



Department of Management

*Chair of Performance Measurement and Financial
Reporting*

**THE IMPORTANCE OF AN INFORMATION
SYSTEM TO SUPPORT FIRMS' PERFORMANCES
CASE STUDY: A.IR. s.p.a.**

SUPERVISOR

Prof. Riccardo Tiscini

CANDIDATE

Preziosi Crescenzo

ID 664711

CO-SUPERVISOR

Prof. Saverio Bozzolan

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To my family

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INTRODUCTION

This dissertation has the final aim of analyzing a case study to highlight the characteristics of an innovative time-based Performance Measurement system (adopted in a regional Government-owned company), which is based on a Management Information System's typical features.

I chose to write about this topic because, nowadays, a lot of Italian companies (especially small and medium enterprises) are not aware of the importance of the analytic data to support decision-making processes, and they don't consider Management Information Systems among their priorities, so they cannot improve their performances, or they cannot do it as good as they would by using these kind of instruments.

Why is an Information System so important for a firm? During the years, the competitive environment has become unstable and turbulent. So, a firm needs rapid information to adapt itself to the evolution of this context, anticipating competitors, and gaining competitive advantage. Firms' capability to adapt to the environment dynamics and the competitive advantage sustainability require analytic data and a Management Information System which is consistent with their needs.

The first chapter focuses on this tool, from the beginning of its usage until nowadays: the key principles, pros and cons of using it, and - to conclude the chapter - a look at the Enterprise Resource Planning (ERP), a sort of evolution of the traditional Management Information Systems, also giving examples - considering data and facts - about why and how the implementation of such tools is not easy, and firms often fail in implementing it in their business units: change usually scares employees.

In the second chapter, a kind of Information System will be introduced: this is a methodology to improve performances by monitoring key processes of a firm, considering two key variables: space and time. So, instead of traditional cost-based indicators, space- and time-based indicators will be considered using that tool.

The final chapter is devoted to the analysis of a business case. An Italian firm called A.IR. Autoservizi Irpini s.p.a. – a regional Government-owned Public Transport company from a little town in the South of Italy – will be introduced. It adopted an Information System in its business reality. We'll apply the guidelines shown in the second chapter, and see how they can fit with a real firm. To conclude, data will be analyzed to understand the real benefits gained by that firm using this tool, and how it improved its performances.

CHAPTER ONE: INFORMATION SYSTEM

1.1 What is it?

An **Information System (IS)** – or **Management Information System (MIS)** – is a tool for the collection, organization, storage and communication of information and data from many business activities within a firm. It provides a unified view of core business processes, also in real time, using common databases. It facilitates information flow between all business functions, overseeing connections to external stakeholders. Everything, from accounting to distribution, is tightly integrated.

Since the 1970s, a lot of software houses have studied how to apply digital knowledge to the firms' processes. At the beginning, costs were really high, computers would often take up whole rooms and requires several teams to run them. As technology advanced, these computers were able to manage greater capacities and therefore to slash their costs.

An important step was made in the 1980s, when **Materials Requirements Planning** was born: this was dedicated to the needs of material requirements to allow a firm to continue to produce. It was very important to have rapid and clear information about the requirements, the transportation and the delivery of materials.

As technological complexity boosted, and costs decreased, the need to share information within a company also increased: so, computers on a common network access shared information on a server. This lets thousands - or millions - of people access data simultaneously.

Then, the introduction of the **Enterprise Resource Planning (ERP)** tied all aspects of the business enterprise together, offering information access enveloping the complete management structure, providing a unified prospect

of core business processes, generally in real-time, using common databases managed by a database management system.

The next step of the Information Systems evolution is the **cloud computing** (or **on-demand computing**): managers will access the MIS remotely with laptop, tablet computers or smartphones.¹ This kind of computing can enable a ubiquitous, on-demand access to a shared pool of configurable computing resources, and they can be provisioned and released with a minimal management effort.²

1.2 Why is an Information System so important?

Markets have become, during the years, unstable and turbulent. So, there is the need for rapid information to a firm, in order to respond to an ever-changing business environment, and to anticipate competitors. To do so, **Information Systems** play a pivotal role, because - as told - functions are tightly integrated, and this benefits companies in several ways: immediate reactions to competitors' actions and/or market opportunities, flexible product configurations, reduced inventory, and tightened supply-chain links.

Firms with a competitive advantage over competitors typically have access to special resources that others do not, or these firms are able to use those resources more efficiently, resulting in higher revenue growth, higher profitability, and higher stock market valuation with respect to their competitors.

Porter's competitive forces have always built the fate of a firm. Due to the advent of the Internet, traditional competitive forces are still working, but

¹ "Management Information Systems: Managing the Digital Firm", Kenneth C. Laudon, Jane P. Laudon.

² "The NIST Definition of Cloud Computing", Peter Mell, Timothy Grance.

competitive rivalry has become much more intense: it is easy for rivals to compete on price alone, and for new competitors to penetrate the market; moreover, the Internet raises the bargaining power of customers (they can quickly find the lowest-cost provider due to the availability of information). However, the Internet also creates opportunities for building brands and loyal customer bases.

In a firm, Information Systems can improve the overall result of business units, promoting synergies and core competencies: the former makes the output of a unit being used as input to another unit, or it makes organizations blending know-how, in order to lower costs and generate profits; the latter is something for which a firm is a leader, relying on knowledge gained through experience (learning-by-doing) or acquired from external sources.

Current systems have an open client-server architecture and are real time. The appeal of such systems is that all the employees of a company will have access to the same information almost instantaneously through one unified user interface. A successfully implemented Management Information System can increase customer satisfaction, reduce inefficient spending, strengthen sales and forecasts, reduce inventory turnaround times, and enhance employee productivity and satisfaction³.

Anyway, a lot of firms (especially small and medium enterprises) do not consider these tools among their priorities, underestimating their potential, and not investing in them.

³ “*ERP Implementation Failure: A Case Study*”, Traci Barker, Mark N. Fralick

1.3 Pros and Cons

As told, the usage of an Information System gives rise to a number of **advantages**.

It improves **employee satisfaction** through removing redundancy and tediousness from day-to-day activities: it allows more time for value-added duties.

Moreover, employees can become more **involved in decision-making processes**. If employees are challenged, and they are not bored on the job, they will be more likely to stay with the job, becoming more experienced.

Another important advantage is the **focus on the core business functions** that have a long history of success. It improves those basics, providing a homogeneous way for companies to integrate them into their own corporate environment.

It also **breaks down barriers** between areas and allows the fluid movement of critical data between functions.

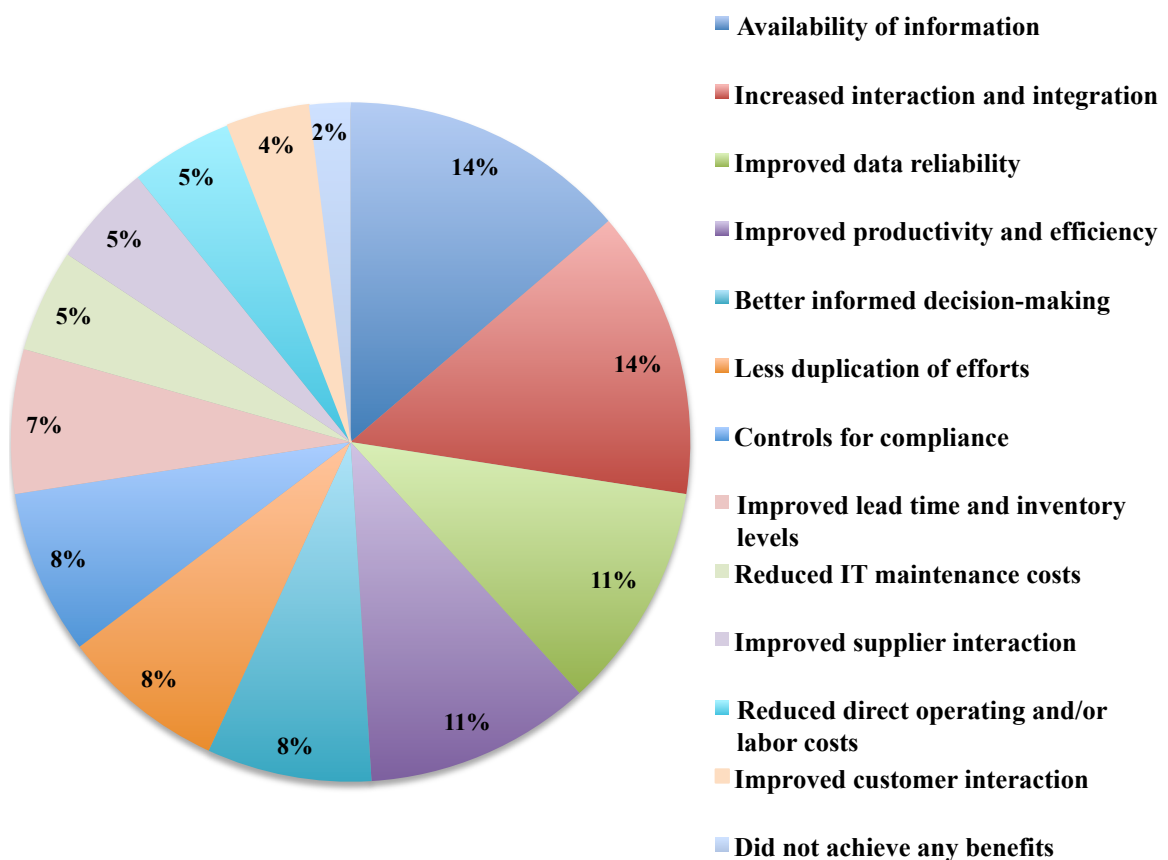
These solutions provide organizations with numerous other business benefits, which can justify the financial investment and time commitment required for an Information System implementation. An important research about this topic was made by *Panorama Consulting Solutions*: this consulting firm developed a report to investigate the software selection, implementation and satisfaction trends across industries, organization sizes and geographic locations. The report summarizes Panorama's independent research into the experiences of customers with regard to enterprise software, vendors, consultants and overall implementations.

To ensure that findings reflect the current conditions as accurately as possible, a total of five hundred sixty-two respondents – in 2015 – completed the survey upon which this data is based. Respondent organizations represented a diverse sample of industries, sizes, revenues, goals and vendors selected. However, all

respondent organizations reported having recent Information System experience. Approximately 47% of organizations are either in the process of implementing this kind of software or have completed implementation. Of the remaining respondents, 22% of organizations are in the process of selecting software, 13% are in the process of upgrading software, and 18% are working on a project such as adding a functional area to an existing Management Information System.

As *Panorama's* research indicates, shown in the following chart⁴, one of the most common benefits organizations may realize would be the availability of information, and the same percentage of organizations realized benefits related to the increased interaction and integration of business processes.

Chart 1: Types of Benefits realized



Source: Panorama Consulting Solution (2015)

⁴ “2015 ERP Report”, Panorama Consulting Solutions.

These main advantages, however, are balanced by three main **disadvantages** coming out when using an Information System.

Without the **proper planning** and **organization**, an Information System is sure to fail. Without an accurate understanding of clients' expectations, products' capabilities or clients' commitment, the undertaking could be tragic. The idea of an Information System works better with **no (or few) changes** being made to the initial software. Companies should not try to "*fit a square peg into a round hole*": they have just to modify their processes.

This tool is worthless without the proper **people** to implement, use and maintain its functionalities. Employees must be managed as if they are just as valuable as the software itself, otherwise the company might be better off saving money, not initiating the project.

There are a lot of examples showing how an Information System implementation can succeed or fail.

Among the successful cases, the Information System helped **Cadbury** to keep the pace in a fast-paced growth, avoiding inefficiencies without losing its competitive advantage. The firm also implemented a new way of warehouse management system, even if it initially took a lot of time: after that set-up time, processes were faster, and cost savings were higher. The feedback system was internal, due to cross-functional implementation, and it did not consider the market reactions, because this was an internal process. Similar cases happened in **Coca-Cola**, **Fujitsu**, **General Motors** or **Boeing**.

This implementation, however, is not always easy as it seems.

Hershey and **Whirlpool** experienced problems that probably could have been avoided if certain aspects of the implementation had been managed differently and according to the recommendations. A "*big bang*" approach was used, instead of a "*phased*" one: the implementation should not be forced into an unreasonable timeline; over-squeezing implementation schedule is a sure-fire

way to overlook critical issues. Testing phases are safety nets that should never be compromised. Moreover, they scheduled cutover in busy business periods: companies should always expect steep learning curves and operational performance dips. Timing cutover during slow business periods, the company gives itself more time, and gives employees more time to learn new business processes and systems.

