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The Impacts Of Technological Innovation On Accounting Firms In Rio Grande Do Sul: Factor Analysis

Abstract

The dissemination of computer use and software development brought about intense modifications in accounting firms' procedures as from the 1990's. From the perspective of accounting professionals, the impact of these innovations has not been properly analyzed. Therefore, the general objective in this study is to assess the impacts technological innovation has caused in the accounting firms in Rio Grande do Sul as from 1990. From the methodological viewpoint, the research is exploratory and the data were collected through a survey, using a structured questionnaire with a scale from zero to ten. The non-probabilistic sample included 408 respondents and the analyses based on these questionnaires took place using "R" factor analysis. Among the results, the respondents' perception that the technological innovation permitted more agile service provision is highlighted, as well as better information quality and the provision of more useful information to the managers. The element that most influenced the firms was the arrival of the Internet. Nevertheless, these innovations enhanced the complexity of the firms' tasks and the need to capture the employees.

Key words: Technological impacts, Accounting firms, Information technology.

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1. Introduction

In less than two decades, society has gone through different technological innovations. The companies that needed a wide range of employees to accomplish administrative services started to count on integrated management systems that permit controlling the companies' main activities practically in real time, using fewer employees for this purpose.

In accounting, this phenomenon has also happened, leading to changes in the firms' internal processes. It can be affirmed that, in some activities, machines and computer systems replaced the human beings. These changes are responsible for increased productivity at work and for the dislocation of people to more dynamic activities though, which demand the use of creativity and decision-making power, without concerns with daily repetitive tasks.

Today, it is hardly probable that an organization can stay competitive without using technological resources, as the investments in technological infrastructure will support the operation of an organization's current or future business (Byrd & Turner, 2000). In that context, Lunardi, Dolce and Maçada (2010) also affirm that information technology-IT is perceived as a strategic need for the organization, which is capable of offering many competitive advantages for who use them in their business, and of creating competitive disadvantages for those who do not.

In the accounting profession, according to Scott (2009), technology has entailed the need to broaden the education and the ascent of accounting consultancy. Other effects on the accounting professionals may exist though as a result of IT innovations. Nevertheless, these have not been clearly evaluated. Therefore, the following question is raised: what were the impacts caused by technological innovation in accounting firms from Rio Grande do Sul as from the 1990's?

The general objective in this study is to assess the impacts the technological innovation has caused in accounting firms from Rio Grande do Sul as from 1990. It gains relevance by providing accounting students and professionals with further understanding about the impacts of the technological evolution in accounting firms.

2. Theoretical Framework

2.1 Accounting and the New Information Technologies

The advances in communication and the revolution in information have turned into landmarks for the accounting profession, as accounting remained stagnated for many years due to its deficit position or even due to the lack of information exchange with its users. Among these advances, the advent of Internet use stands out, which permits information monitoring and virtual transmission. The integrated use among network computers and the Internet have marked a new information age (Araújo, Cavalcante e Duarte, 2003).

Another innovation that entailed several modifications for the accounting firms is the Public Fiscal Bookkeeping System – SPED, established by Decree 6.022 on January 22nd 2007. The objective of the SPED is to standardize the fiscal obligations. This new situation simplified the taxpayers' additional obligations, which will facilitate and rationalize their information (Azevedo e Mariano, 2011). According to studies like Faria, Finatelli, Geron and Romero (2010), however, the SPED has not achieved satisfactory results yet in terms of agility and productivity, as it demands high implementation and execution costs.

Due to these technological changes, the accounting firms need to heed and be prepared for this improvement, mainly regarding the accounting SPED. According to Duarte (2009, p. 107), digital bookkeeping (DBK) is "the accounting pillar of the SPED. In simplified terms, DBK can be understood as the production of accounting ledgers in electronic format, using a file with a standardized layout, and signed with a digital certificate".

The advent of the social networks has entailed new lifestyles and customs for society and impacts for the accounting firms. Duarte, Quant and Souza (2008) have defined the social networks as groups, through "specific software that permits the recording of profiles, with general and specific data and information, in a wide range of formats and types", which can be accessed by other people from many varied settings.

