Best management practices used by companies in Campos Gerais region, Paraná, Brazil

Sérgio Ditkun[a], Jackson Luis Oshiro [b], João Luiz Kovaleski[c], Regina Negri Pagani[d], Rui Tadashi Yoshino[e]

[a] Administrator, student in Industrial Engineering (UTFPR, Brazil), Ponta Grossa, Paraná, E-mail: sditkun@yahoo.com.br

[b] Accountand, student in Industrial Engineering (UTFPR, Brazil), Carambeí, Paraná. E-mail: j.oshiro@outlook.com

[c] PhD in Electronic Systems (Institut Politechnique de Grenoble, France), and Industrial Instrumentation (Université de Grenoble I, France);President of the Production Engineering Association of Paraná (APREPRO); Associate Professor (with tenure) at UTFPR - Ponta Grossa (Department of Industrial Engineering), Brazil; kovaleski@utfpr.edu.br

[d] PhD student in Industrial Engineering (UTFPR, Brazil, and Sorbonne Universités - UTC, France). Assistant Professor (with tenure) at UTFPR - Ponta Grossa (Department of Industrial Engineering), Brazil. E-mail: reginapagani@utfpr.edu.br.

[e] Doctor in Production Engineering from the University of São Paulo. Professor at the Federal Technological University of Paraná (UTFPR), Ponta Grossa, PR – Brazil. E-mail: ruiyoshino@utfpr.edu.br.br

Abstract

In order to maintain its productivity, it is necessary for a company more than technical expertise of its staff; it is also necessary to use the techniques of industrial management, appropriate to achieve organizational goals. This article examines perceptions of students' faculties in the in the region of Campos Gerais, Paraná, Brazil. They were asked to respond a questionnaire, which would demonstrate the reality of organizations where they work as formal collaborators or interns. The main objective of the research is to identify the use of management practices as tools to improve productivity and, consequently, organizational competitiveness. Through these information and analysis it was possible to make a comparison with the management practices used by companies in the State of Paraná, reported in the Industrial Survey, annually conducted by FIEP (Federation of Industries of Paraná State). The methodological research is characterized as descriptive and exploratory held by a multi-case study with qualitative approach. The survey results indicated that the business scenario in the region of Campos Gerais shows that the analyzed companies mostly do not adopt management practices. However, when considering the analysis by sector, it was observed that the ERP (Enterprise Requirements Planning) is the main technique used in the industrial sector, and in the other sectors the lack of a management technique prevails.

Keywords: Industrial management practices. Technology transfer. Industrial survey.

Introduction

In times of economic crisis marked by employment rising and Gross Domestic Product (GDP) fall, it is critical to the make an analysis of how resources are utilized in order to improve productivity as a whole. Constant analysis and continuous search for improvement of production processes is essential to enable the economic growth.

The use of industrial management practices has gained prominence in companies which understand that the use of such practices promotes a more productive and efficient work environment in the use of resources, waste reduction and continuous improvement process. This understanding by the organization enables them to remain aligned with its strategic planning, thus improving their productivity and competitiveness.

According to Linsingen (2007), the importance of technology transfer, and tools and industrial management practices is the result of networking and relationships between people and the organizational, technical, social and cultural aspects, which makes the objects to materialize and acquire relevance and value.

An approach of great importance that has been occurring since 1995 in Paraná State is the Industrial Survey research, performed annually by the FIEP System (Federation of Industries of Paraná State), which counts on several factors that can serve as indicators of productivity increase within the companies surveyed. In this context, what are the main practices of industrial management organizations in the region of Campos Gerais (Paraná, Brazil) use to improve their productivity?

This paper presents the perception of academic students in Business Administration, which also work in different organizations. The information was collected through a survey aimed to identify whether the companies in which they are inserted are using industrial management practices as a tool to improve productivity in the workplace.

The results of this research will serve as a contribution to future researches that might be carried out in companies in the region of Campos Gerais (Paraná, Brazil).

Theoretical background

Productivity and organizational competitiveness factor

According to Mendes (2009, p.159), Brazil has been going through five processes that encouraged positive changes in Brazilian economy: globalization, economic liberalization, price stabilization, privatization and the growing awareness of Brazilian consumers.

Brazil has been a competitive country worldwide for being an emerging country that aims to grow in large numbers every year. However, in 2015, the country dropped 18 positions in the ranking of the most competitive economies in the world, falling to 75th place, according to the Global Competitiveness Report, conducted by the World Economic Forum 2015-2016.

150

Labor productivity figures as one of the main factors of competitiveness. Productivity is the result of the adopted organizational strategy, which defines the success or failure of a company's actions. The adoption of an innovative structure management may involve the incorporation of innovation in the organization to solve coordination problems and commitments resulting from the strategic objectives of compliance with the organization's expectations (Silva et al, 2016). As defined by Ditkun (2013), innovation is an "inevitable need to obtain competitive advantage in organizational (INOVACAO) environment".

