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ENTERPRISE RESOURCE PLANNING SYSTEM AND ITS IMPACT ON THE ADMINISTRATIVE COSTS IN COMPANIES IN MEXICO

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ABSTRACT

The objective was to analyze the implementation impact of the Enterprise Resource Planning Boss System in the administrative costs of companies in the city of Chihuahua. The method was consisted on reviewing the 2010 from 50 companies incorporated in Boss System within the City of Chihuahua, Mexico. The information was fully obtained by January 2012 and in May the final data was concluded. The results showed that companies that use Boss System noted a decrease in administrative costs related to the generation of financial information, in comparison with the methods used prior to the implementation of this software.

INTRODUCTION

At present the industrial small and medium-sized enterprises (SMES) have an increasing amount of information. However, these organizations are not always prepared to manage and use the wealth of information that circulates in them, because it is impossible to do it manually, and at the same time it is extremely complicated to use various tools not integrated between them (Yudayly *et al.*, 2007). During the decision-making process of the organizations a continuous stream of quantity and quality information is required. The growing demands of a market with better negotiating skills force the process managers to act with flexibility and the processes to be adapted according to the changes that occur in the market (Carlos, 2007). Fabio (2014) notes that the vast majority of companies, regardless of their size, carry out their financial and accounting activities through programs and computer applications; logically, all this work should be reviewed and evaluated. In other words, it must be subjected to an audit process, to ensure that the information issued by an organization fully corresponds to its economic reality. Within the literature, different authors have defined ERP in a different way.

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For example, according to Miguel (2008) an ERP can be defined as an integrated suite of administrative applications which provides IT solutions for the processes of finance, accounting, human resources, manufacturing, logistics, services and relations with customers. Its objective is to unite all the business processes of a company under a single information platform. Wei (2008) mentioned that the main reasons why a company should evaluate the performance of its ERP system are: 1) the ERP systems are more complicated than any traditional information system (IF). The implementation of an ERP system requires large investments of money, time and energy; 2) all the business processes of an organization are involved in ERP systems. The ERP system adopted will affect all commercial operations, even future strategies; 3) ERP systems are based on business rules and procedures. The implementation of an ERP system requires the customization and adaptation of work processes based on the business practices of the company. Many of the current processes of business can suffer reengineering and changes; 4) a successful ERP system must not only comply with the requirements of the current functions of the business, but it also has to meet future needs. Continuous updating and maintenance are very important. In many cases the ERP enhances the competitive advantage of the organizations, in others, its implementation has generated dramatic failures with

irreversible damage (Miguel, 2008). Alecxys et al. (2014) argue that the choice of an ERP system should be done after an exhaustive and detailed analysis of the current situation of the company, which must be aligned to the strategy of the Organization, and consider the availability of resources with experience, as well as aspects related to leadership and knowledge of the Organization, maturity and credibility in the existing processes and the degree of reliability of the data. ERP systems consolidate in companies of different sizes and sectors, allowing their real benefits to be definitively evaluated (Fernando & Paulo André da, 2010). Antonio (2011) points out as advantages in the use of an ERP the safety and efficiency in business transactions, simplification in operation, and productivity increase or greater control of each stage.

Based on an empirical study in Chinese organizations, Zhang *et al.* (2006), indicate that the key success factors in the implementation of an ERP system are: 1) higher level of management support: positive engagement, enthusiasm for the project and a strong support; 2) project implementation team: organization and project implementation teams. The members of the team must have experience and capacity; 3) external consultants: knowledge and experience in ERP; 4) the establishment of objectives and scope of the project: objectives and scope must be determined for each stage of the project; 5) training and education: the basic training and education for the operation of a ERP; 6) project management: In accordance with the project's objective, determine the project plan, the allocation of resources, cost control and budget; 7) data: accuracy and completeness of data; 8) Change Management; 9) methods of implementation; 10) evaluation: evaluation of ERP projects and the contribution to business performance.