According to Lemos, Pastor and Oliveira (2012), the social networks support communication among organizations, offering benefits to the users. On the other hand, Mondini, Domingues, Correia and Mondini (2012) underline the companies' difficulty to control their use by the staff, reducing their employees' productivity.

2.2 Technological Innovation and Accounting Management Practices

The introduction of new technologies ends up generating structural changes in organizations and these influence the institutions' costs and the reorganization of their productive processes, always to make them more competitive (Mat, 2010).

Not all researchers see the technological impacts as positive though. Some consider the impacts neutral. According to Scott (2009), for example, technology has definitely changed the face of accounting over the years, but it is not easy to identify if its impacts were negative or positive. In addition, according to that author, some of the impacts of technology are neither negative nor positive, but mere alterations that raise demands for the profession.

In their study about the impacts of technology on information systems in some types of accounting organization, Alsharayri (2011) and Choe (2004) observed only positive relations between the level of technology and the amount of information the information system management produced.

In accordance with Alsarayreh, Jaradat and Alamro (2011), technology has caused great impacts, mainly in the agility and reliability of the information systems used in accounting firms. The basic goal of accounting information, in line with Allahyarl and Ramazani (2011), is to help its users to make decisions, considering that accounting is able to produce relevant information for the formulation of strategic businesses and processes, for activity control and for efficient resource use in an organization.

According to Scott (2009), the clear advantage of technology is the use of different tools that permit accountants to execute their functions in an agile manner. This global aspect of technology contributes to accounting and its competitiveness, as technological advances represent more speed and efficiency for accounting services.

In line with Acevedo (2012), if communication in accounting firms is fast, they can help to increase the productivity, permit better commercial decision making and facilitate the expansion of the company into new territories or countries, as the adoption of IT resources allow the companies to keep up a competitive advantage over their rivals. Accounting firms can use information technology to create new services or improve the services delivered to their clients.

In accordance with Scott (2009), one of the mayor disadvantages of technology is its dependence on human resources. Technology is a product of human innovation and, therefore, repeats the human errors. Human errors, when interlinked with technology, can be very expensive. This demonstrates that another disadvantage is the profession's dependence on technology.

Aribaba, Asaolut and Olaopa (2011), in turn, highlight the importance of IT for society, mainly in small service companies, leading to a better performance and greater corporate development.

According to Mat (2010), the basic goal of IT in an accounting firm is to help the users to make decisions, producing information that can improve the firm's performance and formulate business planning and control strategies.

In that context, Sarakolaei, Bishak and Rahimipoor (2012) affirm that IT can affect the result of the managers' decisions, as it can raise obstacles that hamper the understanding and use of the financial statements the accounting systems produce. These possible difficulties are related to the data put into the system and the possible distortions produced in the output reports. Therefore, the use of IT should be based on appropriate and reliable theoretical concepts and accounting methods.

2.3 Technological Impacts in the Accounting Firms

As regards accounting work, IT can play a fundamental role in the management process of the firm, as well as in the accounting activities. In that sense, Lehmkuhl, Veiga and Rado (2008) emphasize that IT facilitates the knowledge management process of the organization's stakeholders, facilitates the internal and external communication and offers supports to improve the knowledge, whether through the best work practices or discussions to disseminate knowledge.

The most highlighted aspect of IT in the accounting context, according to Handel (2003), derives from its increase in the speed at which the routines the accountants are responsible for are performed. The higher speed in the accomplishment of routines, in combination with precise data processing, are factors that justify the use of IT in the contemporary world, in accordance with Sarokolaei *et al.* (2012). The implementation of new IT technologies in organizations has boosted not only the management process, control and routines, but has revolutionized the business methods and is continuously changing the nature of accounting and the accountants' role. In that sense, Sanchez and Albertin (2009) highlight the importance of investing in IT, as this strategic action can offer competitive advantages.

According to Simons (1987), the competitive environment requires accounting organizations to be capable of creating value for their clients and of distinguishing themselves from their competitors, through the formulation of a well-defined business strategy. This strategy should be consistently supported by organizational factors, such as: effective technologies, organizational design and accounting systems that provide useful and reliable information (Jermias & Gani, 2004).