In 2014, 63% of companies using an Information System noted that their implementation project was successful. This percentage, however, is decreasing: in 2015, only 58% of companies noted that their project was a success. Twenty-one percent illustrated that their project implementation was a failure, which is an increase of 5% from the previous year. Curiously, nearly one-quarter of companies (21%) are “*neutral*” or “*do not know*” if their project was a success.⁵

Confusion or neutrality regarding Information System success is typically an indicator that the organizations did not invest adequate time in software selection, business case justification, benefits realization measurement or post-implementation audits. This can also lead to implementation failure.

Companies should spend a lot of money and many years to implement an Information Systems in their organizations. Once it is implemented, going back is extremely problematic: it is too expensive to undo the changes an Information System brought into a company. There are several failed attempts: companies lost the capital invested in Information Systems and in outside consultants, and also a portion of their business. An Information System implementation is an accurate strategic planning, and discussions with departments. It is crucial for companies to be aware of certain critical issues, before implementing any Information Systems.

⁵ *Ibid.*

So, there are some main **lessons to be learned**.

An Information System project is so complex and vast that it takes several years and a lot of money to roll it out. Its implementation is not as much a technological exercise, but an “*organizational revolution*”. **Extensive preparation** is the key to success: without patience and a careful planning, the implementation will turn out to be corporate root canals, not a competitive advantage.⁶

For these projects to succeed, **top management support** is crucial. Implementing an Information System is not only about changing software systems, but it is also – and above all – about re-positioning the company, revolutionizing business practices. Top management must consider the strategic implications from implementing this solution, examining several problems before launching the project: does the Information System strengthen the company’s competitive position? How does this tool influence the organizational structure and the culture? What is the scope of the implementation? Are there any alternatives that better meet the company’s needs? Moreover, management must be involved in every step of the implementation. It is about people, not processes or technology.

The management of this change must be carefully planned: cutting corners, for instance, is detrimental to a company. Top management must not only bear the cost of the project, but also take an **active role** in leading the change. Intervention from management is often necessary to solve conflicts and to lead everybody to the same goal, building cooperation among the different groups in the organization. Top management, in addition, needs to constantly analyze the progress of the project and provide the right direction to the implementation teams. The success of this project is strictly linked to the strong, sustained commitment by the top management.

⁶ “*Critical Issues Affecting an ERP Implementation*”, Prasad Bingi, Maneesh K. Sharma, Jayanth K. Godla.

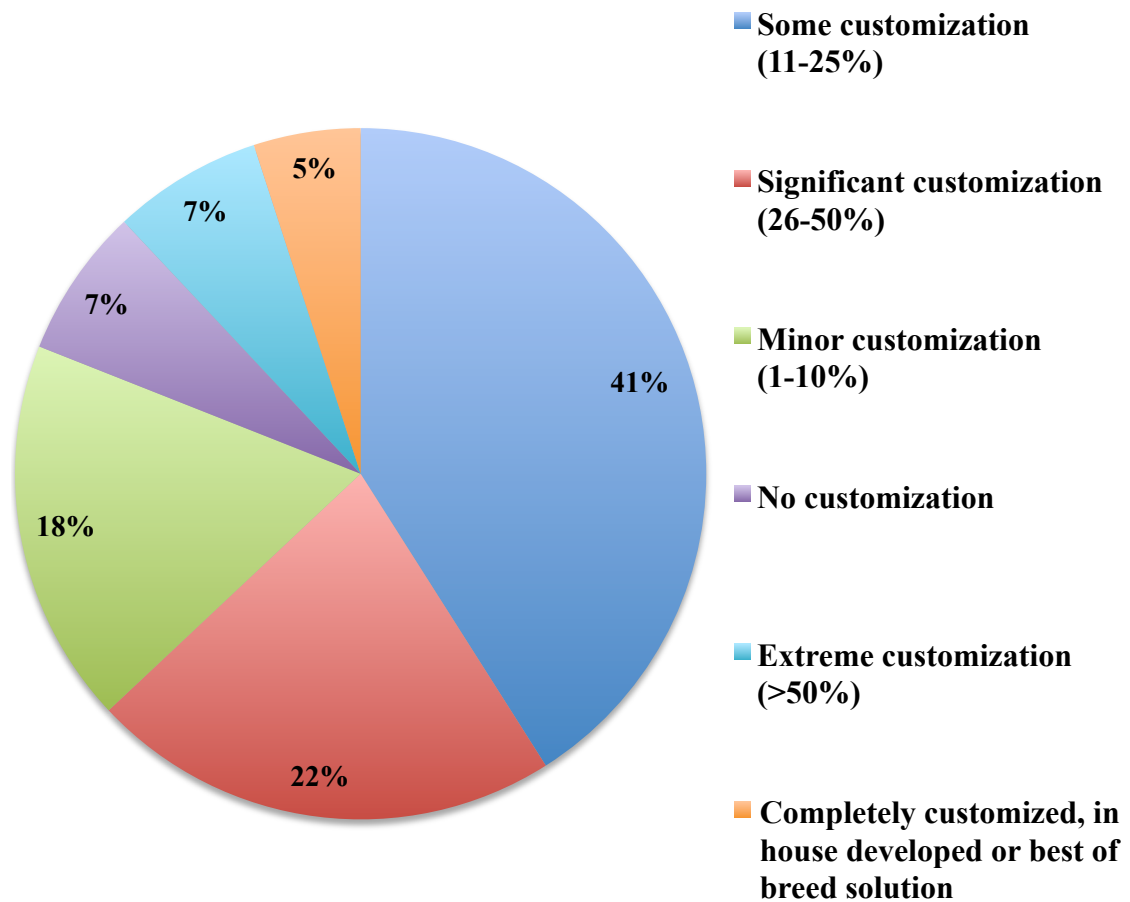
The implementation involves **re-engineering the existing business** processes to the best business process standard. One major benefit of an Information System comes from re-engineering the company's existing way of doing business. All the processes in a company must fit with the Information System.

Costs of aligning with it (but also the subsequent benefits) could be very high: it is not easy to get everyone to agree to the same process. Sometimes, business processes are so exclusive that they need to be retained, and a right path needs to be taken to customize these business processes. If the Information System cannot adapt to the organization, then the organization has to adapt to it, by changing its procedures. When an organization tailors the software to suit its needs, the total cost of implementation rises. The more the customization, the greater the implementation costs.

As shown in the chart in the following page⁷, in 2015, only 7% of companies did not customize any aspect of their Management Information System. An overwhelming 63% of organizations had some or significant customization. Companies should keep their systems “*as is*” as much as possible to reduce the costs of customization and future maintenance and upgrade expenses.

⁷ “2015 ERP Report”, Panorama Consulting Solutions.

Chart 2: Level of Customization



Source: Panorama Consulting Solution (2015)

Moreover, no single application can do whatever a company needs. Companies may have to use other specialized software products that best meet their unique needs⁸. These products have to be **integrated** along with all the “*domestic*” systems. In this case, the Information System serves as a backbone, and all the different software are connected to that Information System.

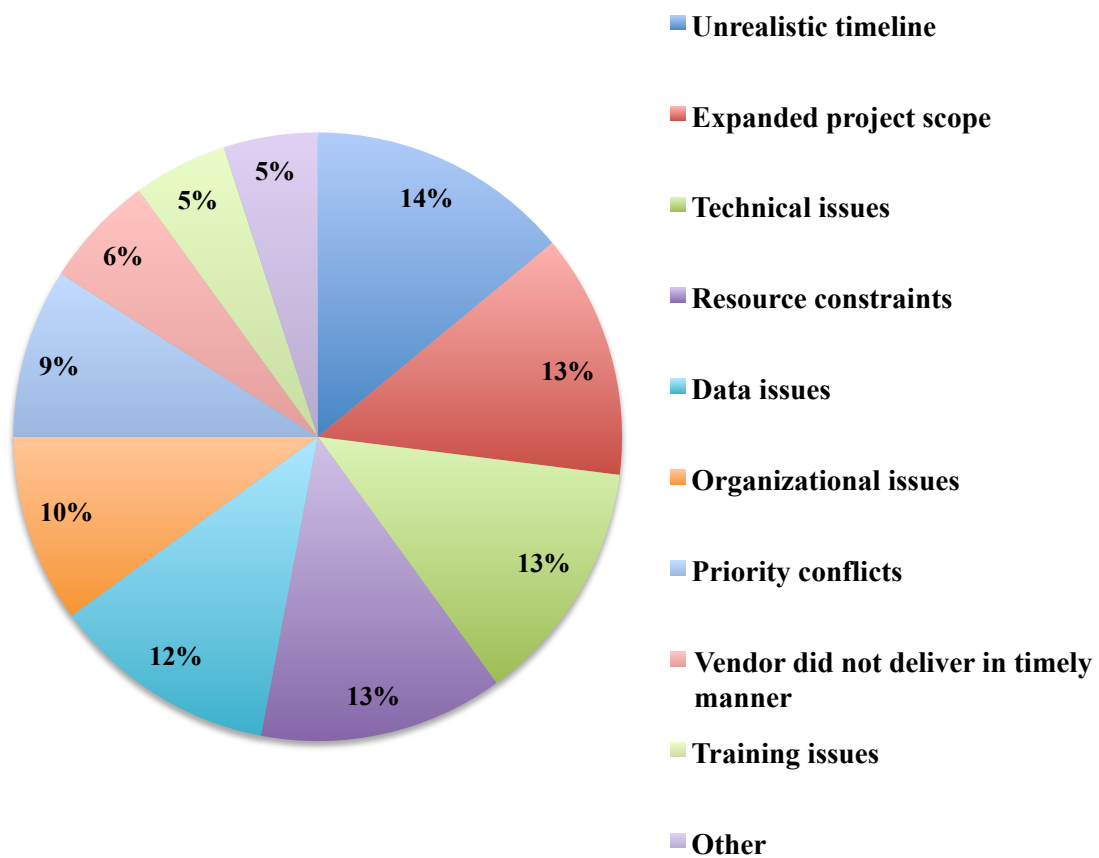
Two issues a company can face are the **implementation time** and the **project budget**. Regarding the former, Information Systems should come in a modular

⁸ “*Enterprise System Integration*”, Judith M. Myerson.

pattern and, as told, should not have to be implemented entirely at once. Several companies follow a phase-in approach, in which one module is implemented at a time.

The average length of time for a “typical” implementation is about 14 months, but 75% of the projects exceed their initial estimated timeline, while 22% are on schedule and only 3% of the projects are under schedule.⁹ Why?

Chart 3: Reasons for Timeline Overages



Source: Panorama Consulting Solution (2015)

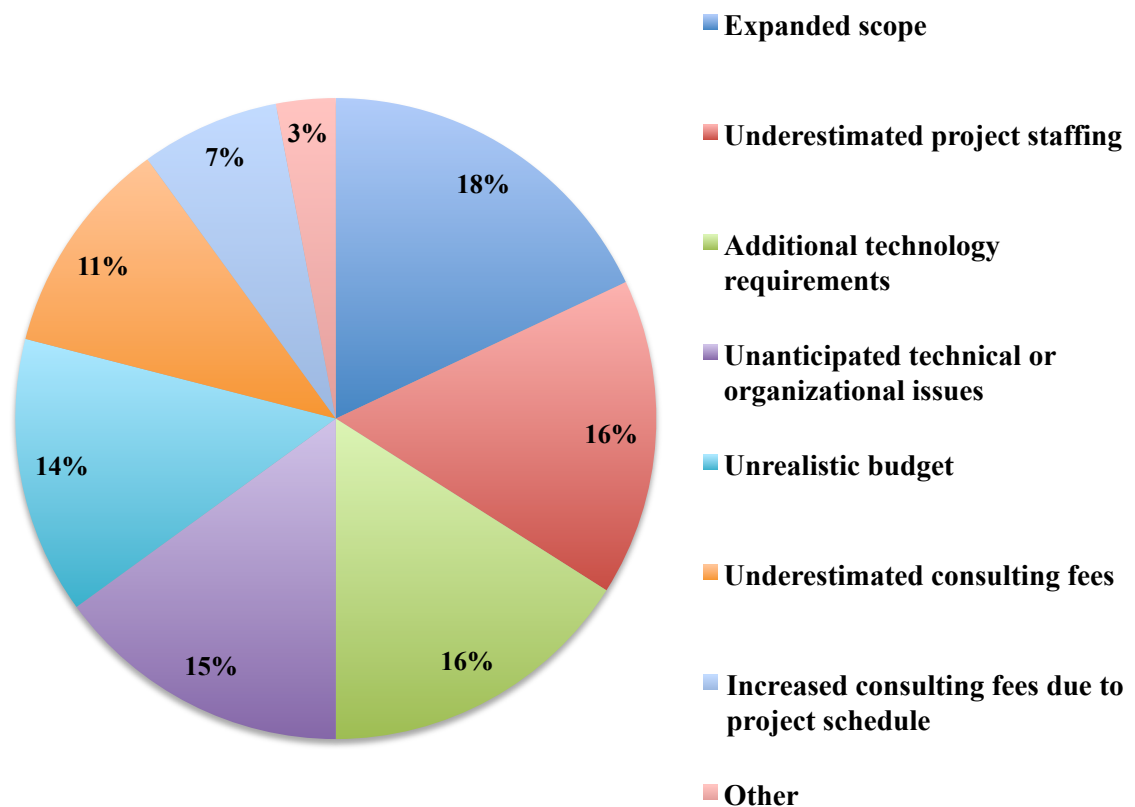
Regarding the latter, 55% of the companies exceed their implementation budget. Among the projects that exceeded budget, a large percentage (31%)

⁹ “2015 ERP Report”, Panorama Consulting Solutions.

exceeded it by less than 25%. Implementation costs, moreover, increased by approximately \$1.7 million, from an average of \$2.8 million in 2014 to \$4.5 million in 2015.¹⁰

This may indicate that organizations are getting wiser about spending a lot in project components “*upfront*” – such as organizational change management – so they do not encounter higher costs down the road when investing in last-minute training and communication. This increase in implementation costs may also be a result of the increased level of software customization. Which are the common reasons for projects going over budgets?