In this context organizations use strategic resources to improve productivity, such as teamwork, leadership, technology transfer, adoption of new management practices among others. However, as stated by Do Carmo and Marcondes (2016), these features alone do not have the effect of creating and implementing strategies, but allow the company to use the resources to create and implement strategies. Once this concept is applied, the results will have a direct impact on productivity, thus generating competitive advantage.

Based on this, the analysis of productivity is essential to be done in order to identify the cause of Brazil's loss of competitiveness compared to other countries, given the current national economic crisis.

In order to search for competitiveness it is necessary for the company to improve its production processes through one of a well-designed strategic plan, optimizing profit (by the process of cost reduction) and creating a differentiation in the quality of your product and / or service that stands out in the market.

Mendes (2009), drawn up a scheme (Figure 1) in order to explain the importance of constantly seeking differentiation in the market to achieve the improvement of both the industry in question, as the economy as a whole.
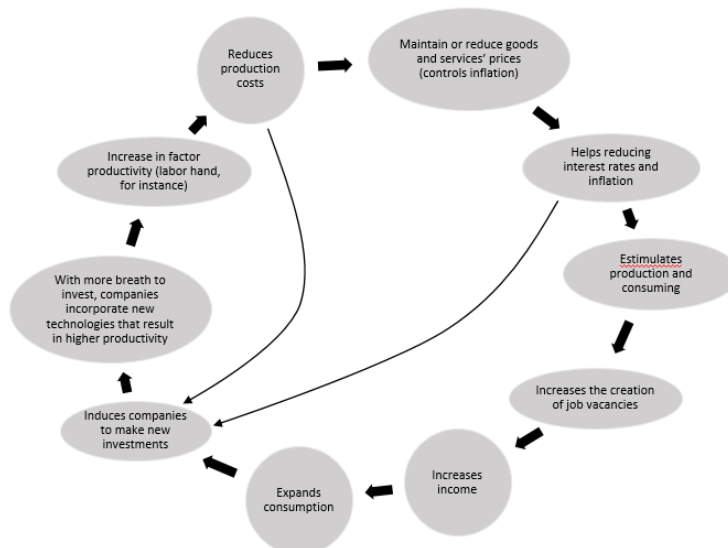

Figure 1 - Vicious cycle of competitiveness
Source: Adapted from Mendes, 2009.

When mentioning the limited productivity, it is right to align its reference to the company's ability to generate 'product' in the production process. Remember that the concept of productivity also refers to the relationship between output and

input of an economic activity. Therefore, this concept goes beyond aspects restricted to the production process, given that the steps of the production process (the purchase of intermediate goods and services and the sale of goods and services that the company produces) trigger value creation (MACEDO, 2012).

Analyzing productivity at the national level, the IPEA (Institute of Applied Economic Research) launched a book in 2014 that tries to answer the main current issues to address the low productivity problems.

Within this book, in the chapter "O desafio da produtividade na visão das empresas" the low-skilled hand labor, low production scale and poor performance of suppliers are seen as the main factors that hindered the companies interviewed ..."

Brazil's productivity can be directly related to the GDP and its distribution according to the national population (GDP per capita). The table below, adapted from National Accounts and IBGE, brings the evolution of both factors since the 1970s.

Table 1 - Average growth rate of Brazilian GDP

Average Growth Rate		
Decade	GDP	GDP per capita
1970	8,6%	6,0%
1980	1,4%	-0,7%
1990	2,8%	1,2%
2000	3,3%	2,1%
2010	7,6%	6,5%
2011	3,9%	2,9%
2012	1,9%	0,8%
2013	3,0%	1,8%
2014	0,1%	-0,7%
2015	-3,8%	-2,3%

Source: CPS-FGV, 2015.

GDP is the sum of all goods and services produced in a given period (month, semester, or year) in a region (city, state, country, or continent). It is directly influenced by the consumption of society. The constant increasing of GDP figures in a region reflects the increase in jobs, improved infrastructure and a consequent wave of investments that generate growth and development (MONTANI et al., 2015, p. 2 apud Vasconcellos, 2000).

Technology transfer as a key factor for increasing productivity

According to Negri (2006), in developing countries it is possible to observe a technological gap in relation to developed countries that are in the technological frontier. The technology transfer (TT), according Closs et al. (2012) is a resource for academic research, innovation for business and economic development for governments, a fact that makes it important strategy in many countries.

Pagani et al. (2015) present a bibliographic portfolio whose core is the technology transfer models (TTM). In Pagani et al. (2016) these models are presented in the form of a typology, demonstrating that the TT process can be carried out from various interfaces of transferors and transferees, impacting particularly developing countries, which reinforces Negri (2006).

This way, it is possible to infer that TT is a mechanism to reduce this technological gap, through the acquisition and accumulation of technological capacity, possible of being performed by any type of organization.