In accordance with Grande, Estébanez and Colomina (2011), a well-defined strategy, based on investments in IT and in staff qualification, will offer the accounting firms productive advantages and favorable changes when compared to the clients and to their competitors.

3. Methodological Procedures

3.1 Research Classification

To accomplish this study, a descriptive and quantitative design was adopted, due to the comparison with practice and the analysis with the help of statistical techniques (Richardson, 1999).

3.2 Population and Sample

The population used to accomplish this research consisted of the 9,260 accounting firms headquartered in the State of Rio Grande do Sul. As the list of e-mails of the professionals registered at the Regional Accounting Council of Rio Grande do Sul (CRCRS) could not be obtained, through other sources, the contact information of 9,079 firms was collected, which were contacted and served as the research population.

Answers were received from 408 accounting firms, which constituted the sample. As the e-mails were sent to the legal representatives to answer the questionnaire, the researchers believe that they were most of the respondents of the data collection instrument.

3.3 Data Collection Instrument

To collect the data, a structured questionnaire – Survey was applied, divided in two parts. The first part of the questionnaire, as displayed in Figure 1, includes relevant questions on the firm's structural data and the profile of the person responsible for the firm. Based on that information, the respondents could be qualified in terms of firm size, years of activity, etc. The second part consists of thirty questions related to the impacts of IT, based on the theoretical framework, distributed as follows: based on Cadez and Guilding (2008), questions 5, 6, 16, 24, 27, 28 and 29 were formulated; Grande, Estébanez and Colomina (2011), questions 11, 14 and 15; Grande, Estébanez and Colomina (2011) and Sarokolaei *et al.* (2012), question 18; Jermias and Gani (2004), question 1, 2, 4, 7, and 9; Langfield-Smith (1997), question 22; Langfield-Smith (1997) and Sarokolaei *et al.* (2012), question 26; Mcafee (2006), questions 3, 8, 17, 23 and 25; Mcafee (2006) and Sarokolaei *et al.* (2012), questions 19, 20 and 21; Rocio (2010), question 30. The authors formulated questions 10, 12 and 13 based on their expectations.

The accounting professionals were expected to score the formulated questions between zero and 10, according to their level of agreement (0 = fully disagrees and 10 = fully agrees) with the impacts IT has caused in their accounting firm.

An e-mail was sent to the people responsible for the firms, requesting their participation in the research. The e-mail contained a link to access the questionnaire in Google Docs. These questionnaires contained fields to be marked, while the questions in Part II contained a field below each question that displayed the score and limited to answers between zero and 10.

Part I
Region of RS the firm is active in
Serrana ( ) Metropolitan Region of Porto Alegre ( ) Campanha ( ) Central ( ) Litorânea ( ) Missões ( ) Campos de Cima da Serra ( ) Alto Uruguai ( ) Planalto Médio ( ) South ( ) Other ( )
Number of clients
Up to 25 ( ) between 26 and 50 ( ) between 51 and 75 ( ) between 76 and 100 ( ) more than 100 ( )
Length of activity of the firm
Up to 5 anos ( ) 6 to 10 years ( ) 11 to 15 years ( ) 16 to 20 years ( ) d21 to 25 years ( ) 26 to 30 years ( ) 31 to 35 years ( ) 36 to 40 years ( ) more than 40 years ( )
Number of employees
Up to 5 ( ) between 6 and 10 ( ) between 11 and 15 ( ) between 16 and 20 ( ) between 21 and 25 ( ) between 26 and 30 ( ) more than 30 ( )
Legal status of the firm
Civil Society ( ) Individual Firm ( ) Businessman ( ) Other ( )
Qualification of the responsible
Accountant ( ) Accounting Technician ( )
Degree of the responsible
B.Sc. ( ) Specialization/MBA ( ) M.Sc. ( ) Ph.D. ( )
How do you classify your firm in comparison with the competitors
Small ( ) Medium ( ) Large ( )