Chart 4: Reasons for Budget Overages



Source: Panorama Consulting Solution (2015)

¹⁰ *Ibid.*

A company, in addition, should really consider what is going to be asking for its **employees**. It should evaluate the current staff and analyze its needs. It should inquire about the employees' desire to be involved and get their inputs. The firm should be reasonable about its requests (e.g.: asking an employee to participate in the Information System implementation and continue its full-time duties is not realistic).

This market has developed so big so fast, and – as a consequence – there has been a **lack of competent advisors**. The skill shortage is so deep that it cannot be filled immediately. Finding the right people and keeping them through the implementation is a major challenge. The Information System implementation demands multiple skills: functional, technical and interpersonal: hiring temporary help to maintain daily activities would be a minor expense. However, there has been a slight decrease in the percentage of companies that have employed the services of Information System consultants. The use of external experts dropped from 83% in 2014 to 77% in 2015¹¹.

Despite this trend, the majority of the organizations continued to rely on **consultants** in their Information System selection and implementation initiatives. As enterprise solutions continue to saturate the marketplace and the number of viable software options continues to increase, organizations are finding that consultants with industry-specific expertise and experience are particularly helpful in guiding them through the selection process. The data also indicate that organizations understand the importance of working with consultants throughout the entire lifecycle of an Information System implementation. Consistent with 2014 findings, a large percentage of companies (40%) brought in consultants during the selection and purchasing stage of their projects¹².

¹¹ *Ibid.*

¹² *Ibid.*

Companies must also be willing to dedicate some of their **best employees** to the project for a successful implementation. Often, companies cannot realize the impact of choosing the internal employees with the right skill set. The importance of this aspect cannot be overemphasized¹³.

Internal resources of a company should not only be experienced in the company's processes, but they should also be conscious of the best business practices in the industry. Internal employees should exhibit the ability to understand the overall needs of the company and should play a crucial role in leading the project efforts in the right direction. Companies should take this exercise seriously and make the right choices. Lack of proper understanding of the project needs and the inability to provide leadership and guidance to the project by the company's internal resources is a major reason for the failure of Information Systems implementation projects.

Moreover, **training and updating employees** on the Information System are major challenges. People are one of the hidden costs of the implementation. Without proper training, about 30% to 40% of front-line workers will not be able to handle the demands of the new system. Training employees on the Information System is not as simple as Excel training in which you give them a few weeks of training, put them on the job, and they blunder their way through¹⁴. The Information Systems are extremely labyrinthine, and need meticulous training. It is difficult for trainers or consultants to pass on the knowledge to the employees in a short period of time. This "*knowledge transfer*" gets hard if the employees lack computer literacy or have computer phobia¹⁵.

¹³ "Critical Issues Affecting an ERP Implementation", Prasad Bingi, Maneesh K. Sharma, Jayanth K. Godla.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

In addition, the employees now have to be taught their new responsibilities. With Information Systems, you are continuously being trained. Companies should bring opportunities to improve the skills of the employees, providing training opportunities on a continuous basis to meet the ever-changing needs of the environment and the employees.

Employees must be given the **incentive** to apply themselves for such a long endeavor: employees working on an Information System implementation project put in long hours, including seven-day weeks and even holidays. Even though the experience is beneficial for the career path of the employees, the stress of the implementation - linked with their regular activities - could make their morale rapidly fall. The success of the intimidating task of an Information System implementation can only be increased by incentives.

A company should be more than supportive of its employees' struggle in the implementation. Employers should come up with creative ways (such as taking the employees on field trips to reduce stress) to reward those players, and should pay close attention to what their employees are trying to tell them. Keeping a current employee happy, and retaining him after spending so much time and resources in training, is far less expensive than hiring and training new employees.

The Information Systems are revolutionizing the way companies produce goods and services. They can integrate different business units of a company, and ensure an effortless flow of information across the enterprise quickly. These tools can bring a lot of benefits to organizations by tightly integrating various departments of the organization. Excellent planning, incorporating employee involvement, good communication, should be at the top of any organization's list when considering an Information System implementation

effort. Although success is not guaranteed, it is definitely a major part of the equation¹⁶.

1.4 The evolution of the Information Systems: the Enterprise Resource Planning

The **Enterprise Resource Planning** (ERP) provides a unified prospect of core business processes, generally in real-time, using common databases managed by a database management system. It simplifies information flow between all business units, and it manages relations with outside stakeholders.

The Gartner Group first used the acronym ERP in the 1990s, where it was seen to extend the capabilities of the Material Requirement Planning. They rapidly grew in the 1990s and, because of the introduction of euro disrupting legacy systems, many companies took the opportunity to replace their old systems with ERPs. At the beginning, these tools were intended to automate back-office functions that did not directly affect customers and the public; front-office functions were mingled later, when the Internet made communications with external parties much easier.

The ERP software market, nowadays, is one of the fastest-growing markets in the software industry. It has seen a rough start with several project failures and a huge shortage of skilled and experienced workers. The ERP market is predicted to grow from a current \$15 billion to a gigantic \$50 billion in the next five years. The estimated long-term growth rates for Enterprise Resource Planning solutions are a stratospheric 36% to 40%. Some estimates put the eventual size of this market at \$1 trillion.

¹⁶ “*ERP Implementation Failure: A Case Study*”, Traci Barker, Mark N. Fralick

Recently, the major ERP vendors have reported significant financial results: contributing to this phenomenal growth is the estimation that 70% of the *Fortune* 1000 firms have or will soon install this kind of systems, and the initiatives to move into medium and small industries with gross revenues lower than \$250 million. ERP vendors, such as SAP, aggressively cutting deals with these industries to make their products more affordable: SAP started selling its products to customers in the \$150 million to \$400 million revenue range¹⁷.

According to *Panorama's* independent ERP research over the past five years, the average cost of ERP implementations has been approximately \$6.1 million with an average duration of 15.7 months. Of these projects, approximately 58% exceeded their planned budgets, and 65% experienced schedule overruns. Post implementation, 53% of organizations achieved less than 50% of the measurable benefits they anticipated from new ERP software¹⁸.

Nowadays, an ERP has eleven main modules, with a consistent look and feel across them:

- **Customer services:** it captures and maintains customer relationships, facilitates the use of customer experiences and evaluates the knowledge management.
- **Sales:** it implements functions of order placement, order scheduling, shipping and invoicing.
- **Procurement:** it maximizes cost savings with support for the end-to-end procurement and logistics processes.
- **Production:** it helps in planning and optimizing the manufacturing capacity and material resources.

¹⁷ “*Critical Issues Affecting an ERP Implementation*”, Prasad Bingi, Maneesh K. Sharma, Jayanth K. Godla.

¹⁸ “*2015 ERP Report*”, Panorama Consulting Solutions.

- **Distribution:** it controls warehouse processes and manage movements in the warehouse and it responds faster to challenges and changes in supply and demand.
- **Accounting:** it automates any financial operations while ensuring regulatory compliance, gaining real-time insight into overall performance.
- **Human Resource:** it maintains a complete employee database and to optimally utilize of all employees.
- **Corporate performance and governance:** it aims to streamline and gains greater control of the corporate services.
- **Business Intelligence:** it analyzes data and converts them to information.
- **Enterprise Asset Management:** it manages the entire asset lifecycle, it improves asset usage and cuts costs with powerful analytics.
- **E-Commerce:** it focuses on external strategies.¹⁹

Nowadays, market demand looks for both price and quality, in addition to greater flexibility and responsiveness. The emergence of various Information Technologies – such as the Internet, Electronic Data Interchange (EDI) and the World Wide Web – facilitates the attainment of an integrated supply chain and, in turn, flexibility and responsiveness in meeting changing market requirements.

An ERP implementation has to be managed as a schedule of wide-ranging organizational change activities; organizational fit and adaptation are important to implement such systems. So, customization can be a crucial, protracted and expensive aspect in the successful implementation of ERP systems.

¹⁹ “*Managing and using Information Systems*”, Keri E. Pearlson, Carol S. Saunders, Dennis F. Galletta (adapted from Shing Hin Yeung).

These systems use Internet technologies to blend the flow of information from internal business units, customers and suppliers. The key principle behind the Enterprise Resource Planning involves entering the data only once, and then – once stored – the data are automatically revised with all the related information within the system. Companies, using this software, can gain a competitive advantage from the way they implement the system and then take advantage of the resulting data. Three main benefits derive from it: business process automation, well-timed access to management information, and improvement in the supply chain via the use of e-communication.

An Enterprise Resource Planning – when successfully put into use – connects all business functions of a firm, including order management, Human Resource Management, accounting, or distribution into an integrated system with shared data. Potential benefits include drastic declines in inventory, breakthrough reductions in working capital, abundant information about customer wants and needs, along with the ability to view and manage the extended enterprise of suppliers, alliances and customers as an integrated whole.²⁰

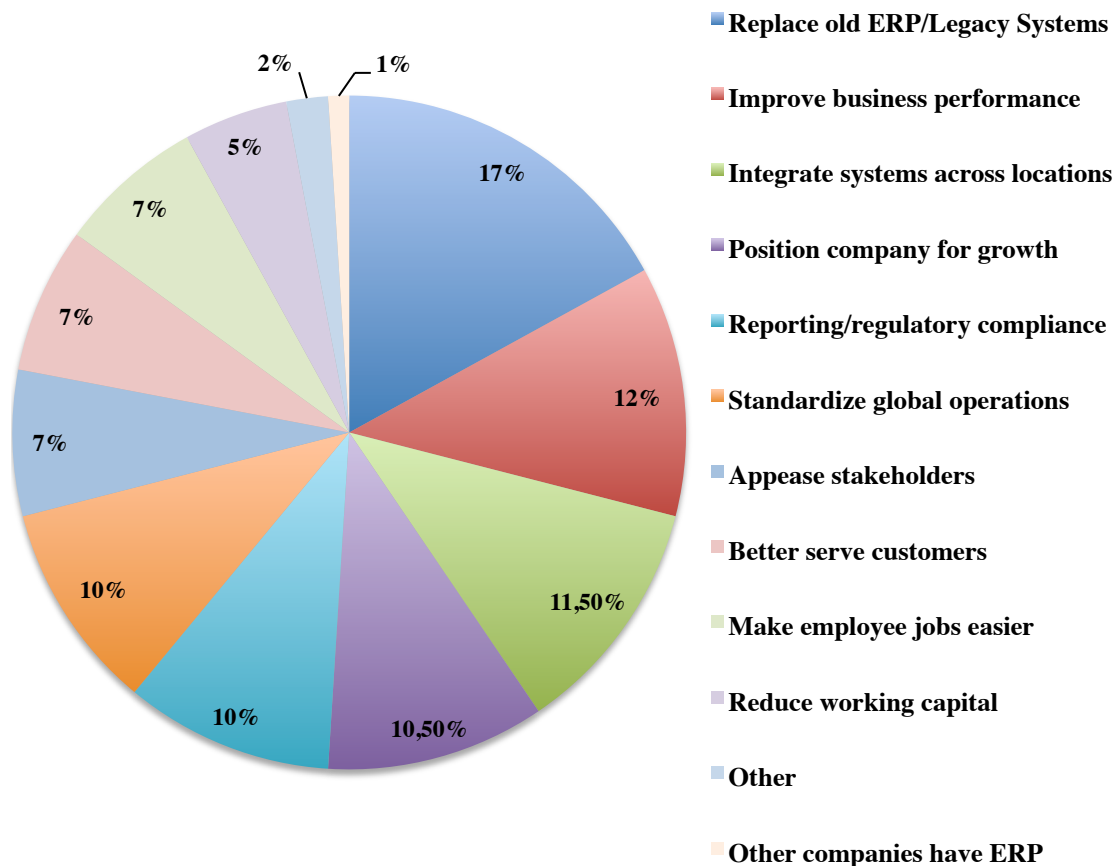
Among the various reasons for implementing ERP, the most common reason reported was to replace their old Enterprise Resource Planning or legacy system (17%). In comparison to 2014, the most common reason was to improve business performance (15%).