Another study conducted by Ronald *et al.* (2012) for small and medium-sized enterprises (SMES) in the city of Bogotá D.C. in Colombia, concluded that the development of an operations management system based on ERP technologies, allows the owners and managers of these companies to assess and improve their internal processes, with the commitment to make the appropriate follow-up to the features of the software, as well as its proper use. The study and application of improvements in resource optimization, supported in information systems, increases the percentage of innovation and technological adaptation of the SMES, allowing for better planning of corporate resources. The ignorance of the technology, by managers, is the main obstacle to the adoption of information and communication technologies in small and medium-sized enterprises. The literature shows information about the benefits of the use of enterprise resource planning systems. However, in the city of Chihuahua, and particularly in the case of Small and Medium-sized Enterprises (SMES) there is little information that displays, according to economic and administrative capacity, the benefits that may be generated.

Given the above, the objective of this study was to analyze the impact of the implementation of the enterprise resource planning system Boss System in the administrative costs of the companies of the city of Chihuahua. This research will help to identify the potential of this type of ERP systems: identify the advantages, disadvantages, and the main features, as well as the problems of implementation and the key issues that require further attention when deciding to establish a program of ERP type. The beneficiaries or potential users of this information are companies that in similar situations to those established

here, serving as a frame of reference for them. The hypothesis: the implementation of the Enterprise Resource Planning System Boss System reduces administrative costs of the companies.

MATERIALS AND METHODS

This is an empirical study with a quantitative approach, non-experimental, transversal and descriptive. It is based on the review of records from the year 2010 of 50 companies incorporated in Boss System. The information required to begin with the analysis was obtained in a comprehensive manner during the month of January 2012 and the final data relation was concluded in May. The analysis of each company was carried out in accordance with what was published in the Official Journal of the Federation in 2009 and the results are shown in Table 1. 94% of the companies that comprise the group are micro and small enterprises, also representing 50% of the total economic sector. 36% of the companies belong in the services sector and only 14% within the industry sector. Among the goods provided on the service sector there are real estate agencies, notaries, accountants, business advisors, agencies, car workshops, cleaning and vigilance services. The industry sector is dominated by mining companies, whereas the trading companies are of diverse nature. In the three groups there are companies that deliver financial information in another language to the parent company or foreign partners. At present, there are a large number of systems or software that help companies in the administration, many of them modular but even so with features that in many cases do not favor the decision-making process by lack of timely information or easy interpretation. Systems or software with different characteristics are currently being developed, in particular to seek the attention of decision-makers and give great importance to the generation of financial information in real time.

One of these developments is Boss System ®. Its size and operation allows it to be on the market in any type of business, although the segment chosen here is comprised of small and medium-sized enterprises. According to Boss Solutions (2011), the company that owns the rights of the system, Boss System is a solution that allows you to optimize the operation of public accounting firms that provide services related to the Control and Processing of Information. Boss System is based on a computational system type ERP (Enterprise Resource Planning) that integrates several modules which allow it to carry out the administration and operational functions in the companies (Clients of the Public Accountants Firm) in a simple and friendly manner. It was designed and developed to meet needs and facilitate the operation of the firm, offering more and better services, while allowing end-customers to operate efficiently using a cutting-edge tool that includes technical support and information hosting services.

RESULTS

Characteristics of the System of Enterprise Resource Planning Boss System

Table 2 shows the characteristics and the use in organizations that form this group of companies prior to the implementation of Boss System. Of them, the highest percentages for any of the modules used prior to the incorporation of Boss System were data security with 90% and traceability of changes in the information with 80%.

Table 1. Classification of the companies incorporated in Boss System according to their economic sector and size

Sector	Micro Enterprise		Small Enterprise		Medium Enterprise			
	Total	%	Total	%	Total	%		
Commercial	25	50	5	20	19	76	1	4
Industrial	7	14	2	29	5	71	0	-
Services	18	36	8	44	8	44	2	11
Total	50	100%	15	30%	32	64%	3	6%

Table 2. Use of some features of the administrative software used by companies, based on those that Boss System mentioned as the most relevant

Features	Accounting		Banks		Accounts receivable		Accounts payable		Billing	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	%	%	%	%	%	%	%	%	%	%
Access and operation via the Internet	0	100	0	100	5	95	0	100	5	95
Real-time information	0	100	2	98	20	80	0	100	22	78
Highly configurable by concepts	0	100	0	100	0	100	0	100	0	100
Automatic posting	0	100	0	100	0	100	0	100	0	100
Data security	90	7	2	98	29	71	0	100	29	71
Integration of modules	0	100	0	100	10	90	0	100	10	90
Traceability of changes	80	20	0	100	29	71	0	100	29	71