Part II		
Question	**Argument**	**Score**
1	The firm makes its database available through remote access for the clients to get the information or reports they need.	
2	The different information, as well as the accounting SPED, the fiscal SPED, among others, led to an increased number of clients who demanded information about these.	
3	The technological innovation enhanced the integration of information between the firm and its clients.	
4	IT entailed the need for continuous improvements in the quality of the firm's services.	
5	IT reduced the number of physical meetings between the person responsible for the office and the clients.	
6	The technological innovation furthered the firm's growth in terms of clients.	
7	The firm, with new technology, can offer new products to its clients.	
8	The services, with IT support, are now performed in a more agile manner.	
9	The services, with IT support, are now performed more safely.	
10	The technological innovation applied to accounting services motivated the creation of new firms.	
11	The application of information systems increased the main salary paid in the firm.	
12	The firm needed to hire external advice for IT support.	
13	IT caused greater financial risks through the payment of fines due to information delay.	
14	IT helped to attend to new markets.	
15	IT helped to attend to new activities.	
16	IT furthered the clients' fidelity to the firm.	
17	The services provided by public agencies gained agility as a result of IT use.	
18	The incorporation of IT increased the need to train the employees to perform the accounting services.	
19	The quality of the services provided improved as a result of IT use.	
20	IT enhanced the complexity of the services provided.	
21	IT added more tasks to the firm.	
22	The management of the firm improved as a result of IT use.	
23	Internal or external communication became agile and efficient as a result of IT use.	
24	The use of IT increased the profitability of the firm.	
25	IT enhanced the agility of the information provided.	
26	The firm had to hire more qualified professionals to respond to the needs deriving from the new technologies.	
27	The employees use social networks during work hours.	
28	The arrival of IT led to a reduction in the number of employees in the firm.	
29	The fees increased in accordance with the proportion of IT-related costs.	
30	The major technological innovation for the firm was the arrival of the Internet.	

Figure 1. Questionnaire applied to the people responsible for the accounting firms in Rio Grande do Sul

According to Van der Stede, Young and Chen (2007), research questions should be pretested for evaluation purposes, in order to check whether the respondents can correctly understand and easily answer the questions.

Therefore, the questionnaire sent to collect the data for this research was pre-analyzed by a college professor holding a Ph.D. in Accountancy and another holding an M.Sc. in Accountancy, followed by a pretest with four accountants and two accounting technicians, all of whom were responsible for accounting firms, four of which were located in the Metropolitan region of Porto Alegre and two in the Serrana region of Rio Grande do Sul.

Through this procedure, problems could be identified in the elaboration of the questions and any contributions or suggestions were incorporated in the questionnaire, contributing to the adjustments needed for the sake of the respondents' correct understanding.

3.4 Analysis Procedures

Factor Analysis permits analyzing the correlations among the variables – in this case the questions – defining a set of common dimensions called factors, based on the correlation matrix. Hence, the responded questionnaires were analyzed using R Factor Analysis, which produces factors that group the questions, summarizing the number of variables for analysis (Hair, Black, Babin, Anderson & Tatham, 2009). Thus, the answers were summarized in few fundamental elements – the factors – that explain a large part of the variance in the answers to all questions asked.

To test the reliability of the questionnaire applied in the research, Cronbach's alpha test was used, which according to Cronbach (1951) measures the correlation among the answers to a questionnaire through the analysis of the respondents' answer profile. This refers to a mean correlation among questions.

According to Freitas and Rodrigues (2005), the coefficients used for the Cronbach's alpha reliability analysis are: $\alpha \leq 0.30$ (very low); $0.30 < \alpha \leq 0.60$ (low); $0.60 < \alpha \leq 0.75$ (moderate); $0.75 < \alpha \leq 0.90$ (high) and $\alpha > 0.90$ (very high).

The validity of the factor analysis was measured by applying the Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test. In accordance with Pereira (2006), the KMO test indicates the adequacy measure of the data and examines the adjustment of the data by considering all variables simultaneously. If the partial correlations are small, the value of the KMO will be close to one and will indicate the perfect adequacy of the data for the factor analysis. As suggested by Pereira (2006), the KMO test is interpreted as follows: If below 0.5, the sample is considered inacceptable; between 0.5 and 0.6 bad; between 0.6 and 0.7 reasonable; between 0.7 and 0.8 average; between 0.8 and 0.9 good; and between p.9 and 1 very good. Bartlett's sphericity test is indicated before the Factor Analysis, in order to test the correlation among the variables. For this study, significance was set at 0.05. Hence, the validity is rejected if the null hypothesis is not confirmed at a 95% confidence level.