Industrial survey conducted by the National Confederation of Industries

The National Industrial Survey is made by the National Industry Council every three months and analyzes factors such as trends in production, investment intentions and expectations of entrepreneurs.

According to FIESP (Federation of Industries of São Paulo State), the Industrial Survey was initiated in the second quarter of 1998, and it is a qualitative survey conducted quarterly by the National Confederation of Industry (CNI) and the Federation of Industries of 19 Brazil's states (AC, AL, AM, BA, CE, ES, GO, MG, MS, MT, PA, PB, PE, PR, Brazil, RN, RS, SC and SP).

The aim of the Survey is to collect information on the development of the domestic industry from the industrial entrepreneurs' point of view. These surveys are a reflection of the progress in the globalization process due to the need to identify the determinants of competitiveness. The CNI has a competitiveness report in Brazil, citing that "[...] the CNI's agenda is to increase the industry's competitiveness and, consequently, the Brazilian economy.

This focus motivates the preparation of the report 'Competitiveness Brazil: comparison with selected countries', first published in 2010 (CNI, 2012). The importance of competition has always been something taken into consideration, to be responsible for the development of industries. According to Ribeiro (2011), competitiveness leads more companies structure themselves and invest in strategic planning to ensure their survival in the market.

Industrial Survey conducted by the Federation of Industries - State of Paraná

The Industrial Survey conducted by FIEP in 2015/2016 was done from random selection of 2,000 companies registered in FIEP, in which some 371 Paraná industries were interviewed, encompassing areas of interest such as International Affairs; Productivity; Competitiveness; Most important strategies, Sale and Purchase; Quality; Infrastructure and Environment (FIEP, 2015).

Each year, FIEP organizes and publishes the results of the Industrial Survey. The research aims to identify the perception of Paraná entrepreneurs concerning various issues related to the industry and serves as a thermometer of the industrial state park future performance. Among the topics covered are: International Affairs, Productivity, Competitiveness, Sale and Purchase Strategies, Quality, Infrastructure and Environment (FIEP, 2015). Since 1995 FIEP publishes the Industrial Survey.

153

The research identified the management practices used by the selected companies in Parana. The five most cited were the ERP (Enterprise Requirements Planning) with 29.87%; Total Quality Programs, with 24,50%; Just-in-Time, with 18.12%; Kanban, with 17.11%, and; MRP (Material requirements programming), with 15.77%.

In order to a better understanding, the five most mentioned practices will be explained. The ERP (Planning of the company's needs), according to Chopra and Meindl (2003), enables intelligent decisions by tracking and overall visibility of a company's supply chain, involving any part of it. Chiavenato (2011) mentions that the Total Quality Program or Total Quality Management (TQM) focuses primarily on people, not only in managers and leaders, for the staff is required to achieve the quality of what they produce .

According to Ludwig et al., (2010), Just-in-Time has as one of its main features the request of the components performed according to the exactly time it is needed. And the components are delivered directly to the production line, promoting an optimization in production processes, ensuring quality and especially waste reduction.

Oliveira (2005) states that the Kanban system, seeking to improve leveling and production control, and minimize the intermediate and final stocks, puts into practice innovative concepts of the Toyota Production System, which uses the visual control technique for balancing production.

And the MRP (Material Requirements Programming) system seeks the reduction of the production cycle, reduced inventory costs and increased customer service level, and has the main objective of meeting deadlines and reducing inventories (Filho et al. (2006). Figure 2 presents the results found by FIEP.
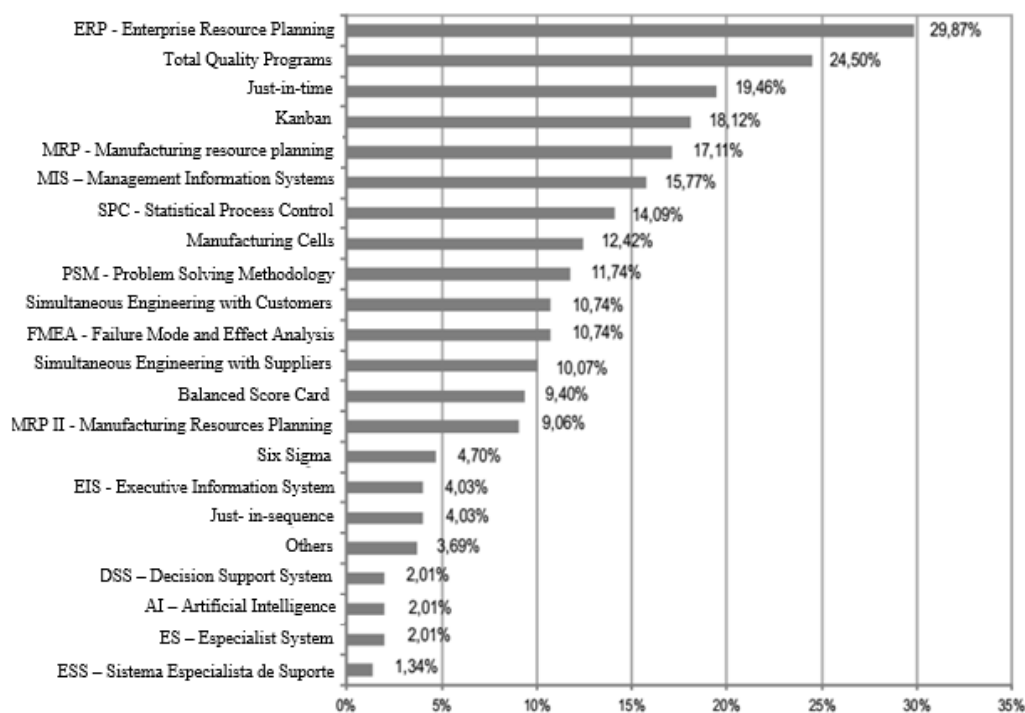