Table 3. Administrative Software systems and modules used by the first group of companies before joining Boss System

Systems or Software	Accounting		Banks		Accounts receivable		Accounts payable		Billing	
	Number	%	Number	%	Number	%	Number	%	Number	%
ContPaq	6	12	3	6	3	6	5	10	3	6
Microsip	2	4	7	14	8	16	2	4	6	12
Multivisión					4	8	3	6	4	8
Proconta	40	80								
Their own			1	2	4	8	2	4	11	22
SAE					1	2	1	2	1	2
Other	1	2	3	6	11	22	12	24	17	34
Manual	1	2	36	72	19	38	25	50	8	16
Total	50	100	50	100	50	100	50	100	50	100

Table 4. Systems use according to the type of companies

Sector	Modules used					Total
	None	One	Two	Three	More than three	
Commercial	4		4	6	3	17
Industrial	6	2				10
Services	12	5	1	5		23
Total	22	7	7	11	3	50
Percent	44%	14%	14%	22%	6%	100%

Table 5. Reasons for not implementing some administrative software

Motive	%
They are complicated, difficult to operate or require expertise for its use	86
They are very expensive	28
It's not required	17
Other	10

Table 6. Education of personnel involved in the generation of financial information

Level of Studies	Before Boss System		With Boss System		Variation
	Quantity	%	Quantity	%	
Unfinished High School	25	13	5	4	-9
High School	13	7	8	7	0
Technical Career	10	5	5	4	-1
Truncated Career	32	17	16	14	-3
Academic degree	111	57	81	69	12
Master degree	2	1	2	2	1
Total personnel	193	100	117	100	76

Only 5% generated or operated via the internet and 22% had no information of any area in real time. None of the companies could obtain information on accounting day-to-day results and none of the systems generate it automatically, that is to say, without the need for any person to do the accounting records. Only 10% had information that came from the integration of two or more modules. Highlighted with high percentages are Data security and Traceability of changes.

Systems or Software used by companies

A variety of software used to perform administrative activities and obtaining financial information was found in this group of companies. It is important to mention that a significant number did not use any software or administrative system specialized in these functions before the incorporation of Boss System. As a result, electronic sheets were used mainly to meet their needs, as shown in Table 3. The information collected is based on the administrative modules of Banks, Billing, Accounts Receivable, Accounts Payable and Accounting. There is a concentration of 80% for the accounting module in a single system called Proconta that is not used by these companies on any other modules. It is clear that for the rest of the activities, the largest concentration is located on the non-use of specialized modules. Instead, only tools such as spreadsheets, which does not guarantee a complete, reliable and timely information for decision-making, and the safety of the information, is used. For the administration of accounts payable, 38% of the companies did not use any software or tool for control, only the "manual system" reception and payment procedures.

The same applies to the management of banks where it shows a 38%. Table 4 specifies that before the incorporation to Boss System, only 42% of the companies on this group used more than a module for the registration and control of the activities referred to in this research. The main reasons given for not using any software in other areas in which the functions were carried out manually or using some other tool, were that a software was too complicated or difficult to operate and its use required expertise, cited by 86% of the companies; the price, cited by 28%; assuming that they do not require it, cited by 17%, and other various reasons, cited by 10% of the companies, as shown in Table 5. The above information is not confirmed by reviewing the characteristics of the personnel that work in the generation of financial information, since 69% have a bachelor's degree, 18% truncated or technical career and 96% has experience of more than two years in the use of some administrative software, as shown in Tables 6 and 7. It is important to note the change in schooling and number of staff that worked before and which currently exists in this group of companies. The total number of employees directly related to the generation of financial information decreased from 193 to 117; that means, 76 people were reassigned to other activities or have withdrawn from the company. The group that increased participation was the one who has a bachelor's degree.