The number of components used was defined by the latent root criterion, that is, based on the quantity of the variance a certain factor represents. For this criterion, values higher than one are significant factors, that is, they represent a large part of the total variance (Cooper and Schindler, 2003). Hence, the factors accepted in this study obtained coefficients higher than one for the latent root.

The statistical software used for the analysis was SPSS (Statistical Package for the Social Sciences) and the extraction process of the factors was done by the rotation of the factors, whose effect, according to Hair *et al.* (2009, p. 116), is to "redistribute the variance from the first factors to the last in order to reach a simpler and theoretically more significant factor pattern". The rotation method defined for this study was varimax, which is the default method in SPSS.

According to Hair *et al.* (2009, p. 118), "the varimax criterion is concentrated on the simplification of the columns of the factor matrix. The varimax method maximizes the sum of the variances of the load required from the factor matrix".

4. Analysis of Results

4.1 Descriptive Analysis of the Questionnaire Respondents and Answers

In this section, the research data are processed through a descriptive analysis. These data relate to the profiles of the accounting firms whose responsible persons answered the questionnaire.

In total, 408 answers were obtained to the questionnaires sent. Most respondents came from the Metropolitan region of Porto Alegre, that is, 37.01% of the total sample, followed by the Serrana region (13.97%). Campanha (3.68%) and Campos de Cima da Serra (3.43%) were the regions that least contributed to the research.

According to the collected data, 130 companies have a portfolio with more than 100 clients, corresponding to 31.86% of the sample. The firms with fewer clients, up to 50, totaled 136 companies (33.33%), while the remaining 142 companies (34.80%) have between 51 and 100 clients.

Many companies were established at the height of the technological innovation, that is, 144 accounting firms have been working between 11 and 20 years, representing 35.29%. It could be perceived that few respondents (8.09%) have had the firm for more than 40 years.

Due to the complexity and range of tasks required to execute the activities in an accounting firm, help from employees is essential. Among the respondents, 50.73% of the firms have up to ten employees, that is, 207 firms have few employees and attend to 208 companies with up to 75 clients (50.09%). Thus, 49.27% of the firms with more than ten employees work in the 49.02% of the companies with more than 75 clients.

According to data from the CRCRS website, 9,260 accounting firms are registered at the Regional Accounting Council of Rio Grande do Sul. In this group, 2,180 (23.54%) were registered as civil societies and 7,080 (76.46%) as individuals. In the research, 181 (8.07%) of the respondents were constituted as civil societies, that is, the participation of this category in the sample was smaller than in the population.

According to the research data, 80.88% of the respondents hold a B.Sc. in Accountancy and 19.12% are accounting technicians. It is important to emphasize that, according to the data obtained from the CRCRS, in the State of Rio Grande do Sul, there are 36,949 active CRC register, of which 21,778 (58.94%) relate to accountants and 15,171 (41.06%) to accounting technicians.

The research results reveal a great concern with their professional recycling among the accounting professionals. Nevertheless, 337 professionals hold a B.Sc., specialization/MBA, Master's or Ph.D. degree. As an undergraduate degree is compulsory to take these graduate courses, it can be concluded that there are at least seven accounting technicians among the respondents who hold an undergraduate degree in another activity than accountancy.

Most (50.74%) of the respondents consider their firm small in comparison with their competitors, as there are 130 firms with more than 100 clients among the respondents, but only 52 (40.00%) respondents perceive that their firms are larger than the competition.

4.2 Validation and Determination of the Factors

In this part, the factor analysis of the data obtained from the questionnaire is presented, related to the impacts of IT as perceived in the 408 accounting firms that answered the questionnaire.

The reliability of the questionnaire was determined using Cronbach's alpha statistics for the 30 questions in Part II of the instrument. According to the result of the Cronbach's alpha test, 0.829, the research data were consistent and were classified as highly reliable.