Figure 2 - Management solution graphic used in the Paraná companies
Source: XX Industrial Analysis: The vision of industry leaders from Paraná

Methodology

The research is defined as exploratory. According to Marconi and Lakatos (2007), this type of research derives from a problem or question, and helps to familiarize the researcher with an environment, event or phenomenon. It can also be considered to be descriptive. According to Gil (1999), the descriptive research objectives to describe the characteristics of a given population and the relationships between variables.

This study is also characterized by the multiple case study, since the questionnaire was applied to a group of several students who were active in different organizations in the region of Campos Gerais. According to Eisenhardt (1989), in this type of research there is no preview for this sample size, which indicates statistical significance, since what one wants to analyze is the perceptions of various groups.

As for the means of data collection, it was chosen to adopt a questionnaire with closed questions. The questionnaire was applied in the classroom for students of Business Administration and Accounting of the first, second, third and fourth years of a higher education institution in the city of Ponta Grossa, Parana. The institution hosts students from the cities of Carambeí, Castro, Ipiranga, Ponta Grossa, Palmeira, Reserva and Teixeira Soares.

The classification led to the quantity of each segment. From a total of 169 questionnaires applied in classrooms during the period from 01/04/2016 and 29/04/2016. Respondents were: 61 from shopping area, 39 from industry, 53 from the service sector, 04 from the rural sector, 09 from sector public sector, 01 from NGOs, and 02 from philanthropic area. The sampling was by accessibility, both to students and companies' collaborators. .

Research limitations

This research, regardless the responses in relation to what one is seeking, can never be said that it portrays the reality of the organizations in the area surveyed. For more accurate answers it is necessary to direct the search to interested organizations and use appropriate methods.

The objective was to know the reality under the perception of the students / employees who work in the organizations of the region. The answers presented here show only an overview of the companies in the region. Only the items considered important were analyzed in an attempt to respond the objective of the research.

Results

Industrial Survey in Paraná

Analyzing data from the industrial survey of Paraná conducted by FIEP in 2015/2016, it can be observed that, concerning the reason for an increase in companies' productivity, the most important factors were an improved management of personnel and technological modernization, according to entrepreneurs from the companies surveyed.
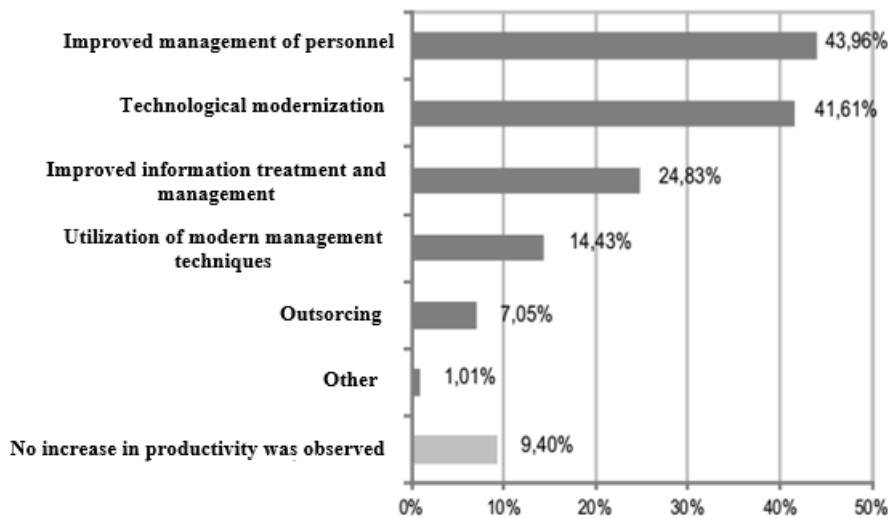
155

Figure 3 - Reasons for the productivity increase in companies
Source: XX Industrial Survey: The vision of industry leaders from Paraná

In the Figure 3 it is possible to identify how the investment in management practices influenced for an improved management of personnel and technological modernization. A unique and innovative analysis made by FIEP, which could be adopted by other federations, is the analysis of management solutions used in companies, which stood out in recent years, which are: ERP software (Enterprise Requirements Planning), Total Quality Programs, Just-in-Time, Kanban and MRP (Material Requirements Planning).