Administrative costs in companies

The use of an administrative software represents, without a doubt, a cost for enterprises and its management could be linked to the price. Table 8 shows a comparison of the prices of the different administrative systems used in part or in full by the companies that make up this group. Although the

packages and conditions offered are not the same for all systems, there was a monthly amount as a reference for the cost to the company. With regard to costs or administration costs, the results showed the concepts that are shown in Table 9. Various reasons explain that no concept appears in the total number of companies, it would be important to highlight the fact that some companies belong to a group of companies, and only perform certain activities that are charged as fees. The same occurs with telephone, electricity or rent services that are billed as administrative services without a breakdown. Table 10 shows that the most important expenditure amounts to salaries, which represent 41.7% of the total expenditures. The following expenditure was the fees with 23.9%, plus the social burden represented at 6.4%. The sum of these concepts amounts to 72%, representing three quarters of the total expenditure by concepts of administrative costs. The third concept in amount comes from the investment in equipment and software for the administration, with 10.3%. Within the characteristics of the System of Enterprise Resource Planning Boss System and what it offers, a reduction of time in the registration activities and follow-up of administrative functions, can be found, as well as lower requirements for assets of data processing and storage.

Financial information, its generation and use

The need for financial information on this group of companies is evident. The data shows an interest in its generation and use, with important changes in the figures before and after the implementation and use of Boss System. The first change, as shown in Table 11, is located in the periodicity of the generation of information, in which up to 88% of the companies do on a daily basis. It should be pointed out that prior to the implementation of the system, the highest figure was 47%. The second important concentration in the various modules is located in the generation of information on a weekly basis. There has been an increased interest in the generation of daily information by means of the modules that facilitate the operation of the company, mainly in what refers to cash, billing and accounts receivable, and less to do so in the module of accounting. Its progress also goes from zero to 69% with the use of Boss System. An important highlight would be the readiness with which the administrative areas placed themselves at the disposal of the financial information management (Table 12). Prior to the implementation of Boss System Management, Management had the possibility of having a maximum daily information on 40% of the companies. This refers to one of the most sensitive issues, which is banks; none of them could have the available accounting information on a daily basis, and 96 per cent had it until the monthly closing. With the implementation of Boss System, the daily availability of the information in billing and banks went from up to 88% and the one form accounting rose up to 70%. Highlights of less interest regard the generation of information on accounts payable, since some companies didn't even had an accurate knowledge on the frequency with which they prepared it. Regarding the accounting information, the generation of some financial reports for the management had significant changes in frequency. On this regard, it's worth mentioning the balance relations, balances age or accounts receivable and sales reports, while reconciliations, basic financial statements and the determination of taxes remaining relatively the same. Of lesser interest it can be mentioned the generation of information on accounts payable, as even some companies had no accurate knowledge about the frequency

Table 7. Experience of staff in the use of some administrative software

Experience	Before Boss System		With Boss System		Variation
	Quantity	%	Quantity	%	
1 – 6 months	1	0	0	0	-1
6 – 12 months	6	3	1	1	-2
Less than 2 years	17	9	4	3	-5
More than 2 years	169	88	112	96	8
Total staff	193	100	117	100	76

Table 8. Costs of different administrative systems or software used by the companies of this group

Modules	Contpaq / Adminpaq			Microsip		SAE		Xnet		Boss	
	No. de users	Cost (pesos)	Update	No. de users	Cost (pesos)	No. de users	Cost (pesos)	No. de users	Cost (pesos)	No. de users	Cost (pesos)
Accounting	20	30,380.00	17,388.00	10	14,900.00	10	714			10	2,000.00
Banks	15	25,392.00	13,676.00	10	14,900.00	10	649			10	
Inventory	10	35,948.00	43,024.00	10	15,000.00	10	1,143.00			10	
Accounts receivable				10	15,000.00						
Accounts payable				10	15,000.00						
Billing	15	25,392.00	N/A	10	17,400.00				7,306.84		
Totals		\$117,112.00	\$74,088.00		\$91,300.00		\$2,506.00		\$7,306.84		\$2,000.00
The estimated monthly costs:											
Estimated Time of Use											
Without updating		3 years									
Annual Cost		39,037			30,433		30,072		N/A		24,000
Monthly cost		3,253			2,536		2,506		N/A		2,000

Observation

Boss Solutions includes information lodging on Boss servers.

Information obtained from Web pages of each system.