The validity of the factor analysis was measured using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test. The coefficient of the KMO test can be considered good (0.835) and that of Bartlett's sphericity test is high (3325.248) for a significance level of 0.000, indicating a low probability of the correlation matrix being an identity matrix, rejecting the null hypothesis. This indicates that the variables are correlated and that a factor analysis can be applied.

The amount of factors was determined by analyzing the variability percentage of the data, given by the screeplot criterion, constructed through the latent root, as shown in Figure 2.

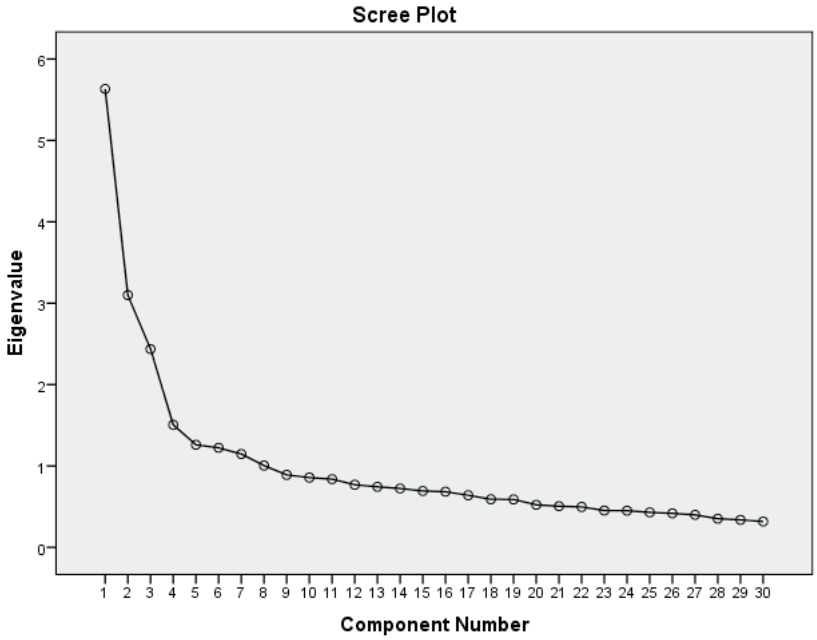

Figure 2. Eigenvalue graph for the definition criterion of the number of factors

Based on the analysis of Figure 2, it is verified that eight factors should be considered. The individual analysis of factors seven and eight, however, indicated that these incorporated only one question each, besides individually contributing by less than four percent to the total variance. Therefore, these two factors were eliminated in this research, defining the analysis based on six factors.

The identification of the factors was obtained based on the elaboration of the factor matrix rotated through the varimax method, which according to Hair *et al.* (2009) concentrates on the simplification of the columns of the factor matrix and only those questions with a factor loading of more than 0.58 composed the factors.

Based on these criteria, the six factors explained 50.52% of the total variance and included the questions displayed in Figure 3, which also presents the name given to each factor.

Factor	Variables	Denomination
1	8. The services, with IT support, are now performed in a more agile manner. 9. The services, with IT support, are now performed more safely. 7. The firm, with new technology, can offer new products to its clients.	Confiabilidade
2	2. The different information, as well as the accounting SPED, the fiscal SPED, among others, led to an increased number of clients who demanded information about these. 5. IT reduced the number of physical meetings between the person responsible for the office and the clients. 26. The firm had to hire more qualified professionals to respond to the needs deriving from the new technologies. 27. The employees use social networks during work hours.	Qualificação profissional
3	23. Internal or external communication became agile and efficient as a result of IT use. 22. The management of the firm improved as a result of IT use. 25. IT enhanced the agility of the information provided.	Eficiência organizacional
4	29. The fees increased in accordance with the proportion of IT-related costs. 28. The arrival of IT led to a reduction in the number of employees in the firm. 24. The use of IT increased the profitability of the firm.	Resultado econômico
5	20. IT enhanced the complexity of the services provided. 21. IT added more tasks to the firm.	Complexidade na execução dos serviços
6	14. IT helped to attend to new markets. 15. IT helped to attend to new activities. 10. The technological innovation applied to accounting services motivated the creation of new firms.	Inovação tecnológica

Figure 3. Interpretation of the factors

Source: Research data.