Analysis of survey done with the students in Campos Gerais Region

Based on the analysis performed by FIEP, and with the data collected, it was possible to evidence the practices used by companies located in the region of Campos Gerais. ERP (Enterprise Requirements Planning) had 11.41%; Total Quality Programs, 8.94%; SPC (Statistical Process Control), 7.22%; MIS (Management Information System) and DSS (Decision Support System) both with 6.65%. Among the surveyed, 10,84% declared to use none of the practices mentioned, being this option the second in the rank.
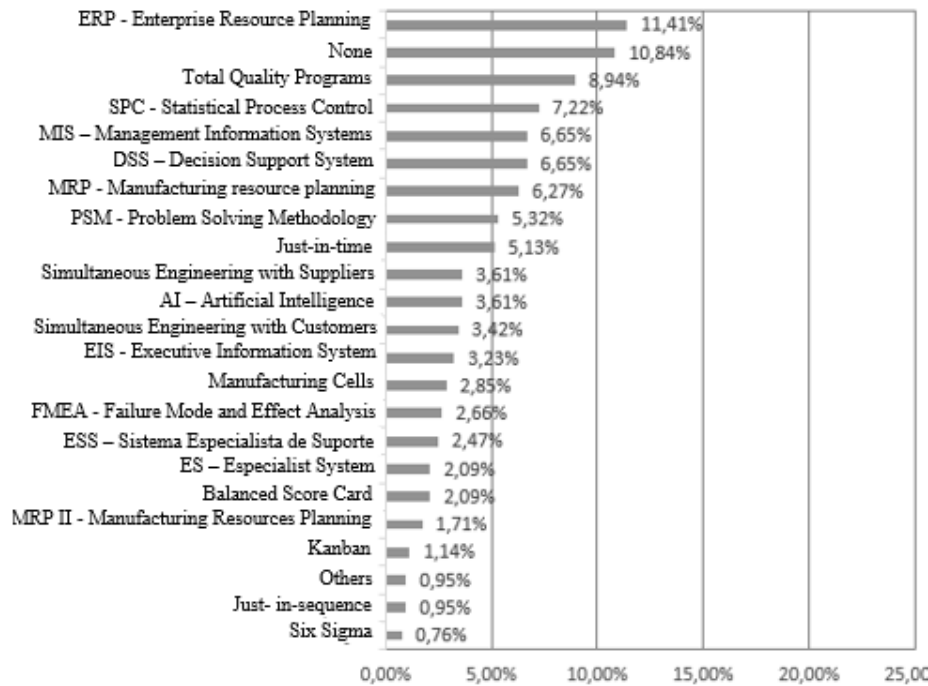
Figure 4 - Management solution used by companies in Campos Gerais
Source: XX Industrial Survey: The vision of industry leaders from Paraná

The data by sector is presented on Figure 5.

Figure 5 - Management solution used in trade establishments in Campos Gerais
Source: XX Industrial Survey: The vision of industry leaders from Paraná

By analyzing Figure 5, it can be identified that 16.20% of the trades do not have any technical management. And a total of 11.97% utilize ERP (Enterprise Requirements Planning).
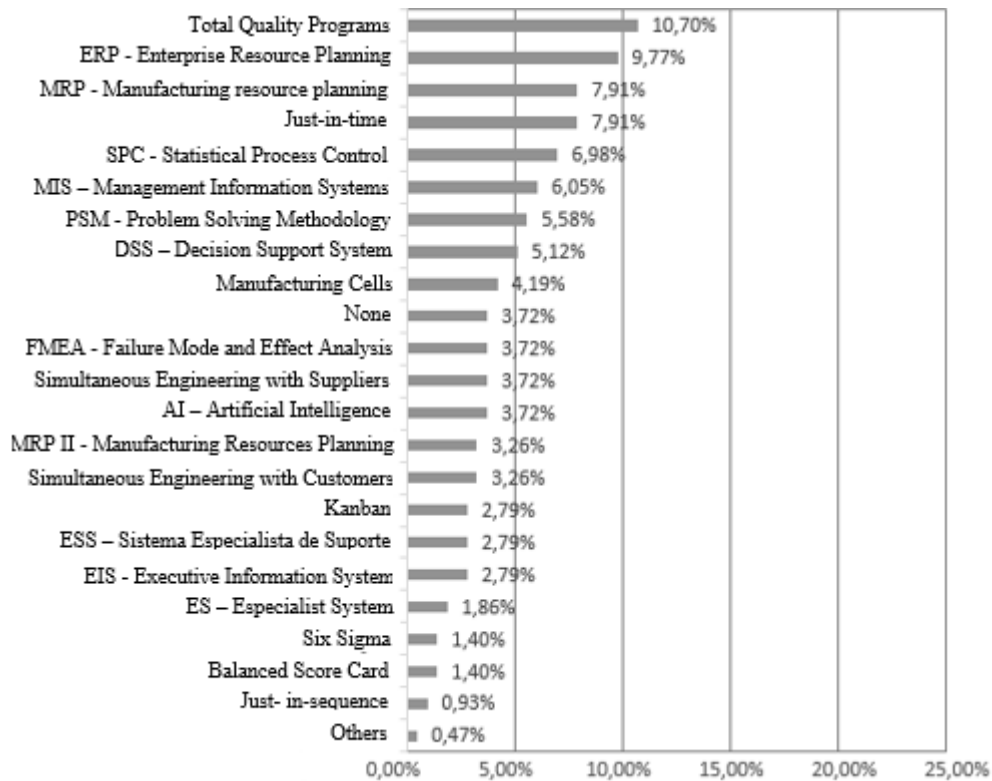