Table 9. Administrative expenses incurred by the companies that use Boss System

Type	Number of companies	Total percentage
Salary	36	72
Taxes and social burden	36	72
Office supplies	39	78
Equipment and software costs	40	80
Services (telephone, electricity, water, others)	42	84
Honorarium	45	90
Fuel	36	72
Travel and per diem	32	64
Rent	26	52
Other (messaging, fees, miscellaneous, etc.)	41	82

Table 10. Administrative expenses incurred by the companies that use Boss System during the year 2010

Type	Amount (thousands of pesos)	%
Salary	42,094,246	41.7
Taxes and social burden	6,446,968	6.4
Office supplies	398,555	0.4
Cost of equipment and software	10,345,237	10.3
Services (telephone, electricity, water, others)	3,705,199	3.7
Honorarium	24,129,964	23.9
Fuel	3,044,673	3.0
Travel and per diem	3,965,481	3.9
Rent	5,268,198	5.2
Other (messaging, fees, miscellaneous, etc.)	1,478,272	1.5
Total	\$100,876,793	100

with which they prepared them before the use Boss System and even then, the highest frequency was found in periods of a week or more. The generation of financial reports relates mostly to those that have to do with the cash, over those that show results, and even more so over the ones regarding planning or even control, as in the case of budgets and reconciliations (Table 13). The use of information by the managers or owners continues a trend different from the results of the three previous tables, before and after the implementation of the system, in spite of its availability. As shown in Table 14, 60% use accounting information on a monthly basis, even when 70% of the companies make it available on a daily basis. It strikes the daily utilization in banks where 17% went up to 81% and billing where 13% reached 70%.

Personnel involved in the generation of financial information

The human element is fundamental to the operation and generation of financial information on companies and also a determining factor in the total administrative costs. This group of companies had a total of 193 people involved in the generation of financial information prior to the implementation of Boss System. The largest concentration of this staff, 97 of the total, was specifically in the last accounting movements, reduced to only 55 at the end of this research, that is to say, a decrease of 43%. Significant reductions were observed in the staff of the different areas. A total of 76 people reduction can be seen on the personnel involved in the generation of

Table 11. Frequency with which information is captured in the administrative software or is manually generated

Before the implementation of Boss System

Modules	Daily		Weekly		Biweekly		Monthly		Other		Totals
	Number	%	Number	%	Number	%	Number	%	Number	%	
Accounting	0	-	2	4	1	2	43	91	1	2	47
Banks	22	47	14	30	1	2	2	4	8	17	47
Accounts receivable	11	25	16	36	1	2	4	9	12	27	44
Accounts payable	2	4	7	15	8	17	14	30	15	33	46
Billing	19	42	6	13	1	2	6	13	13	29	45

After the implementation of Boss System

Modules	Daily		Weekly		Biweekly		Monthly		Other		Totals
	Number	%	Number	%	Number	%	Number	%	Number	%	
Accounting	35	70	1	2	4	8	10	20	0	-	50
Banks	44	88	4	8	0	-	2	4	0	-	50
Accounts receivable	40	85	5	11	1	2	0	-	1	2	47
Accounts payable	35	71	10	20	1	2	2	4	1	2	49
Billing	42	88	4	8	1	2	1	2	0	-	48

Variation after the implementation of Boss System

Modules	Daily		Weekly		Biweekly		Monthly		Other		Totals
	Number	%	Number	%	Number	%	Number	%	Number	%	
Accounting	35	70	-1	-2	3	6	-33	-71	-1	-2	-2
Banks	22	41	-10	-22	-1	-2	0	0	-8	-17	-17
Accounts receivable	29	60	-11	-26	0	0	-4	-9	-11	-25	-25
Accounts payable	33	67	3	5	-7	-15	-12	-26	-14	-31	-31
Billing	23	45	-2	-5	0	0	-5	-11	-13	-29	-29

Table 12. Frequency with which generated information is being is made available by any means to the administration

Before the implementation of Boss System

Modules	Daily		Weekly		Biweekly		Monthly		Other		Totals
	Number	%	Number	%	Number	%	Number	%	Number	%	
Accounting	0	-	1	2	0	-	45	96	1	2	47
Banks	19	40	16	34	1	2	5	11	6	13	47
Accounts receivable	11	25	15	34	1	2	8	18	9	20	44
Accounts payable	2	4	6	13	8	17	18	39	12	26	46
Billing	17	38	8	18	1	2	9	20	10	22	45

