameworks were indicated in the ITG field, four of which were mentioned by at least two researchers. Nevertheless, this question was found to be the most difficult one to answer due to the high rate of blank answers (63.4%) in the Delphi

Position	Foreign researchers	Frequency	Percentage
1	Weill, Peter	11	68.8%
2	Grembergen, Van	5	31.3%
3	Ross, Jeanne W	4	25.0%
4	De Haes, Steven	3	18.8%
14 researchers mentioned by one or two respondents		8	
<i>Total respondents</i> (except 15 that did not express their opinions)		16	

Table 9.
Foreign researchers who support ITG in Brazil

Position	Research techniques or approaches	Frequency	Percentage
1	Case study	14	66.7%
2	Survey	10	47.6%
3	Quantitative research	7	33.3%
4	Theme	5	23.8%
5	Interview	3	14.3%
11 research techniques mentioned by one respondent: content analysis, Delphi analysis, secondary data analysis, feasibility analysis, descriptive studies, event, exploratory, action research, symposiums, theory, model validation		11	
<i>Total respondents</i> (except 20 that did not express their opinions)		21	

Table 10.
Key research techniques or current ITG research approaches in Brazil

Table 11.
Main theories or
theoretical frameworks
of ITG in Brazil

Position	Theories or theoretical frameworks	Frequency	Percentage
1	Frameworks	8	53.3%
2	Institutional theory	5	33.3%
3	Agency theory	4	26.7%
4	Transaction cost theory (Outsourcing)	2	13.3%
18	Theories or milestones mentioned by an interviewee: strategic alignment, dynamic capabilities, certification, effectiveness, finance, risk management, business management, corporate governance (CG), indicators, mechanisms, models, practices, actor-network theory (ANT), the theory of communicative action (TCA), social representation theory (SRT), digital transformation, resource based vision (RBV), Weill-Ross, No clear theoretical framework	18	
	<i>Total respondents</i> (except 26 that did not express their opinions)	15	

survey conducted. One respondent mentioned that in Brazil there are no clear theoretical frameworks in ITG research. Luciano, Macadar & Wiedenhof (2015) also questioned the significant absence of basic theories in the ITG field. In national journals, the use of theories corresponds to about 5%; in North American journals, for instance, ITG theories corresponds to around 70%.

Still, frameworks are mentioned by 53.3% of researchers. This contrasts with a study by Luciano, Macadar and Wiedenhof (2015), which states that good practice models do not belong to the key concepts of ITG. Therefore, “perhaps new frameworks could also be considered a milestone, as it interferes with how organizations control their IT” (researcher D). “The theories are largely based on empirically used frameworks” (researcher E). From another perspective, in addition to COBIT, as pointed out by several respondents, “although ITIL is not a governance model but a service management model, it has had a significant impact on the governance area [...] with ITIL as a governance mechanism for monitoring IT decisions and their outcomes” (researcher F).

In contrast, the institutional theory was mentioned by 33.3%, followed by the agency theory (26.7%) and the transaction costs theory (Outsourcing) (13.3%). Moreover, the institutional theory has been widely used in the area of ITG, as pointed out in studies by Ilott (2016) and Jacobson (2009) and by some of the researchers surveyed herein.

Table 12 shows the answers obtained for Question 12 regarding the main themes or research trends in ITG.

Question 12 indicates some key insights for future research on ITG research. Answers were categorized into 43 different research themes or trends, five of which were mentioned by at least three researchers.

“Emerging Technologies” was the most dominant topic (29.2%), which includes, according to the research, aspects related to Cloud Computing, IoT and other types of applications, as well as the impact of these new technologies on society (Luftman, Derksen, Dwivedi, Santana, Zadeh & Rigoni, 2015; Peppard, 2016; Pick, 2015; Tiwana & Kim, 2015). Consideration should also be given to the need for greater strategic IT agility based on the governance of these new IT-specific actions (Tiwana & Kim, 2015).