Figure 6 - Management solution used in the industries in Campos Gerais
Source: XX Industrial Survey: The vision of industry leaders from Paraná

Figure 6 shows that the Total Quality Programs are present in 10.70% of the companies surveyed, followed ERP (Enterprise Requirements Planning) with 9.77%, then MRP (Material Requirements Programming) and Just-in –Time, both with 7.91% each.
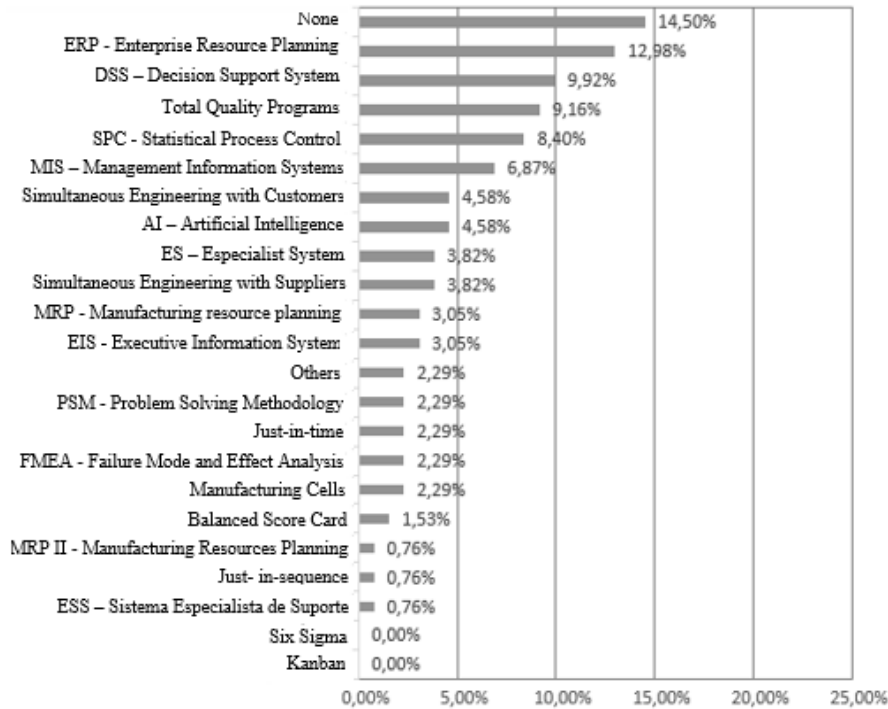
158

Figure 7 - Management solution used by service companies in Campos Gerais
Source: XX Industrial Survey: The vision of industry leaders from Paraná

According to Figure 7, 14.50% of service companies do not use management practices; 12.98% use ERP (Enterprise Requirements Planning); 9.92% use DSS (Decision Support System); 9.16% use Total Quality Programs, and; 8.40% use the SPC (Statistical Process Control).

Figure 8 - Management solutions used in public organizations in Campos Gerais
Source: XX Industrial Survey: The vision of industry leaders from Paraná