Overall, organizations anticipate significant benefits from their Enterprise Resource Planning systems: they expect to improve business performance, integrate systems across multiple locations and position their organization for growth²¹.

²⁰ “*Planning for ERP systems: analysis and future trend*”, Injazz J. Chen.

²¹ *Ibid.*

Chart 5: Reasons for Implementing ERP



Source: Panorama Consultin Solution (2015)

ERP implementation involves deep organizational change processes, with serious implications for the management model, the structure, the culture and the people. The Enterprise Resource Planning software is very adaptable, but companies that wish to correctly use this software have to transform their working practices to fit the ERP. The key factor is the way in which it is configured.

There are three groups of **problems**:

- **Cultural**: the implementation expected a high acceptance in areas that provide just as good or better functionality than the old system.

However, some functions and processes might not get the full appreciation the legacy systems once had.

- **Business:** there is the need for a rigid business structure for it, in order to work successfully. Participants of cross-functional workshops soon understood that their working practices must be adjusted to fit the systems.
- **Technical:** the accuracy of data. The system requires the retrieval of old data from the legacy systems that have to be normalized, screened and stored in a sensible data format within the new system data repository.²²

Moreover, a lot of **risks** threaten the ERP implementation. The majority of these challenges are people-related.

As seen in the chart in the following page²³, the most prevalent challenges are related to **organizational change issues**: resistance to change is the most common challenge, while other common challenges include a shortage of staffing resources, a lack of clear expectations and goals or a lack of overall vision. Organizations need to take a more pragmatic approach to organizational change management with a direct focus on increasing end-user buy-in. Project challenges, weak organizational change management and lack of executive alignment can lead to poor buy-in across the organization.

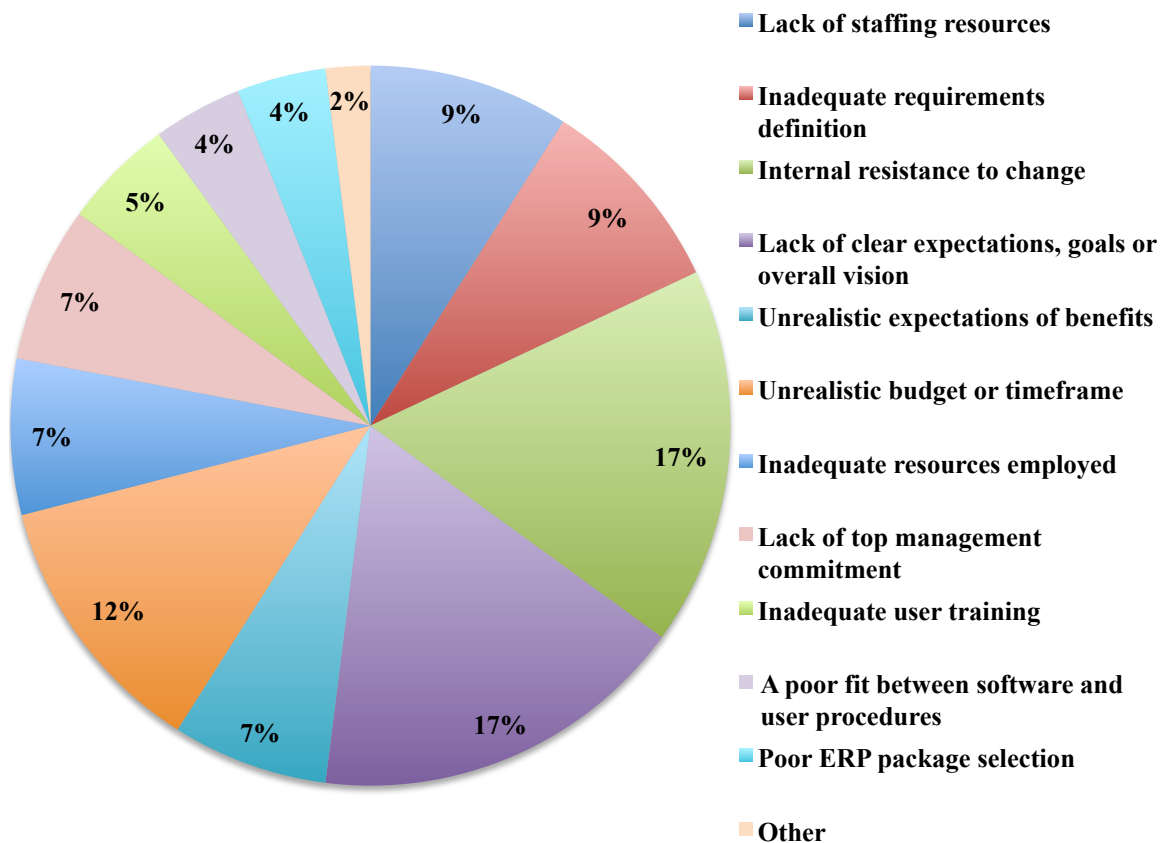
Poor buy-in shows itself in a number of different ways. End-users who don't understand the need for the ERP system or the benefits it should bring to the organization may fail to pay attention during training, continue to use workarounds, and participate in other subversive activities to undermine system and management efficacy.

²² “Enterprise information systems project implementation: a case study of ERP in Rolls-Royce”, Yahaya Yusuf, Angappa Gunasekaran, Mark S. Abthorpe.

²³ “2015 ERP Report”, Panorama Consulting Solutions.

Organizations often don't realize the incredibly negative impact a poorly motivated staff can have on attrition rates, ERP system usage, benefits realization from the system, return on investment and, ultimately, the customer experience.

Chart 6: Major Challenges



Source: Panorama Consulting Solution (2015)

So, how to succeed?

There is not a right answer, but some **activities** should be taken, in order to improve the chance of a success, such as bridging the legacy systems and cleaning up suspect data, training the senior management (which is not

technically oriented), or managing effective relationships and leading teams in both technical and non-computer based environments²⁴.

As seen in the graph in the following page²⁵, other solutions are also used among companies. The use of status updates accounts for nearly a quarter of reported change management activities (22%). A significant portion of companies also used focus groups as part of their change management strategy. Beyond these two activities, there is a sharp decline in responses to emails, customized training and other critical change management activities.

Organizational change management is significantly more effective when you have an in-depth understanding of your people and business processes. Implementing new ERP software when employees are not adequately prepared to handle that level of change, will present challenges throughout an ERP project.

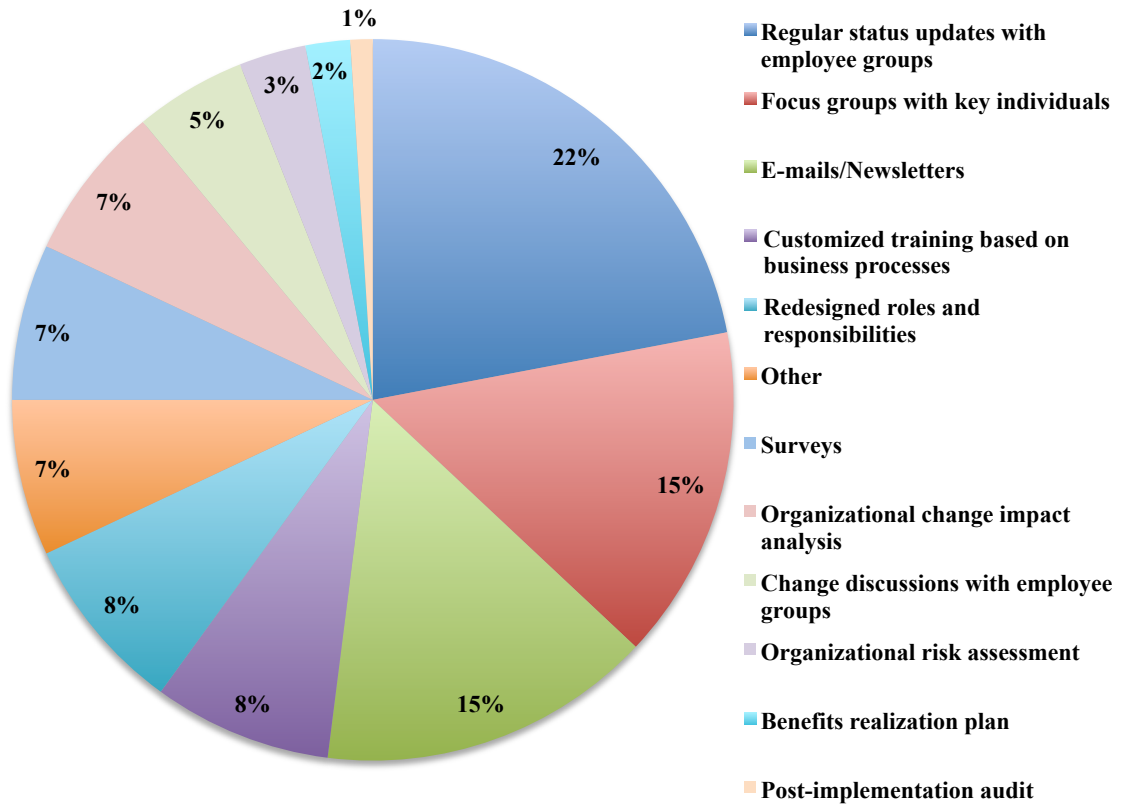
There are several consequences to neglecting the organizational change management: without communication from managers and project teams, end-users grow disenchanted and apathetic.

Their attitude becomes, “*They don’t care, so I don’t care.*”

²⁴ “*Enterprise information systems project implementation: a case study of ERP in Rolls-Royce*”, Yahaya Yusuf, Angappa Gunasekaran, Mark S. Abthorpe.

²⁵ “*2015 ERP Report*”, Panorama Consulting Solutions.

Chart 7: Organizational Change Management Activities



Source: Panorama Consulting Solution (2015)

CHAPTER TWO: HOW IT WORKS

2.1 General information

Senior executives understand that their companies' Performance Measurement systems heavily affect the conducts of managers and employees; they also are inclined to think that traditional accounting measures can give misleading signals for continuous improvement and innovation, so, they cannot rely on one set of measures to the exclusion of the others.

No single measure can provide a clear performance target or focus attention on the critical areas of the business²⁶. Financial measures must be integrated with operational measures on customer satisfaction, or internal processes, etc.

While giving senior managers information from different perspectives, an Information System minimizes information overload by limiting the number of measures used. Usually, companies do not suffer from having too few measures; on the other hand, they keep adding new measures whenever an employee (or a consultant) makes a worthwhile suggestion²⁷. This proliferation of measure is harmful to a company: it should focus on the handful of measures that are most critical, those on which life and death of a company depend on.

This new way of doing business can meet several needs:

- Such Information Systems can **collect**, in a single software, and then in a single report, many of the **seemingly contrasting elements** of an

²⁶ “*The balanced scorecard – Measures that drive performance*”, R.S. Kaplan, D.P. Norton.

²⁷ *Ibid.*

organization's competitive agenda (customer and quality orientation, minimizing response time, etc.)

- By imposing managers to consider all the crucial operational measures together, this kind of Information System lets them see whether **growth** in one area may have been achieved at the expense of another: even the best objective can be inadequately achieved.

A new kind of information system is going to be introduced in this chapter. It can help a company improving its performance, and it is based on the relationship between **logistics** and competitive **advantage**.

This tool²⁸ focuses on activity-based methodologies, in order to correctly set up planning, to control and to analyze problems. Moreover, it defines some guidelines to measure these processes' performances, and their application is useful to stimulate a positive tendency to continuous improvement. The tool was initially thought for a public transport firm and, in the third chapter, the implementation results will be shown.

This Information System will mainly focus on two variables: **space** and **time**, and these two variables are analyzed in each of the key processes in a firm.

Investigating time and space has always been important for a firm, especially considering the evolution of the accounting systems.

The role of time in accounting is to sequence, synchronize, and allocate scarce time across organizational events: the ordering of recorded transactions, the periodizing of accounting calculations, and the monitoring of economic performances. Time is not only reflected, but partially constituted in

²⁸ Presented by Professor Domenico Nicolò during the “*Conference on agro-industrial logistics in Mediterranean area*”

accounting systems²⁹. Nowadays, the “accrual” concept in accounting has evolved to be a core of the intrinsic logic of periodic income accounting. Periodic income is a part of a socially constructed reality that has a self-reproducing capability once it is instituted³⁰. This Information System has the same basics.