“Performance and impact” was the second most mentioned topic (20.8%). It encompasses aspects aimed at better understanding the benefits of ITG or its own effectiveness or performance, which has been a trend through confirmatory research, confronting or relating various constructs (e.g. Lunardi, Dolci, Maçada & Becker, 2014).

Table 12.
Top current ITG research topics or trends in Brazil

Position	Research topics or trends	Frequency	Percentage
1	Emerging technologies	7	29.2%
2	Performance and impact	5	20.8%
3	Mechanisms	3	12.5%
	Models	3	12.5%
	Public sector	3	12.5%
	12 topics mentioned by two respondents: culture, distinguishing between ITG and IT management, frameworks, data governance, digital governance, indicators, Industry 4.0, Internet, corruption prevention, social networking, information security, outsourcing	24	
	25 topics mentioned by an interviewee: alignment, background, certifications, compliance, understanding, cybercrime, strategies, structures, human factor, ITG phenomena, finance, inter-institutional governance, investments, maturity, modeling, IT operational level, orchestration, small and medium-sized businesses (SME), forensic expertise, manufacturing plant, symbolic power, privacy, traceability, hospital sector, systems, stakeholders, ITG not themed/current trend	25	
	<i>Total respondents</i> (except 17 that did not express their opinions)	24	

“Mechanisms”, “Models” and “Public Sector” were all placed in the third position with 12.5%. “Mechanisms” was not detailed by respondents, which may be related to both aspects of relationship mechanisms as well as processes that are also used as ITG mechanisms. By “Models”, the researchers mentioned both governance and management models and, the application of Governance models in different areas of knowledge (researcher A). The so-called good-practices models or frameworks most prominent in Brazil have been ITIL and COBIT (Lunardi, Dolci, Maçada & Becker, 2014). Moreover, “Public Sector” is another topic related to the different instances of government and companies or public agencies. It is, in general, a very recurring theme on recent research (Tonelli, Souza Bermejo, Santos, Zuppo & Zambalde, 2017).

Mentioned by 8.3% of respondents, on an equivalent basis, are the themes: culture, in national or organizational aspects; distinction between ITG and IT management; framework (COBIT for example); data governance or security and information security; governance or digital transformation; indicators; Industry 4.0 or scanning services; Internet governance and social networking; corruption prevention as well as outsourcing and contract governance.

However, other aspects mentioned by the interviewees were the lack of understanding of what ITG really means in Brazil due to the lack of maturity in research in the area (researcher B). Another trend would be to focus more on the “phenomena” that stabilize or destabilize IT governance in organizations and less on the superficial (sometimes endless) “explanations” around the topic (researcher C).

5. Final considerations

After the expression of distinctive positions and discussions under different approaches, we conclude that ITG is not the subject of a single research area; instead, it is an interdisciplinary field with the participation of researchers from at least five of the 49 assessment areas officially approved by CAPES. However, the greatest recognition comes from peers. While

the largest community of researchers (i.e. the Applied Social Science community) believes to own the responsibility for ITG studies, other researchers associate it with other fields, such as exact and earth sciences, engineering and multidisciplinary studies. In general, ITG is identified as more adherent to the areas of “Public and Business Administration, Accounting and Tourism” and “Interdisciplinary”. It is important to review the evaluation criteria and the respective quality of the scientific production of ITG-related journals, especially in their respective evaluation areas.

However, although good practice models are classified as significant theoretical frameworks, studies that are simply based on these frameworks should be attenuated. New theories in the field of ITG need to be developed, as well as a better research foundation in ITG that also relies on institutional theory and agency theory, as main adjacent theories.

The main trend for the coming years is the research on emerging technologies such as Cloud computing and IoT, both in the context of ITG. Analyzes regarding the performance and impact of ITG are important areas to be investigated in order to better understand ITG benefits and effectiveness.