By analyzing Figure 8, it is identified that among public organizations, 17.39% do not use management practices, whereas 13.04% use MRP (Material Requirements Programming), MIS (Management Information System) and DSS (System Management support).
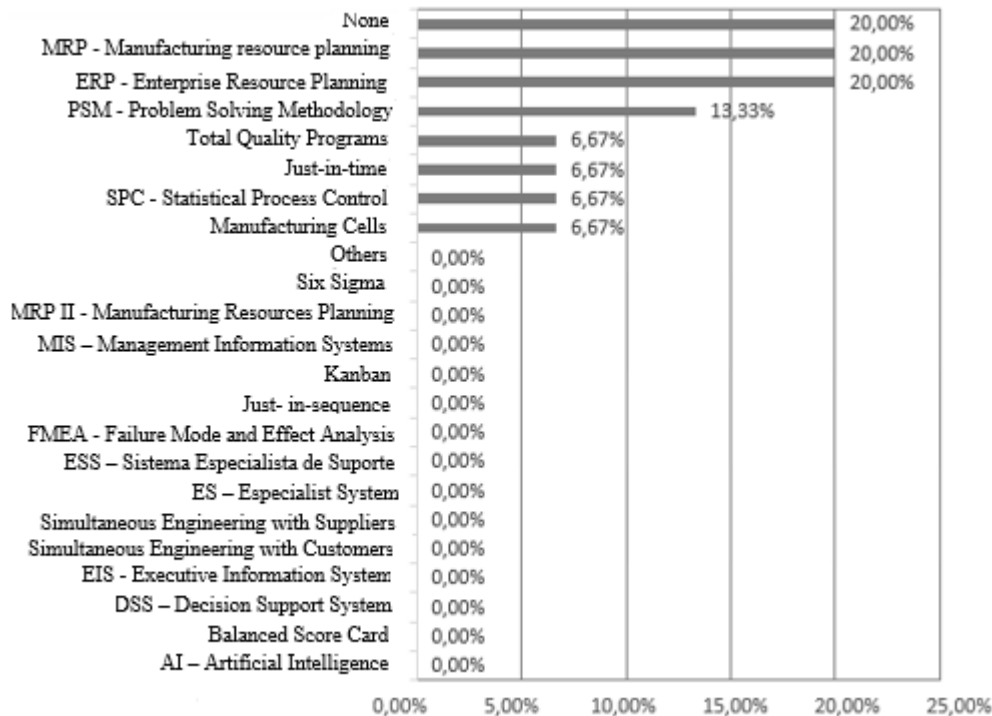

Figure 9 - Management solutions used in other sectors in Campos Gerais
Source: XX Industrial Survey: The vision of industry leaders from Paraná

In Figure 9 it is possible to identify that 20% of companies involving Agribusiness sectors, Philanthropy and NGOs do not use management practices anymore; in past periods, they used MRP (Programming Material Requirements) and ERP (Enterprise Resource Planning), both also in 20% of companies.

Final considerations

This study was able to identify that, regarding management practices used by most of the companies in Campos Gerais region, ERP (Enterprise Requirements Planning) is the most used tool. This shows the alignment with the survey conducted by FIEP.

But what surprised was that 57 companies, that do not use any technical management, representing 10.84% of the interviewed. Among them, only 23% of the companies are industries, which raised the need to make the survey by sector. With this distribution it became clear that management practices are most widely used in industries, whereas other sectors do not give priority to the use of such practices, what could cause a slowdown in the growth of other sectors if taken as comparison made by FIEP that identifies the correlation between the use of management practices and the best personnel management and technological modernization.

Therefore, it was possible, through the survey, to show that industrial companies in Campos Gerais actually use mostly management practices, particularly ERP (Enterprise Requirements Planning), which does not occur with other sectors, where most do not use any technical management practice.

References

ALVARENGA, B. **Ranking de Competitividade dos Estados**: para comparar e cobrar. [online] http://veja.abril.com.br/noticia/brasil/ranking-de-competitividade-dos-estados-para-comparar-e-cobrar   http://www.ipardes.gov.br/index.php?pg_conteudo=1&cod_conteudo=1>. Access February 22 2016.

COSTAS, R. **Entenda por que a produtividade no Brasil não cresce**. [online] <http://www.bbc.com/portuguese/noticias/2014/05/140519_produtividade_porque_ru> Access February 15 2016.

CHOPRA. S; MEINDL, P. **Gerenciamento da Cadeia de Suprimentos** – Estratégia, Planejamento e Operação. Prentice Hall, 2003.

CHIAVENATO, I. **Introdução à teoria geral da administração**. São Paulo: Elsevier, 2011.

DIAS, A. A. **Gestão de Transferência de Tecnologia na Inova Unicamp**. [online] <http://www.scielo.br/pdf/rac/v17n3/a02v17n3.pdf>. Access April 20, 2016.

DITKUN, S. **Arrebentando Paradigmas**: Um dos caminhos para conseguir a Sinergia entre pessoas nas Organizações. 2. ed. São Paulo: All Print Editora, 2013.

DO CARMO, G. G. A; MARCONDES, R. C. **Mergers and acquisitions with a focus on resources and organizational capabilities**. REBRAE. CURITIBA, v. 9, n. 1, p. 62-78. Jan./abr 2016. [online] <http://www2.pucpr.br/reol/pb/index.php/rebrae?dd99=issue&dd0=766>   Access June 21 2016.