How can this tool be adapted to a Public Transport company?

Considering space, it is divided considering territories served by the company’s coaches: it is needed to highlight possible negative results of single bus lines composing the whole travel (e.g., a bus line goes from Naples to Rome, and then from Rome to Milan, while the whole travel is the one from Naples to Milan). Whenever a firm will consider the general view, negative results from specific lines will not be revealed, because they can be outpaced from other, best-performing ones.

Considering time, it is divided into infra-annual periods (month, quarter, etc.), in order to give useful information, intervening in processes to correct them as soon as possible if they reveal some kind of problems. The inscription of time allows trends to be extracted from the past and projected into the future. A significant part of the organizational present is concerned with the strategic projection and calculation of the future, often in accounting (capital budgeting) terms. The writing of time has brought the future into the present³¹.

Moreover, time analysis is more important than cost analysis for a Public Transport firm: the punctuality in the delivering of services has a very important role, and the competitive advantage can be built on it. If coaches are not on time, the performances will drop, even if the firm manages everything

²⁹ “*Accounting in time: organizational time-reckoning and accounting practice*”, M. Ezzamel, K. Robson.

³⁰ “*Time and space in income accounting*”, S. Takatera, N. Sawabe.

³¹ “*Accounting in time: organizational time-reckoning and accounting practice*”, M. Ezzamel, K. Robson.

in the right way (new coaches, low tickets, and so on), because consumers will perceive this service as a low-quality one. Time is a very important variable looking for the competitive success³².

It is also well known that the Performance Measurement can accomplish its function to improve the overall results of a firm only if it can give frequent information during the year. So, observing the overall results by the end of the year is very important, but having disaggregated information all over the year is far more important: otherwise, you cannot correct any mistakes.

Using a balanced system that considers monetary and non-monetary indicators, processes' overall performances can constantly be measured. This will address the actions of all the actors involved in a firm, promoting a positive tendency to continuous improvement³³.

Mixing those two variables, an Operating Profit Margin analysis can also be conducted. By this analysis, a firm can highlight some negative bus lines, and then decide what to do: it can invest in them, eliminate them, or understand how another line should perform to outweigh these losses.

So, it is crucial to constantly monitor the operations and the processes of a firm, in order to understand what kind of bus lines are making the firm lose money, and deciding if (and how) they have to be modified, because they give rise to new costs, and increase the overall duration of the production and distribution cycle, without generating value for the firm³⁴.

³² “*Competing Against Time: How Time-Based Competition is Reshaping Global Markets*”, G. Stalk Jr., T.M. Hout.

³³ “*Balanced Scorecard – Measures that Drive Performance*”, R.S. Kaplan, D.P. Norton

³⁴ “*Accounting for Time. Reengineering Business Process to Improve Responsiveness*”, A. Faye Borthick, H.P. Roth.

Moving deeper into this Information System, it must be considered that, usually, a Public Transport company is made up of two main areas: **administration** and **production**. While the “production” area is composed by those who basically deliver the service (in a public transport firm, the drivers), the “administration” area, as shown in the following table, is a little more complex. It contains a lot of business units (we can also call them “responsibility centers”), and they can be divided into two sub-areas: centers supporting the operating activities (those supporting the delivering of the service), and those supporting top management.

Table 1: How responsibility centers are allocated

| ADMINISTRATION AREA | | | | | |
|--|-------------------|---------------|--|--------------------------------------|----------------------------------|
| Centers supporting operating activities | | | Centers supporting top management | | |
| Provision | Production | Sales | Administration | Management Information System | Human Resource Management |
| Provision | Maintenance | Tickets | Secretary | Accounting | HRM |
| Storage | Technical office | Subscriptions | Legal affairs | Performance Measurement | |
| Purchasing | | Other | | | |
| Contract management | | | | | |

Starting from this point, it is easy to analyze how this system works for each of the business units, considering two variables: “*time*” and “*space*”.

2.2 The variables: time and space

2.2.1 The basics

Costs and expenses of those responsibility centers are part of the so-called structure costs (salary, depreciation, utilities, services, etc.), which are relatively stable even if the production volume increases.

These centers' costs, moreover, are “*non-controllable*” (it means they are not significantly easy to be influenced) by the actors to which the responsibility is given. Measuring these costs is useful for the strategic planning (here, the firm intervenes on the overall activity and takes decisions influencing production, activities, and costs), but not during the operating management, to evaluate the performance. In this phase, costs and activities have already been defined, and it is crucial to optimize their activity.

Starting from this standpoint, the Performance Measurement system has been created to promote a tendency to continuous improvement within the firm, in terms of minimizing the duration of the processes made by those centers. The basic idea is the following: reducing the duration of all the processes allows the firm to increase its operating speed and, by this way, increase the timeliness and punctuality of the responses by the responsibility centers with respect to the demand of services coming from other centers or the customers.

A faster firm becomes a more efficient firm, and it has the possibility to save much more: it minimizes the incidence of the structure costs on the product (or service) delivered. These costs, in fact, are distributed over a wider volume of production in the same unit of time.

2.2.2 The methodology

Considering the aims already defined, this responsibility centers' performance measurement system:

- Gives performance standards to centers, with respect to the processes' and activities' execution time, to the transmission of information to other centers or to the maximization of the services' quality perceived by the customers.
- Measures centers' performances through some parameters, built using variables or indicators that can express performance.
- Communicates, monthly or quarterly, those indicators to the persons in charge (who use the indicators to improve their performance) and to the top management (who evaluates the ability to reach the goals).

This system simulates the market, considering relationships among responsibility centers: each business unit, doing activities which are considered as "downward" ones, becomes a customer looking for an information (or for a service), and that information (or that service) is given by centers considered as "backward" ones.

To sum up, **"client" centers are involved in the performance measurement of "supplier" centers.**

In order to define objectives, variables, and performance indicators, persons in charge of those business units in the "administration" area have been interviewed, in order to collect all the activities they can do, as it will be shown in the next paragraph.

This information, acquired through a "*bottom-up*" method, was integrated with those written in the quality management manual or the anti-corruption law.

Among all these activities, those mostly influencing in reaching strategic goals have been identified: they are processes from which it mostly depends the

satisfaction, both from the internal side (from other centers) and from the external one (customers).

The assigned goals are functional to the realization of two fundamental strategic goals:

- Speeding up in the collection and transmission of information among centers in the administration area, in order to make timely, and so efficient, the whole management information system. A business unit has to collect information, and then send them to the “*Performance Management*” center, reporting eventual lags or some other dissimilarities. The effectiveness is the basis of this Performance Management system: if an useful information is not timely, it rapidly becomes useless.
- Speeding up the administrative processes that are different from those transmitting data or information, influencing the reach of strategic goals of the firm. This system can also define some intermediate goal, milestones, useful to reach the overall ones.

Performance is evaluated through some indicators showing a proper score. These scores, obtained by the responsibility centers quarterly, are summed up annually, to obtain an overall qualitative judgment on the already done activities, according to a pre-defined ranking published by the top management and the Management Information System facilitator.

2.2.3 The path

Each organization is unique, so there’s **no a single path** for building this Management Information System. At *Apple*, for instance, a senior finance, intimately familiar with the strategic thinking of the top management group, constructed a new Information System to measure performances without

extensive deliberations³⁵.

But, as told in the previous chapter, it is not always that easy.

There is, however, a basic development plan, made up by seven steps, to create and implement this kind of Information Systems.

- 1) **Groundwork**: the firm should involve all its business units in this “change”, understanding the issues each unit can face during the process, and identifying some persons in charge for each business unit. They will have to lead the whole unit through the change. Usually, this employee is the senior manager of each unit.
- 2) **Interviews**: each responsibility center’s leader (as told, he usually is the manager of each unit) has to receive the required material about the Information System, as well as internal reports that describe the company’s (eventual) new vision and mission, or the strategy indicating the path to reach new company’s goals through this Information System. The facilitator (as seen, it can be either an external consultant, or someone already employed by the company) handle interviews with these leaders, to collect their inputs on the activities made by that unit and tentative proposals for their measures. The facilitator can also interview some shareholders to learn about their expectations for a business unit’s financial performance.
- 3) **Executive Workshop**: the top management and the facilitator go through the process of developing the Information System. Usually, during these workshops, people discuss the suggested mission and vision, and the strategy to adopt, until harmony is reached. Then, once this consensus is reached, people have to answer a question: “*if we attain good outcomes with this tool, how our performances will change?*”. The results of the interviews can also be displayed, to provide an external perspective. In the end, this group develops a basic Information System, encompassing all the operational measures to

³⁵ “*Putting the Balanced Scorecard to work*”, R.S. Kaplan, D.P. Norton

reach the objectives.

4) **Interviews**: the facilitator reexamines and consolidates the output from the workshop, and then he should interview the leaders about the proposed Information System, asking them for some kind of issues or suggestions.

5) **Executive Workshop**: the business units' leaders and their direct subordinates have to debate about vision, mission, strategy and the implementation system. They can build up an implementation plan, they can propose measures or highlight controversies. By the end of the meeting, leaders and subordinates are demanded to establish objectives for each of the proposed indicators, and a targeted percentage of improvement.

Then, the leaders meet to come up to a final consensus on vision, mission, strategy and Information System implementation (which involves communicating the Information System to employees, integrating the tool in the management philosophy, etc.).

6) **Implementation**: eventually, a new team is created for the implementation. This team develops the implementation plan, including putting measures into a real-time database which automatically keeps itself up-to-date, communicating the Information System throughout the organization. As a result, a tool that links every business unit in the organization, from the top management to the "shop floor" could be established.

7) **Periodic Reviews**: each month (or, in case, each quarter) a sort of "book" is prepared, for top management analysis or consultations with business units' managers. Obviously, the Information System should be revised annually, as part of the strategic planning, goal setting, and resource allocation process.

2.3 Summing up

To sum up, in this chapter the main hypotheses and assumptions characterizing this model have been highlighted.

Performance Measurement is crucial to influence the professional conduct of managers and employees, and traditional measurement systems are obsolete. Financial indicators are now integrated with other, important non-financial indicators, giving manager different perspectives; anyway, a company should focus on a few number of measures, usually those on which life and death of a company depend on, because using a lot of indicators can be harmful to that company.

So, in this model, space- and time-based indicators are introduced.

The relationship between space, time and accounting can be – and has been – viewed as a functional one: this kind of accounting information help in the sequencing and the synchronization of organizational activities, and this information is also collected considering the space “covered” by the organization. Accounting, anyway, should not be viewed merely as assisting in the allocation of time and space: accounting is actively implicated in the construction of valuable time and space.

Using a balanced system that considers monetary and non-monetary indicators, processes’ overall performances can constantly be measured. This will address the actions of all the actors involved in a firm. Mixing those two variables, then, an Operating Profit Margin analysis can also be conducted. By this analysis, a firm can highlight some negative or positive results, and then decide what to do. Moreover, the implementation process has been shown, understanding how long it could be, and how important is the support from top management, as told in the first chapter.

Last, but not least, an overview of a Public Transport firm was given. As told before, there are a lot of direct and indirect costs, and some revenues to consider and to impute, including those two variables in the calculus.

After this theoretical introduction, the results from this Information System implementation will be shown in the following chapter.

CHAPTER THREE: CASE STUDY - A.IR. Autoservizi

Irpini s.p.a.

The last chapter of this work is going to focus on a regional Government-owned Public Transport company based in Avellino, a little town in the South of Italy: this firm is called A.IR. Autoservizi Irpini s.p.a., and it is a so-called “*best practice*” in Campania Region. During the last years, this firm has faced the financial crisis and, consequently, the reduction of Government’s aids. This made the Public Transport industry to have a deep crisis.

However, A.IR. Autoservizi Irpini s.p.a. had positive economic and financial results, keeping the fare evasion rate at the lowest level in the Region, investing in order to improve their services and their production processes, becoming one of the best firms in the South of Italy, while many others were facing bankruptcy.

3.1 About the company

A.IR. Autoservizi Irpini s.p.a. was born on November 16th, 2001, by the transformation of the former G.T.I. – Gestione Trasporti Irpini – from a Limited Liability Company into a Public Limited Company.

This newborn firm is continuing the transportation of customer from the area of Avellino to 96 little towns around Avellino and more than 20 cities all over Italy: Naples, Rome, Venice, Caserta, Salerno – University of Fisciano, Perugia, Trieste and some others.

Firm’s growth during the last few years, made it become the protagonist of important projects: the collaboration with firms operating in complementary

industries, the creation of new structures, an organizational change. The final aim of the firm is to integrate the transportation service with complementary services (waiting rooms, parking, luggage custody, etc.) in order to improve the quality delivered to (and perceived by) its customers.