Another relevant aspect is the greater insertion and interaction of researchers with practitioners and high-level executives, which enables the accomplishment of partnerships between the academy and companies or public or private organizations, such as ANPAD, SBGC, ISACA, among others. The development of research applied to the real problems and demands of organizations and society is essential, as already indicated by [Araújo, Ralha, Graeml & Cidral \(2015\)](#).

We have managed to shed light on some ITG indicators as a research topic, allied to the opinion of ITG national researchers. Our investigations into this area led to some relevant aspects for the advancement of this incipient research field with the support of legitimating academic bodies; the findings are relevant not only for the academia, but also for the community of practicing managers.

The findings add substantially to advancements in the field of ITG. The research contributions can be grouped according to each stakeholder involved with ITG.

- (1) For academia and academia-related researchers: one must seek to evolve toward the full institutionalization of this area of research and to preserve the legacy of this scientific community, as pointed out by [Tolbert and Zucker \(1999\)](#). To this end, this study may help to advance ITG in Brazil. In addition, many of the points listed in this paper, once adapted, can be put into action by the scientific community.
- (2) For the practicing community of business managers and private and public organizations: it is a two-way street. It is necessary to increase the partnership between practitioners, i.e. the ones involved in ITG activities in organizations and ITG researchers. There is a lot of dissonance in the nomenclatures used, in addition to gaps between what is published and what is operationalized in the daily activities of executives. For the development of good quality research, the academia needs to unite and be closer to the professionals operating in organizations active in the market. On the other hand, in order to make ITG more practical, one must also resort to what is published scientifically. In fact, top executives are also responsible for making this happen.
- (3) For academic legitimizing bodies: Brazilian graduate programs, associations – such as ANPAD, SBGC, SBC and ABEPRO – and editors from various international and national journals and scientific events listed herein should pay more attention to their role in the scientific evolution of this new area of research. Thus, the indicators shown in our research indicates what the scientific community understands as the main supporters for the evolution of this research area.

- (4) For non-academic legitimating bodies: the various institutions evaluated in this research, especially ISACA, can also contribute to promoting and expanding the partnership between the academy and practitioners from organizations active in the market. In addition, non-academic institutions should require greater connection between the academia and the community of professionals involved with ITG. The research conducted herein can help to guide new actions undertaken by these non-academic organizations, which legitimizes them area.
- (5) For researchers from other areas of knowledge: science continues to expand. That being said, ITG as an interdisciplinary theme, cannot be studied only from a single perspective, since the phenomenon and related problems are complex. Thus, it is important to pay attention to the possibility of the ITG academic community to get involved with researchers from other areas, in addition to being open to research from other areas of knowledge.

Finally, a number of potential limitations need to be considered. First, some researchers were unavailable to participate in the second phase of the Delphi research. Second, it was not possible to go through a third Delphi round. Likewise, “Part B” (open-ended questions) of the research instrument, was another limitation as it was not contemplated in the second phase for a new collection of answers, which could have partially changed the results presented herein.

A similar study conducted with international researchers or market professionals is suggested for future research. Another possibility would be the elaboration of roadmaps demonstrating the relations between researchers in the ITG area and its structural evolution. Such identification would clarify the agents involved in ITG; i.e. the cooperation between programs and researchers from different areas focused on ITG.

Notes

1. Portuguese acronym for Associação Nacional dos Cursos de Graduação em Administração.
2. Portuguese acronym for Associação Nacional de Pós-Graduação e Pesquisa em Administração.
3. Portuguese acronym for Sociedade Brasileira da Computação.
4. Portuguese acronym for Congresso da Sociedade Brasileira da Computação.
5. Portuguese acronym for Simpósio Brasileiro de Sistemas de Informação.
6. Portuguese acronym for Associação Brasileira de Engenharia de Produção.
7. Portuguese acronym for Encontro Nacional de Engenharia de Produção.
8. Portuguese acronym for Sociedade Brasileira de Gestão do Conhecimento

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