After the implementation of Boss System

Modules	Daily		Weekly		Biweekly		Monthly		Other		Totals
	Number	%	Number	%	Number	%	Number	%	Number	%	
Accounting	35	70	1	2	4	8	10	20	0	-	50
Banks	44	88	4	8	0	-	2	4	0	-	50
Accounts receivable	40	85	5	11	1	2	0	-	1	2	47
Accounts payable	35	71	10	20	1	2	2	4	1	2	49
Billing	42	88	3	6	1	2	1	2	1	2	48

Variation after the implementation of Boss System

Modules	Daily		Weekly		Biweekly		Monthly		Other		Totals
	Number	%	Number	%	Number	%	Number	%	Number	%	
Accounting	35	70	0	0	4	8	-35	-76	-1	-2	-2
Banks	25	48	-12	-26	-1	-2	-3	-7	-6	-13	-13
Accounts receivable	29	60	-10	-23	0	0	-8	-18	-8	-18	-18
Accounts payable	33	67	4	7	-7	-15	-16	-35	-11	-24	-24
Billing	25	45	-5	-12	0	0	-8	-18	-9	-20	-20

information; that is, a 39 per cent less than they did before the implementation of the system, going from 193 to 117 persons (Table 15). This decrease in staff was reflected according to the schooling, at the lowest level, from 25 people without high school finished to just 5, which represents a decrease of 80%. The variation was similar in high school with a 38%; in

technical career with 50%; in those with truncated career with 50%, and less in those with a degree, 27%; all towards the low (Table 16). The level of expertise in the use of some administrative software grouped on more than 2 years and only less than 4% had previous experience.

Table 13 .Frequency with which financial reports are generated Accounting

	Daily			Weekly			Biweekly			Monthly			Other			Never		
	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%
	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation
Financial Statements	-	-	-	-	4	4	-	-	-	94	96	2	6	-	-6	-	-	-
Taxes Determination	-	-	-	-	2	2	-	6	6	91	92	0	9	-	-9	-	-	-

Banks

	Daily			Weekly			Biweekly			Monthly			Other			Never		
	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%
	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation
Bank Balances	33	79	47	41	17	-25	2	-	-2	11	2	-9	13	2	-11	-	-	-
Bank Reconciliations	-	-	-	-	17	17	2	10	8	91	71	-20	4	2	-2	2	-	-2
Cash Budget	-	2	2	-	-	-	-	4	4	9	38	-29	48	17	-31	43	38	-5

Balances Age and Accounts Receivable

	Daily			Weekly			Biweekly			Monthly			Other			Never		
	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%
	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation
Accounts receivable	2	27	24	45	67	21	5	4	0	34	2	-32	14	-	-14	-	-	-

Balances Age and Accounts Payable

	Daily			Weekly			Biweekly			Monthly			Other			Never		
	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%
	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation
Accounts payable	2	6	4	24	81	57	13	6	-7	48	6	-42	13	-	-100	-	-	-

Billing – Sales

	Daily			Weekly			Biweekly			Monthly			Other			Never		
	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%
	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation
Sales Report	7	31	24	24	58	33	2	7	4	56	2	-53	11	2	-9	-	-	-

Table 14. Frequency with which the administrators or owners use the financial information

Modules	Daily			Weekly			Biweekly			Monthly			Other		
	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%	%Without	%Whit	%
	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation	BOSS	BOSS	Variation
Accounting	-	30	30	-	4	4	-	-	6	6	98	60	-38	2	-2
Banks	17	81	64	21	10	-11	2	-	-2	49	8	-41	11	-	-11
Accounts receivable	9	69	60	18	22	4	2	2	0	55	4	-50	16	2	-14
Accounts payable	-	61	61	9	28	19	7	2	-5	73	9	-64	11	-	-11
Billing	13	70	56	13	17	4	4	-	-4	56	9	-47	13	4	-9