In order to reach this final goal, one of the projects in which the firm has been involved, was the creation of a new Management Information System, which has the basics presented in the previous chapter. As already told, firms usually hire external consultants to support employees in implementing this kind of tools, and this also happened to A.IR. Autoservizi Irpini s.p.a. Consultants always work closely with employees, giving their expert help, but they should not do all the work: without the proper support from the internal employees, there would be no understanding of how the system has been implemented, or how the system should be maintained. In these cases, the tool would be useless to the company. The trained employee who grows with the system, on the other hand, will make the system expand, and he will make the company evolve. So, he will be a true asset to the company more than the Performance Measurement system itself.

Moving toward that Performance Measurement system, it is good to remind that time and space were the main variables analyzed in the implementation. In the following pages, the whole path for the analysis of the variables is presented, and the implementation results will be shown.

Considering time as the first variable to analyze, the attention will be on some centers supporting operating activities (purchasing, contract management, tickets) and some supporting the top management (secretary, accounting, Human Resource Management).

Considering space, then, the way the company divides its bus lines according to territories served will be the focus: this way of doing business allowed the company to understand which line guarantees positive financial results and

which does not; after doing this, the company should decide what to do with the “financially negative” bus lines: cancel them, modify them or investing in them.

To begin, the focus will be on “time” variable.

3.2 Time

Time analysis is a crucial variable in a transport company, even more important than cost analysis: timeliness in services delivered to external customers is one of the most important determinants in creating competitive advantage. Even with an optimal managerial behavior, efforts can be worthless if services are not delivered in time: customers would perceive that service as a low-quality one, even if there are low-cost tickets or new investments in infrastructures and coaches.

Besides timeliness in services to external customers, the company should monitor timeliness in delivering services or information to internal customers (i.e., other responsibility centers). How did the company – using the Management Information System already presented – improve the timeliness of internal communications?

First, the company had to collect – using a bottom-up method, interviewing persons in charge in each center – all the activities made by those centers. Then, considering the tasks from which life and death of the company depend on, objectives and indicators are given. Persons in charge must fill a sheet, and then send the report to another center (*Performance Management Center*, PMC).

3.2.1 Collecting tasks

The first thing to do, as told, is to collect the main activities assigned to responsibility centers. This happens through a bottom-up method: the Performance Management Center interviews persons in charge for each center, choosing the most important activities, which will then be measured through appropriate indicators.

To begin, centers supporting operating activities will be considered.

Purchasing

This center's main tasks are basically two procedures:

- purchasing provisions that are bounded by contracts;
- purchasing unbounded provisions.

These procedures have different steps:

- preparing, analyzing and approving estimates;
- preparing orders for goods and services, transmitting them to the top management to have approval;
- storing copies of orders made;
- treating relationships with suppliers;
- monitoring suppliers' performances through appropriate indicators;
- shipment checking, preparing reminders or complaints about inefficient suppliers;
- generating periodic purchasing reports.

Contract management:

This center is responsible for managing bids for assigning tasks, services or provisions. It must control the whole path, from the announcement to the results' publication:

- announcing the bid;
- collecting the bids;
- nominating a commission for verifying the bids;

- assessing the bids;
- nominating the “winner”, and stipulating the contract.

This center must also monitor the expiration of the existing contracts.

With respect to the other centers, here it would be tough to define *a priori* some standards regarding time: the variety of the phases of the path give rise to numerous opportunities. How to solve this problem? A company should consider historical data about the execution time, comparing those data with the present data.

Ticketing:

This center has to manage all kind of tickets (unique or seasonal ones) the company can sell: city lines, regional lines or national lines. The center sends the request for tickets to the Sales Center in order to satisfy internal and external demand. Moreover, it has to daily monitor the online ticketing and transmit data to the Accounting Center.

Last, but not least, this center has to manage the fines the company makes, reporting every month money collected from those fines.

After presenting tasks collected from centers supporting operating activities, three of the centers supporting top management will be analyzed.

Secretary:

This center has a crucial point in connecting the CEO with the owner, and then the CEO with all the responsibility centers the firm has, coordinating all the managerial activities. It organizes, coordinates and manages all the tasks helping the CEO and the owner, and it works as a filter and an intersection among the other offices.

Its main activities are:

- obtaining proposals from other centers;
- screening administrative documents before showing them to the CEO;
- storing dossiers from shareholders' meetings;

- preserving relationships with other companies, or regional bodies;
- servicing tasks to the fully owned company CTI-ATI s.p.a. (which manages the city lines);
- elaborating charts for brochures or company's documents;
- supporting other centers with informatics;
- updating and upgrading the company's website.

Accounting:

This center must prepare the company's financial statement with the appropriate attachments (such as the explanatory note) and adjust entries, interacting with the CEO and the owner for the preparation of the managerial dossier.

It also must prepare quarterly financial reports (highlighting profitability and productivity coefficients) and daily reports with the financial availability and revenues from tickets selling. Every month, this center has to:

- account for Value Added Tax (VAT) and other taxes;
- account for payment orders;
- record pay packets;
- check the bank account balance.

This center's main goal is to implement procedures for determining the financial needs in medium and long term, through monitoring inflows and outflows.

Human Resource Management (HRM):

This is one of the busiest centers in the company. It has a lot of tasks to accomplish but, as told for the other centers, the focus will be on those from which the life of the company depends on. So, main tasks are:

- managing relationships with employees or external consultants, with institutes, companies and so on;
- training, quality and privacy management;
- monitoring absenteeism, collecting requests for holidays or licenses;

- making interviews for recruiting new employees.

3.2.2 Objectives and indicators

As already done about the tasks collection, those six responsibility centers will be considered.

After collecting tasks, it is important to have clear in mind the objectives that the top management needs a center to achieve. There are only three main objectives for each center, because only the most important tasks to make the firm “survive” are considered. After assigning objectives, the top management must also give non-financial indicators to assign a score, establishing how a center is performing.

Purchasing:

This center has three main assigned goals:

- Minimizing the order processing time for purchasing provisions bounded by contracts;
- Maximizing the number of market surveys in order to minimize the costs for unbounded provisions;
- Timeliness for communicating data to “Performance Management” center.

When objectives are set, how can the center measure them? The company has found some useful indicators, giving a score to this center. Summing up all those scores, the company can be able to understand if the center has been effective or not.

So, in this case, to measure the first goal, the indicator is the ratio between the number of purchasing orders processed the day after the purchasing request and the number of purchasing orders for provisions in the quarter. Then, the following table is used to assign a score.

Table 2: score assigned to the first task

| % of orders processed within the day after the request | Score |
|---|--------------|
| 100% | 10 |
| $80\% \leq x \leq 100\%$ | 8 |
| $50\% \leq x \leq 80\%$ | 5 |
| $x < 50\%$ | 0 |

The person in charge of the responsibility center must fill a sheet as the one represented in the following table, writing the number of requests received per day, and the number of requests that are successfully accomplished.

Table 3: sheet to be filled for keeping the system alive

| Date | Number of requests received | Number of requests accomplished |
|----------------|------------------------------------|--|
| 01/01 | | |
| 02/01 | | |
| ... | | |
| 31/01 | | |
| Monthly totals | | |

To measure the second goal, the indicator is the ratio between the number of market surveys successfully managed and the number of market surveys requested by another center in the quarter. As shown before, the person in charge will fill a sheet with accurate data about the center's tasks, and then the indicator will conduct the company to a score.

Table 4: score assigned to the second task

| % of successful surveys | Score |
|--------------------------------|--------------|
| 100% | 10 |
| $80\% \leq x \leq 100\%$ | 8 |
| $50\% \leq x \leq 80\%$ | 5 |
| $x < 50\%$ | 0 |

To measure the third goal, the indicator is the number of dissimilarities communicated from the “Performance Management” center in the quarter. The score is assigned as shown in the following table.

Table 5: score assigned to the third task

| Number of dissimilarities | Score |
|----------------------------------|--------------|
| $x = 0$ | 10 |
| $x = 1$ | 5 |
| $x > 1$ | 0 |

Summing up all these scores, a report will be sent to the “Performance Management” center and to the top management.

Table 6: total score

| Score | Judgment |
|---------------------|-----------------|
| 30 | Excellent |
| $20 \leq x \leq 30$ | Sufficient |
| $x \leq 20$ | Insufficient |

A similar path is taken by other responsibility centers.

Contract Management:

There are three main objectives, measured by three appropriate indicators:

- Timeliness in preparing preliminary documents for bids for assigning tasks. The indicator is the ratio between the number of procedures for preparing preliminary documents within “n” days from the request from the top management and the number of procedures for preparing preliminary documents in the quarter.
- Timeliness in publishing announcements for bids. The indicator is the ratio between the number of publications (for which the time lapse from the announcement of the bid and the publication is lower than “x” days) and the number of procedures for the bid made in the quarter.
- Timeliness in verifying requirements of the winner and in sending to the top management a contract draft. The indicator is the ratio between the number of procedures for verifying requirements for which the contract draft is sent to the top management within “x” days from the adjudication and the number of procedures for verifying requirements in the quarter.

As done for the previous center, summing up all these scores, there will be a total score – sent to the top management – to make an overall judgment about the activities of that center.

Ticketing:

- Timeliness of tickets and season tickets sales reporting (every month) sent to the Accounting center. The indicator is made of the number of quarterly reports that are sent to the Accounting center.
- Timeliness of fines reporting sent to the Accounting center. The indicator, here, is the number of reports sent to the Accounting center, too.
- Optimization of the Customer Relationship Management, indirectly evaluated through the quantification of the number of complaints received in the quarter by the Secretary center, only if these complaints

are amenable to the activity of the Ticketing center, so if they are about provision and/or distribution of tickets. The indicator is, obviously, the number of complaints that are amenable to the provision or the distribution of tickets.

Secretary:

- Timeliness of communications of the informative reports to the “Performance Management” center. The indicator is represented by the ratio between the number of informative reports about this Management Information System that are sent “in time” to the “Performance Management” center and the whole number of reports.
- Timeliness of communications of the complaints from the customers to the “Performance Management” center. The indicator is made up by the ratio between the number of reports noticing complaints that are sent in time to the Performance Management center and the whole number of reports noticing complaints.

Accounting:

- Preparing quarterly reports highlighting profitability and productivity coefficients. The indicator is the number of quarterly reports transmitted to the Secretary.
- Transmitting monthly to the top management a summary containing the cash deposited in the bank, the debts expiring in that month (distinguishing them: accounts payable, etc...), and the accounts receivable. The indicator is the number of reports monthly received by the top management.
- Transmitting to the Performance Management center the quarterly accounting position during the first three quarters. The processing of the last quarter is strictly related to the procedures for preparing the financial statement, so, it has been removed from the indicator.

Anyway, a reward would be attributed to the center if the last quarter's report will be sent until a certain time.

Human Resource Management:

- Timeliness of communications to the top management of monthly statistics about overwork. The indicator is the number of annually communications divided by 12.
- Timeliness of communications to the top management of monthly absences detections. The indicator is the number of communications divided by 12.
- Timeliness of monthly communications about data of interest to the Accounting center. The indicator is simply the number of communications.

3.2.3 Tabs for acquiring information

Here, tabs through which centers can acquire information will be shown. As told, each center is - simultaneously - “client” and “supplier” of information. In the “client” column, information received by the responsibility center considered will be given.