As verified in Figure 2, the questions related to agility, safety, productivity, efficiency, complexity and innovation summarized the accounting professionals' answers in this research. Next, the interpretation of each of these factors will be presented.

4.3 Interpretations of the Factors

Factor 1, called Reliability, basically consisted of variables related to agility, safety and technological innovation. These elements play a determinant role in the credibility of the services for the clients as, in accordance with theory, the information the accounting firms' clients want to receive should comply with these commitment patterns, that is, it needs to be agile, safe and timely.

Factor 2, Professional qualification, included variables related to IT and which entailed repercussions for the accounting firm respondents, mainly regarding increased spending on the firm's functioning. Examples are spending on training to qualify the employees or even hiring people with higher knowledge levels on IT. This entailed a mean increase in the payment role and in the hiring of external advice to support the accounting firms in their procedures and information.

Another concern the respondents demonstrated with the employees' high use of the social networks. It is known that accessing social network sites demands time, during which they stop doing tasks that are often fundamental for the firm.

In Factor 3, organizational efficiency, it is perceived that IT made external information sharing more agile. The same is true for the firms' internal communication, making the information more efficient and, consequently, improving the quality of the services provided. Factor 3 was in accordance with the theoretical review, strengthening the idea that IT came to support the service provision and the management of the firm itself.

The scores of the variables in Factor 4, Economic results, indicate some disadvantages of IT for the accounting firms. To give an example, the mean score of variable 29 was 3.87, that is, the respondents consider that the return of IT investments was not proportional to the fees charged from their clients. In addition, the IT did not entail a reduction in the firms' employees either, nor did it contribute to increase the firm's profitability.

The factor called Complexity in the execution of the services, Factor 5, revealed that, according to the interviewees, the quantity of information the accounting firms need to provide increased. This additional information refers to the clients as well as supervisory entities, particularly the Brazilian Internal Revenue Service and the State Secretary of the Treasury. It can be affirmed that the arrival of IT entailed more complexity and added more tasks to the execution of the services in the accounting firms. Variable 13 composed this factor, but was not significant to explain its variance. It is important to highlight, however, the respondents' concern with the financial risks the accounting firms are exposed to by not complying with the obligations within the legal deadlines established by the supervisory entities. One example relates to the fines established by law in case of delayed information provision, whether for work, accounting or tax purposes.

The factor loadings of all variables in factor 6, Technological Innovation, were significant. According to the respondents, this factor presents some advantages resulting from IT, as well as help to leverage the attendance to new markets and new activities. According to the respondents' opinions, variable 10, technological innovation, was not very important for the creation of new firms.

4.4 Analysis of the Mean Scores Attributed to Each Factor

In this part, the mean scores attributed to the factors are analyzed, considering the distribution of the information from part I of the questionnaire, which was aimed at obtaining information on the interviewed firms' profile. In that sense, Table 1 contains the mean scores the respondents attributed to each factor obtained.

Table 1
Mean scores attributed to each factor

Factors	Mean	Standard Deviation
Factor 1 – Reliability	7.14	1.40
Factor 2 – Professional qualification	6.62	1.69
Factor 3 – Organizational efficiency	7.14	1.39
Factor 4 – Economic result	4.44	1.87
Factor 5 – Complexity in the execution of the services	7.93	1.55
Factor 6 – Technological innovation	6.11	1.86

Source: Research data.

As observed in Table 1, the technological innovation led to greater complexity in the execution of the services, reducing the accounting firms' economic result. The possibility to integrate the computer programs contributed to reduce the time spent on tasks and possible errors. For the accounting firm to remain competitive and not be excluded from the market, however, it is fundamental for technological innovation to be present in order to follow the new technologies and compliance with the new accounting requirements. According to the respondents, IT affected the companies' economic result as, according to the data, this factor obtained a very low average score.

To verify whether the IT entailed significant technological impacts for the accounting firms, probable comparisons among the groups that could permit the production of these impacts were verified with the help of variance analysis (ANOVA).