Table 15. Personnel involved in each area

Modules	Before Boss System		With Boss System		Variation	
	Number of staff	%	Number of staff	%	Number of staff	%
Accounting	97	50	55	47	- 42	- 43
Banks	33	17	22	19	- 11	- 33
Accounts receivable	27	14	17	15	- 10	- 37
Accounts payable	19	10	11	9	- 8	- 42
Billing	17	9	12	10	- 5	- 29
Totals	193	100	117	100	- 76	- 39

Table 16. Education of personnel involved in the generation of financial information

Modules	Before the Boss System		with Boss System		Variation	
	Quantity	%	Quantity	%	%	
Unfinished High School	25	13	5	4	- 9	
High School	13	7	8	7	0	
Technical Career	10	5	5	4	- 1	
Truncated Career	32	17	16	14	- 3	
Academic degree	111	57	81	69	12	
Master degree	2	1	2	2	1	
Total staff	193		117		76 employee	

Table 17. Experience of staff in the use of some administrative software

Experience	Before Boss System		With Boss System		Variation	
	Quantity	%	Quantity	Quantity	%	
1 – 6 months	1	0	0	0	- 1	
6 – 12 months	6	3	1	1	- 2	
Less than 2 years	17	9	3	3	- 5	
More than 2 years	169	88	96	96	8	
Total staff	193		117			

Table 18. Spending on monthly salaries in administrative staff directly related to the generation of financial information

	Number of staff	Total salaries paid monthly	Average monthly salary
Before implementation of Boss System	193	\$ 2,193,108	\$ 11,363
After implementation of Boss System	117	1,583,876	13,537
Difference	- 76	- 609,232	2,174

Table 19. Staff that only performs activities directly related to the generation of financial information

	Before Boss System		With Boss System		Variation	
	Quantity	%	Quantity	%	%	
Staff that only performs functions related to generation of financial information	100	52	62	53	1	
Personnel performing other administrative functions	93	48	55	47	- 1	
Total staff	193		117			

The companies retained staff with more experience in the generation of financial information, because the 12% with less than 2 years of experience before the implementation of Boss System, was reduced to only a 4% (Table 17). In companies of this size, the generation of information has traditionally required a significant number of trained staff. The cost of this necessary human resource, in addition to the monthly salary, involves a series of additional expenses. Before the implementation of Boss System, the companies spent only in wages the amount of \$2'192,108. Going from this amount to \$1'583,876 represents a variation of \$609,232. The latter amount shows a 28% decrease in administrative expenditure related to the generation of financial information. It is important to mention that some of these companies made salary increments during the period from August 2011 to May 2012, which is reflected in these numbers. Changes in the structure of personnel, as well as the fact that the companies retained on these activities staff with generally higher

education and experience in use of administrative software, as well as the previously noted increases in the wages, varied the average salary per employee directly related to the generation of financial information from \$11,363 to \$13,537. Despite this increase, the total expenditure under this heading decreased (Table 18). Before the change to Boss System, the specific expenditure on staff involved in the preparation of financial information in these companies represented up to \$2'193,108 in nominal wages without considering any charge for social spending, and involved a total of 193 people with an average monthly income of \$11,363 pesos. Of the total number of staff that worked in the generation of financial information, 48% before the implementation of Boss System and 47% after the implementation, intervenes in other administrative functions and is not fully dedicated exclusively to the generation of financial information (Table 19). The reduction in the total amount of salaries reported is presented on a monthly basis. However,

this is not the only decrease in administrative costs that this group of companies have experienced, as the reductions in contributions to the IMSS (Mexican Social Security Institute) and INFONAVIT (Federal Institute for Worker's Housing), payroll tax, annual bonus and vacations are directly linked to the concept of salary. The figure which may represent the savings for these concepts was not quantified.

Conclusion

Companies that use Boss System generate immediate financial information, obtained from the day-to-day operations. This allows administrators to use more often such information because, after the implementation of the system, it is more complete. The most impacted administrative cost after the implementation of Boss System is that organizations use less time and staff in the process of generation and analysis of financial information, compared with the method used before the implementation of said software. There was an effect of decrease in administrative costs related to the generation of financial information, compared with the methods used before the implementation of this software. The results of the financial analysis allow us to infer that the impact on the administrative costs was positive. Therefore, the hypothesis that states that the implementation of the Enterprise Resource Planning System Boss System reduces the administrative costs of the companies of the city of Chihuahua, can be accepted.

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