Table 7: information Secretary must acquire

| Supplier | Client - Secretary |
|---------------------|--|
| Contract Management | Receive preliminary documents for bids, and then sent them to the top management |
| | Transmitting announcement of bids |
| | Receiving contract drafts to transmit to the top management |

| | |
|---------------------------|---|
| Ticketing | Receiving quarterly reports containing the number of complaints about provision and distribution of tickets, indicating also the time for solving them. |
| Accounting | Receiving quarterly financial reports, containing also profitability and productivity coefficients |
| | Receiving monthly reports about cash deposited in bank, debts expiring in that month (distinguishing these debts), accounts receivable. |
| Human Resource Management | Receiving monthly statistics about overwork |
| | Receiving monthly communications about absences detection, to transmit to the top management |

Table 8: information Accounting must acquire

| Supplier | Client - Accounting |
|---------------------------|--|
| Ticketing | Receiving quarterly reports about tickets and season tickets sales |
| | Receiving monthly reports about fines |
| Human Resource Management | Monthly reports about data of interest |

Table 9: information Contract Management must acquire

| Supplier | Client – Contract Management |
|-----------|---|
| Secretary | Receiving notification for preparing preliminary documents for bids |
| | Receiving notification to start a bid |
| | Receiving notification for the adjudication of the bid |

Table 10: information Performance Management Center must acquire

| Supplier | Client - PMC |
|---------------------|--|
| Purchasing | Market surveys for reducing costs of purchasing provision unbounded by contract |
| Contract Management | Quarterly reports about time lapse between the announcement of the bid and the beginning of the bid |
| | Quarterly reports about time lapse between the adjudication and the transmission of the contract draft |
| Ticketing | Noticing when the center receives requests for season tickets and when the center accomplish the requests |
| | Noticing when the center sends monthly reports about the tickets and season tickets sales to the Accounting center |
| | Noticing when the center sends monthly reports about fines to the Accounting center |

| | |
|-----------|---|
| Secretary | Noticing when the Contract Management center shows the preliminary documents to the top management responding to specific requests for bids of the top management |
| | Noticing when the Contract Management center announces the beginning of the bid |
| | Noticing when the Contract Management center – after a bid adjudication – sends a contract draft |
| | Quarterly financial reports, also showing profitability and productivity coefficients, prepared by Accounting center |
| | Noticing when the center receives monthly report by Accounting center, containing cash deposited in bank, debts expiring in that month and accounts receivable |
| | Monthly reports containing statistics about overwork, from the HRM center |
| | Monthly reports containing absences detection, from the HRM center |
| | Quarterly reports about complaints amenable to provision and distribution of tickets and/or season tickets, from the Ticketing center |

| | |
|---------------------------|--|
| Accounting | Sending to the Secretary quarterly financial reports, containing profitability and productivity coefficients |
| | Sending to the Secretary monthly reports about cash deposited in bank, debts expiring in that month, accounts receivable |
| | Noticing when the HRM center sends the monthly report about data of interest |
| | Noticing when the Accounting center sends the monthly report about tickets and season tickets sales, from the Ticketing center |
| | Noticing when the Accounting center receives reports about fines, from the Ticketing center |
| Human Resource Management | Noticing when the Secretary receives monthly statistics about overwork, from the HRM center |
| | Noticing when the Secretary receives monthly statistics about absences detection, from the HRM center. |

3.2.4 Information centers must give to implement the system

Responsibility centers, in order to make the system always be up-to-date, have to send some kind of information to different centers, within certain deadlines.

Contract management

This center must send information to two other centers: Secretary and Performance Management. Regarding the former, the center has to send preliminary documents about bids, the announcement of bids and the contract draft; regarding the latter, the center has to send quarterly reports about the time lapse between the announcement of the bid and the beginning of it, and quarterly reports about the time lapse between the adjudication of the bid and the transmission of the contract draft.

Ticketing

This center has to send information to Accounting, Performance Management, and Secretary. To the first center, it has to send quarterly reports about monthly tickets and/or season tickets sales and monthly reports about fines; to the second one, reports about time lapse between the request for tickets or season tickets and the date the request is accomplished, and time lapse between the collection of tickets sales and fines and the date it sends the report to the Accounting center; to the last center, it has to send the number and the date of complaints received, and the date when these complaints have been solved.

Accounting

This center has to send quarterly financial reports, containing profitability and productivity indicators, and monthly reports about cash deposited in bank, debts expiring in that month and accounts receivable, to the Secretary. It has to send quarterly financial reports to the Performance Management center:

- when quarterly and monthly reports are sent to the Secretary;

- when monthly statistics about data of interest are received;
- when monthly data about tickets and season tickets sales are received from Ticketing center;
- when monthly data about fines are received from Ticketing center.

Human Resource Management

This center sends information to three centers: Secretary, Performance Management, and Accounting. To the first center, it sends monthly statistics about overwork and absence detection; to the second center, it sends reports about sending dates of statistics to the Secretary and reports about sending dates of monthly reports about interest of data to Performance Management center; to the third center, it sends monthly statistics about data of interest.

Purchasing

It sends to the Performance Management center reports about market surveys, made upon requests from other centers in order to reduce costs for purchasing provisions unbound by contracts.

Secretary

This center has numerous information to send.

To the Contract Management center, it sends notifications about requests for preparing preliminary documents for bids, notifications for starting the bid and for its adjudication.

To the Performance Management center, it sends reports about time lapse between the time when the bid is prepared and when it starts, and between the time when the bid is over and when the contract draft is ready; it also sends reports about the time the center receives – from the Accounting center – quarterly financial reports (containing profitability and productivity coefficients) and monthly reports about cash deposited in bank, debts expiring in that month and accounts receivable; it sends reports about the time it receives – from the HRM center – monthly statistics about overwork and

absence detection; it sends reports about the time it receives from the Ticketing center documents about complaints and when they are solved.

As told, time is one of the most important variables in a public transport company: timeliness in providing services to external or internal customers (other centers) is crucial for a firm to operate efficiently.

3.3 Space

Another important variable to consider is the “space”. As space, the company means all the territories served. Analyzing the Operating Margin for the single lines made by the company means highlighting – eventually – bus lines with negative economic results, and then taking decisions: the company can eliminate the line, modify it, invest on it, or – at least – know how many kilometers another travel has to do in order to overcome that negative result.

Now, it is going to be shown how different types of costs are imputed considering the key variables: space and time.

Direct costs

Fuel consumption: the responsibility center gives quarterly data about fuel provision acquired, inside or outside the garage of the firm, from the coaches used for regional or national lines. Considering the former, the responsibility center considers kilometers made, the average consumption and the unitary cost for a liter; considering the latter, the indicators are the same, but the consumption and the unitary cost can vary, because these coaches can have fuel provisions outside the garage.

Oil consumption: it considers the kilometers made.

Tires consumption: tires consumption has to consider the weighted average unitary cost of the tire in the quarter, and the average duration of a tire (e.g., 80000 kilometers): these are necessary elements to calculate the cost of consumption by tires from regional and national lines. Obviously, the calculation must be made considering the different kind of coaches a firm can have.

Drivers cost: how to calculate it? Considering minutes of usage. Minutes of “non-usage” are calculated by the difference between the maximum usable time of the drivers (e.g., 6 hour and a half), and the real minutes of service in the different trips he can do.

Other direct costs: taxes, insurance, etc.: how to impute the cost? Considering minutes of usage. Non-usable minutes are calculated considering the maximum time of usage, and then subtracting from it the minutes used to have the trips.

Other kinds of costs

Parking, toll, internet booking, tickets emission: quarterly, they are directly imputed to the bus lines on which they are concerned.

Costs directly attributed to the line

Garage, repository, washing, repairs, personnel, electric energy, water, waste disposal: they are calculated on the basis of the number of bus lines (round trip) effectively made by the coaches during a year.

After imputing all the costs, how to impute the **revenues** among these lines?

Bus lines are considered “results centers”, because a firm can attribute also the revenues to them. Considering the national ones, direct revenues are considered, because every kind of ticket is solely concerned to them.

Considering regional ones, a firm cannot attribute directly to those lines its revenues, because there can be a different kind of tickets.

So, to make the Management Information System work, some new hypotheses should be introduced:

- Considering a frequentation survey, the firm should intercept your customer demand also considering the fare evasion rate.
- The company has to differentiate the kind of client you have on each line, considering the ticket he has.
- The company should divide the revenues basing it on each kind of ticket a firm sells, as suggested before.

After introducing the imputation of costs and revenues for a single line, the results of this management behavior are shown.

Two years ago, the firm had a travel from Salerno to Termoli: it was connecting Salerno, Avellino, Benevento, Campobasso and Termoli, five different cities in two different Regions. Analyzing the Operating Margin, the following scenario came out: the Campobasso-Termoli line was the one with the lowest number of customers, and so the one generating lower revenues.

So, the line to Termoli was erased, maintaining only Campobasso. In addition, from Benevento to Campobasso there was the same problem. What happened? The firm canceled the stop in Benevento, too. Nowadays, the bus line goes from Salerno to Avellino, and from Avellino to Campobasso. In the following table, the calculus made by the firm to modify the bus line will be shown. Obviously, the calculus – made on an Excel sheet – was made every quarter, even if here the totals are reported.

Table 11: calculus about Salerno-Termoli line

| | |
|------------------------------------|----------------------------|
| <u>REVENUES</u> | <u>146.410,13</u> |
| | |
| <i>Fuel consumption</i> | 78.218,20 |
| <i>Oil consumption</i> | 17.12,30 |
| <i>Tires consumption</i> | 3.727,61 |
| <i>Toll</i> | 0 |
| <i>Parking costs</i> | 0 |
| <i>Accommodation costs</i> | 0 |
| <i>Drivers' costs</i> | 99.528,45 |
| <i>Washing costs</i> | 8906,35 |
| <u>TOTAL VARIABLE COSTS</u> | <u>192.092,91</u> |
| | |
| <i>Garage/Repository costs</i> | 58.562,55 |
| <i>Insurance costs</i> | 9.441,50 |
| <i>Property tax</i> | 1.592,34 |
| <i>Annual servicing</i> | 90,00 |
| <u>TOTAL FIXED COSTS</u> | <u>69.686,39</u> |
| | |
| <u>GROSS MARGIN</u> | <u>- 115.369,18</u> |
| | |
| <u>NET OPERATING MARGIN</u> | <u>- 115.369,18</u> |

As someone can easily understand, calculus on that bus lines highlights a massive negative result. In this case, the company can decide to eliminate the line (in this case, this was the solution), to invest on it – maybe using discounts or promotions to attract new customers – or to improve another line to overcome this deficit. As told, analyzing the Operating Margin, a firm can also decide to invest on a bus line. This is what happened to the Avellino-

Rome line. A lot of people benefits from two daily round trips, so the firm decided to add another round trip to satisfy the growing market demand. The decision was made after considering positive results from the Operating Margin analysis, as shown in the following table.

Table 12: calculus on Avellino-Rome line

| | |
|------------------------------------|--------------------------|
| <u>REVENUES</u> | <u>672.033,04</u> |
| | |
| <i>Fuel consumption</i> | <i>208.660,86</i> |
| <i>Oil consumption</i> | <i>4.537,03</i> |
| <i>Tires consumption</i> | <i>9.9893,33</i> |
| <i>Toll</i> | <i>27.688,60</i> |
| <i>Parking costs</i> | <i>14.000,00</i> |
| <i>Accommodation costs</i> | <i>0</i> |
| <i>Drivers' costs</i> | <i>120.427,07</i> |
| <i>Washing costs</i> | <i>11.362,43</i> |
| <u>TOTAL VARIABLE COSTS</u> | <u>396.569,31</u> |
| | |
| <i>Garage/Repository costs</i> | <i>156.289,79</i> |
| <i>Insurance costs</i> | <i>14.162,25</i> |
| <i>Property tax</i> | <i>2.332,38</i> |
| <i>Annual servicing</i> | <i>135,00</i> |
| <u>TOTAL FIXED COSTS</u> | <u>172.544,30</u> |
| | |
| <u>GROSS MARGIN</u> | <u>102.544,30</u> |
| | |
| <u>NET OPERATING MARGIN</u> | <u>102.544,30</u> |

3.4 Summing up

Sometimes it's hard to find reliable data about Public Transport in Italy, because the analysis is often based on numerous and different sources. The only certain thing, at the moment, is that this industry is in a deep crisis, characterized by scarce resources and uncertain laws. Lower funds are given to State- or regional -owned companies, and those companies are forced to fire employees, to use obsolete vehicles, and – above all – they don't invest in this industry: this led to a decrease in the quality perceived by the customers. On one hand, there's the need for new investments in the industry; on the other hand, sometimes there's no certainty even about necessary resources to guarantee services delivered until nowadays. But the scarcity of resources is not the only one problem: there's no long-term view in doing business in this industry. This led Italy to have an expensive and inefficient public transport system, and the gap between Italy and other European countries is still widening.

During the last few years, a strong reduction in Government's aids destined to Public Transport was made: there was an important cut by the Government (more than 5%, which means more than 90 million of kilometers per year for a company³⁶), and in Campania – while the national average was a -12% – there was a reduction of 27%³⁷.

A.IR. Autoservizi Irpini s.p.a. also faced this difficulties, but it is still closing years with positive financial results: in 2014, the company has a profit of €124.912³⁸, the only one firm in Campania with positive financial results. Firms usually look for new, innovative ways to keep costs at a certain level, and to increase the revenues. Improvements made in A.IR. Autoservizi Irpini

³⁶ Isfort-ANAV-ASSTRA report

³⁷ ANAV-ASSTRA.

³⁸ Company's website: www.air-spa.it

s.p.a. – from the beginning of the implementation of the Management Information System presented into this work until nowadays – are under everybody's eyes, and these improvements are supported by positive financial results of the company.

That tool was able to give the company a positive tendency to continuous improvement, by adopting two simple variable – space and time – and analyzing them the best way possible. It is a great example of how public firms can have a correct managerial behavior, despite low funds and continuous political pressures.

CONCLUSION

This dissertation was set out to analyze a case study in order to highlight the characteristics of an innovative Performance Management system, based on the main features of a Management Information System, adopted by a regional Government-owned company operating in the Public Transport industry.