Estado do Paraná. **No Ranking da Competitividade o Paraná segue na frente**. [online] <http://www.e-parana.pr.gov.br/2015/11/3300/No-Ranking-da-Competitividade-o-Parana-segue-na-frente.html>. Access February 18 2016.

FILHO, et al. **Redução da instabilidade e melhoria de desempenho do sistema MRP**. [online] <http://www.scielo.br/pdf/%0D/prod/v16n1/a06v16n1.pdf>. Access April 28 2016.

FIEP - FEDERAÇÃO DAS INDÚSTRIAS DO ESTADO DO PARANÁ – (Brasil). **Sondagem Industrial**.   [online]   <   http://www.fiepr.org.br/para-empresas/estudos-economicos/uploadAddress/sondagem201516_ok_site[66937].pdf>. Access February 15 2016.

FIESP- Fundação das Indústrias do Estado de São Paulo, Brasil. **Pesquisa Sondagem Industrial da CNI** – Regionais Bauru, Jundiaí e Presidente Prudente. [online] <http://www.fiesp.com.br/indices-pesquisas-e-publicacoes/sondagem-cni-jundiai-1o-trim-2008/>. Access December 18 2015.

IPARDES-Instituto Paranaense de Desenvolvimento Econômico e Social-Brasil. **Paraná em números.** [online] < http://www.ipardes.gov.br/index.php?pg_conteudo=1&cod_conteudo=1>. Access December 19 2015.

LUDWIG, et al. Ap**licação da metodologia just in time para a redução de estoques em uma indústria   do   ramo   moveleiro.**   [online] <http://www.nexos.ufsc.br/index.php/lean/article/download/1220/pdf_12> Access April 28 2016.

MENDES, J. T. G. **Competição e competitividade das empresas brasileiras**, pág. 163 (2009)

MACEDO, M. M. **Gestão da produtividade nas empresas**, pág. 113 (2012) <http://www.grupouninter.com.br/web/revistaorganizacaosistemica/index.php/organizacaoSi stemica/article/viewFile/65/39> . Access August 18 2015.

MONTANI, et al. **A evolução do PIB paranaense – 2009 a 2014**. [online] <ftp://ftp.unicentro.br/artigos/economia2015/c6ef1e41f1694e7dc9c1a38cc5c2dea95723.pdf> Access August 23 2015.

NEGRI, F. **Determinantes da inovação e da capacidade de absorção nas firmas brasileiras**: qual a influência do perfil da mão-de-obra. (2006). Instituto de Pesquisa Econômico Aplicada (IPEA). Cap. 4, 101-122

NERI, Marcelo. **A Economia do Brasil nos últimos 40 Anos e Perspectivas para o futuro**. [online] <http://www.cps.fgv.br/ibrecps/40anos_EconomiaOGlobo_Neri_CPS_FGV.pdf>. Access 19/12/2015.

OLIVEIRA, F. E. M. **Considerações sobre o Kanban**. Revista do Centro de Ciências Administrativas, Fortaleza, vol. 11, n. especial, p. 103-110, 2005.

Pagani, R; Kovaleski, J; RESENDE, L. (2015) '**Methodi ordinatio**: a proposed methodology to select and rank relevant scientific papers encompassing the impact factor, number of citation, and year of publication', Scientometrics, Vol. 105 (3), pp 2109-2135. doi.org/10.1007/s11192-015-1744-x.

Pagani, R. N; ZAMMAR, G; KOVALESKI, J. L; RESENDE, L. M. **Technology transfer models**: a typology and a generic model. (2016). International Journal of Technology Transfer and Commercialization, Vol 14, (forthcoming) Available at: http://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=ijttc.

PEREIRA, **Apostila de Administração**. Pág. 6. [online] < http://www.cefetsp.br/edu/natanael/Apostila_ADM_parte1.pdf>. Access August 21 2015.

Portal G1. **Brasil cai 18 posições em ranking de países mais competitivos**. [online] <http://g1.globo.com/economia/noticia/2015/09/brasil-cai-18-posicoes-em-ranking-de-paises-mais-competitivos.html>>. Access December 12 2015.

RIBEIRO, C. J. **Competitividade**: Fator determinante para a sobrevivência das organizações e do homem. [online] <http://www.webartigos.com/_resources/files/_modules/article/article_77792_20111008221 2223e87.pdf>. Access April 20 2016.

SILVA, P. S. C; JORGE, M. F; RISCADO TERRA, B. R. C. S. S; SOARES, J. A; DOS SANTOS, J. A. N; JORGE, M. J. **Pro-innovation restructuring strategy**: case study of a multipurpose public organization in health. REBRAE. CURITIBA, v. 9, n. 1, p. 62-78. Jan./abr 2016. [online] <http://www2.pucpr.br/reol/pb/index.php/rebrae?dd99=issue&dd0=766> . Access June 21 2016.

162

163