The first comparisons between the length of the accounting firms' activity and the factors "Reliability", "Professional qualification" and "organizational efficiency" did not show statistically significant differences among the groups. A statistically significant difference was found among the groups with different lengths of activity in relation to the mean score of the economic result ($p = 0.009$).

According to the mean answer scores of the respondents for the accounting firms, it can be affirmed that the IT made the accomplishment of the firm's activities more complex. Among the highest means, that of firms active between 30 and 35 years is highlighted, with a mean score of 8.50. Despite the high average, no statistically significant difference was found among the groups with different lengths of activities in relation to the mean score observed.

In the respondents' perspective, the technological innovation hardly contributed to encourage the creation of new accounting firms as, due to the increased tasks, mainly in fiscal terms, the accounting firms had to get modernized for the technological innovations. Therefore, these modernizations only added compulsory tasks, which made it difficult to look for new activities that were not exclusively focused on attending to clients and complying with legal accounting, labor and fiscal standards. When comparing the length of the accounting firms' activities with the market, activities and technological innovations, no statistically significant differences were found.

The comparison between the factors and the number of clients showed that the factors Reliability, Professional qualification, organizational efficiency, economic result and complexity in the execution of the services did not cause any significant differences either, but that this difference does exist between the number of clients and the factor Technological innovation ($p = 0.024$). In that sense, it is interesting that firms with few clients (up to 25) attributed higher scores than the others. Next, the mean score drops and again rises for firms with more than 76 clients.

The analyses of the difference of means made in relation to the number of employees and the factors showed no statistically significant differences, except for the professional qualification factor, with firms having more than 11 employees scoring this factor higher (6.81).

The comparisons of means between the companies' legal status and the factors found in the analysis were also significant for a single factor, that is, the economic result. The lowest mean score was for companies consisted as Civil Societies.

Finally, when looking for different answers between the qualification of the person responsible for the accounting firm and the factors extracted in the factor analysis, no statistically significant difference appeared. The same was true for the mean scores related to the classification of firm size and the other factors, that is, no statistically significant differences were found.

5. Final Considerations

The objective in this study was to evaluate the impact of the technological innovation in accounting firms from Rio Grande do Sul as from 1990.

The study verified the use of IT to develop the accounting activities. The factors found presented a group of variables that permitted an interrelated analysis, permitting the evaluation in a set of related variables, thus avoiding the individual analysis of each variable.

In addition, it was observed in this study that, in accordance with the theoretical framework, IT can offer advantages and disadvantages in accounting activities. Among the advantages, agility in the execution of the services provided stood out. The integration of computer systems and the advent of the Internet were highlighted, according to the research results, as the main technological innovations in the accounting firms, permitting the faster production of more precise and useful information. Another advantage of IT use is the

generation of new activities. The technological innovations in the accounting sector are increasingly fast and bring modern techniques and devices for their execution. Hence, the accounting professionals need to continuously improve their tasks with a view to safe and objective information transmission to their clients.

Among the disadvantages of IT, in this research, the dissatisfaction of the responsible persons with the economic result was verified since, as expected at the start of this study, the IT did not reduce the number of employees the firms hired. This caused increased monthly spending on the payroll, which cannot be transmitted to the clients. In addition, the IT entailed greater financial risks due to fines and high interest rates for firms that may have delayed the delivery of the necessary obligations to supervisory entities. Thus, the firms had to absorb these costs, which logically cut down on their profitability.

These research results are in accordance with the theory that affirms the essential importance for these firms to assume a continuous commitment to strategically and conditionally strengthen the accounting activity, so that they can deliver important and timely information to their clients. What was verified in this study are the constant changes the technological innovation has brought about, through the use of advanced technologies that permit the automation of the accounting firms' services, aiming to optimize their results in terms of the services offered as well as their internal management.

As a limitation, it should be emphasized that the analysis of the study was limited to the State of Rio Grande do Sul, based on a non-probabilistic sample. Thus, the obtained results describe the perception of part of the accounting professionals in that unit of the Federation, which may differ from other locations. Also, the analysis process was quantitative, and a qualitative approach could enrich the understanding of the trends observed in this research. Hence, further research in different states and using new methods would enhance the understanding about the impact of technological innovation in accounting firms.

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