Many things happen around these systems, and it is difficult to separate their developments from those in management control and/or corporate integration. This causes significant effects in a firm. These systems force involved actors to go out of their common way to solve problems and create solutions, and to work with the Performance Measurement.

The case study illustrates that integration among different business units (our “responsibility centers”) can be explored and managed in various ways in relation to this Performance Management system. Integration between separate entities that are mutually dependent (or – at least – have become so) is less a goal than a problematizing activity, because the ambition to achieve the full integration cannot be always fulfilled: the mutual dependence between these centers is a highly demanding task for a firm, because the higher the integration, the heavier the inefficiencies to which these linkages can lead the firm. All these things can make companies’ performances collapse, unless companies themselves would figure out coordination mechanisms – already implemented in that Performance Management System – to manage the integration. This tool points out, introducing a client-supplier architecture and simulating the market mechanisms, that management control system can play a crucial role in achieving this goal.

By investigating time and space in the implementation of the Performance Measurement system, a new way of doing business is born: space and time are significant resources to put forward a number of more contemporary views as to how space and time are both managed and experienced. Concepts of space and time are crucial to the manner in which an organization is managed and organized. As already seen in this dissertation, a firm constantly monitoring time and space can make informed decisions about its processes, or about services delivered to its customers: the Public Transport company studied in this work, in fact, adopt this system to highlight positive or negative results in its bus lines, and to take decisions about it: investing in the positive ones, or modifying the negative ones before it would be too late.

As the company taken in consideration has applied this system, it has been noticed that it represents a significant change in the basic hypotheses about Performance Measurement. Conventional Performance Measurement systems point out the particular tasks they want employees to accomplish and then measure performances to see if those employees have – in fact – performed their tasks: widespread systems try to control employees' conducts.

This new system, on the other hand, is suitable for the kind of organizations many firms are trying to become. The strategy – not the control – is the focus of that system: it establishes objectives, but it takes for granted that people will adopt every necessary behavior or take every necessary action to arrive at those objectives. Measures are designed to push people toward the global vision. Managers know what kind of final result should come, but they cannot tell employees how to achieve that result.

This new system is uniform with the initiatives undertaken in many companies nowadays: cross-functional integration, client-supplier partnerships, a tendency to continuous improvement, team rather than individual liability.

With all of these basics already in mind, and considering that a lot of MIS implementation efforts end in failure, excellent planning, incorporating employee – or external consultants – involvement (this means involving the right employees and treating them with respect and recognition), and good communication should be at the top of any organization's list when considering these efforts.

Success is not warranted, but this is definitely a major part of the equation. Without these notions, a company would be wasting its money and its time, not using these tools to their fullest capabilities.

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Department of Management

*Chair of Performance Measurement and Financial
Reporting*

**THE IMPORTANCE OF AN INFORMATION
SYSTEM TO SUPPORT FIRMS'
PERFORMANCES
CASE STUDY: A.I.R. s.p.a.**

SUPERVISOR
CANDIDATE

Prof. Riccardo Tiscini

Preziosi Crescenzo

ID 664711

CO-SUPERVISOR
Prof. Saverio Bozzolan

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ABSTRACT

This work has the purpose of investigating the characteristics of an innovative time- and space-based Performance Measurement system, which is based on Management Information System's typical elements. Why? Today, a lot of companies are not conscious of the importance of the analytic data to support decision-making processes, and they don't consider Management Information Systems among their priorities.

CHAPTER 1

An **Information System (IS)** – or **Management Information System (MIS)** – is a tool for the collection, organization, storage and communication of information and data from many business activities within a firm. It provides a unified view of core business processes, also in real time, using common databases.

Why is an Information System so important for a firm? Markets have become more uncertain, and there is the need for rapid information to a firm, responding to an ever-changing business environment, and anticipating competitors. The firm's ability to adapt itself to the environment dynamics and to maintain a competitive advantage requires analytic data and a Management Information System which is consistent with their needs: **Information Systems** play a crucial role, because functions are tightly integrated, and this benefits companies in several ways: immediate reactions to competitors' actions and/or market opportunities, flexible product configurations, reduced inventory, and tightened supply-chain links.

There are a lot of advantages from the usage of an Information System.

- It improves **employee satisfaction** through removing redundancy from day-to-day activities: it allows more time for value-added tasks.
- Employees can be more **involved in decision-making processes**. If employees are challenged, and they are not disinterested in the job, they will be more likely to stay with the company, becoming more experienced.
- The **focus on the core business functions** that have a long history of success: it improves those functions, providing a homogeneous way for companies to integrate them into their own corporate environment.
- It **breaks down barriers** between areas and allows the fluid movement of critical data between functions.

These solutions, however, provide organizations with a myriad of other business benefits, which justifies the financial investment and time commitment required for

a Management Information System implementation: as *Panorama's* 2015 report indicates, one of the most common benefits organizations may realize would be the availability of information, and the same percentage of organizations realized benefits related to the increased interaction and integration of business processes.

These main advantages, however, are balanced by three main causes of failure of an Information System implementation:

- **No proper planning and organization:** without an accurate understanding of clients' expectations, products' capabilities or clients' commitment, the undertaking could be tragic.
- **Changes to the initial software:** no (or few) changes have to be made to the initial software. Companies should not try to "*fit a square peg into a round hole*", but they have to modify their processes.
- **No proper people** to implement, use and maintain its functionalities: employees must be managed as if they are just as valuable as the software itself.

An Information System project is so complex and vast that it takes several years and a lot of money to roll it out. Its implementation is not as much a technological exercise, but an "*organizational revolution*". So, there are some main lessons to be learned:

- **Extensive preparation** is the key to success: without patience and careful planning, the implementation will turn out to be corporate root canals, not a competitive advantage.
- **Top management support** is crucial. The implementation is also about re-positioning the company, revolutionizing business practices. Top management must consider the strategic implications of implementing this solution, examining several problems and alternatives, before launching the project. Management must also be involved in every step of the implementation: it has to take an **active role** in leading the change. Intervention from management is necessary to solve conflicts, to lead everybody to the same goal, to build cooperation among the distinct groups in the organization, and to constantly analyze the progress of the project. The success of this project is strictly linked to the sustained commitment by the top management.
- The implementation involves **re-engineering the existing business** processes to the best business process standard. All the processes in a company must fit with the Information System. Sometimes, business processes are so exclusive that they need to be retained. If the IS cannot adapt to the organization, then the organization has to adapt to it, by changing its procedures, avoiding an increase in the total costs.

- No single application can do everything a company needs, and companies may have to use other specialized software products. These have to be **integrated** along with all the “*domestic*” systems. In this case, the Information System serves as a backbone, and all the different software are linked to that Information System.
- A company should really consider what is going to be asking for its **employees**. It should evaluate the current staff and analyze its needs. It should inquire about the employees’ desire to be involved and get their inputs. The firm should be reasonable about its requests.

The IS market has developed so big so fast, so there has been a **lack of competent advisors**. Finding the right people and keeping them through the implementation is a major challenge. The Information System implementation demands multiple skills: functional, technical and interpersonal. Hiring temporary help to maintain daily activities would be a minor expense: the majority of the organizations continued to rely on **consultants** in their Information System selection and implementation initiatives: they are particularly helpful in guiding companies from the IS selection to the end of the implementation process.

Companies must also be willing to dedicate some of their **best employees** to the project for a successful implementation. Often, companies cannot realize the impact of choosing the internal employees with the right skill set: internal resources of a company should not only be experienced in the company’s processes, but also be conscious of the best business practices in the industry. Those employees should exhibit the ability to understand the overall needs of the company: lack of proper understanding of the project needs and the inability to provide leadership to the project by the employees is a major reason for the failure of Management Information Systems implementation projects.

Moreover, **training and updating employees** on the Information System are major challenges. People are one of the hidden costs of the implementation. Training employees on the Information System is not simple: a company cannot give them a few weeks of training, put them on the job, and they blunder their way through. The Information Systems are extremely labyrinthine, and need meticulous training. It is difficult for trainers or consultants to pass on the knowledge to the employees in a short period of time. This “*knowledge transfer*” gets hard if the employees lack “*computer literacy*”. With Information Systems, you are continuously being trained. Companies should bring opportunities to improve the skills of the employees, providing training opportunities on a continuous basis to meet the ever-changing needs of the environment and the employees.

Employees must be given the **incentives** to apply themselves for such a long effort: employees working on an Information System implementation project put in long hours, including seven-day weeks and even holidays. Even though the experience is beneficial for the career path of the employees, the stress of the implementation - linked with their regular activities - could make their morale rapidly fall. The success of the pressuring task of an Information System implementation can only be increased by incentives. Employers should come up with creative ways to reward those players, and should pay close attention to what their employees are trying to tell them. Keeping a current employee happy, and retaining him after spending so much time and resources in training, is far less expensive than hiring and training new employees.

The Information Systems are revolutionizing the way companies produce goods and services. These tools can bring a lot of benefits to organizations by tightly integrating various departments of the organization. Excellent planning, incorporating employee involvement, good communication, should be at the top of any organization's list when considering an Information System implementation effort. Although success is not guaranteed, it is definitely a major part of the equation.

The evolution of the Management Information Systems is represented by the **Enterprise Resource Planning (ERP)**: it provides a unified prospect of core business processes, generally in real-time, using common databases managed by a database management system. It simplifies information flow between all business units, and it manages relations with outside stakeholders.

The ERP software market, nowadays, is one of the fastest-growing markets in the software industry. It has seen a rough start with several project failures and a huge shortage of skilled and experienced workers, but it is predicted to grow from a current \$15 billion to a gigantic \$50 billion in the next five years.

ERP implementation involves deep organizational change processes, with serious implications for the management model, the structure, the culture and the people. The Enterprise Resource Planning software is very adaptable, but companies that wish to correctly use this software have to transform their working practices to fit the ERP. The key factor is the way in which it is configured.

There are three groups of **problems**:

- **Cultural**: the implementation expected a high acceptance in areas that provide just as good or better functionality than the old system.

- **Business:** there is the need for a rigid business structure for it, in order to work successfully. Participants of cross-functional workshops soon understood that their working practices must be adjusted to fit the systems.
- **Technical:** the accuracy of data. The system requires the renewal of old data from the legacy systems that have to be normalized, screened and stored in a sensible data format within the new system data repository.

Moreover, a lot of **risks** threaten the ERP implementation. The majority of these challenges are people-related.

The most prevalent challenges are related to **organizational change issues**: resistance to change is the most common challenge, while other common challenges include a shortage of staffing resources, a lack of clear expectations and goals or a lack of overall vision. Organizations often don't realize the incredibly negative impact a poorly motivated staff can have on attrition rates,

So, how to succeed?

There is not a right answer, but some **activities** should be taken, in order to improve the chance of a success, such as bridging the legacy systems and cleaning up suspect data, training the senior management, or managing effective relationships and leading teams in both technical and non-computer based environments.

Organizational change management is significantly more effective when you have an in-depth understanding of your people and business processes. Implementing new ERP software when employees are not adequately prepared to handle that level of change, will present challenges throughout an ERP project. There are several consequences of ignoring the organizational change management: without communication from managers and project teams, end-users grow disenchanted and apathetic. **Their attitude becomes, “They don't care, so I don't care.”**

CHAPTER 2

Senior executives understand that their companies' Performance Measurement systems massively affect managers' and employees' behaviors; they are also inclined to think that traditional accounting measures can give misleading signals for continuous improvement and innovation, so they cannot rely on one set of measures to the exclusion of the others.

No single measure can provide a clear performance target or focus attention on the critical areas of the business. Financial measures must be integrated with operational measures on customer satisfaction, or internal processes, etc.

While giving senior managers information from different perspectives, an Information System minimizes information overload by limiting the number of measures used. Usually, companies do not suffer from having too few measures; on the other hand, they keep adding new measures whenever an employee (or a consultant) makes a worthwhile suggestion. This proliferation of measure is harmful to a company: it should focus on the handful of measures that are most critical.

A new kind of information system has been introduced in this dissertation: it can help a company improving its performance, and it is based on the relationship between **logistics** and competitive **advantage**.

This tool focuses on activity-based methodologies, in order to correctly set up planning, controlling and analyzing problems. It also defines some guidelines to measure these processes' performances, and their application is useful to stimulate a positive tendency to continuous improvement.

This Information System will mainly focus on two variables: **space** and **time**, and these two variables are analyzed in each of the key processes in a firm.

Investigating time and space has always been important for a firm, especially considering the evolution of the accounting systems.

The role of time in accounting is to sequence, synchronize, and allocate scarce time across organizational events: the ordering of recorded transactions, the periodizing of accounting calculations, and the monitoring of economic performances. Time is not only reflected, but partially constituted in accounting systems. Nowadays, the "accrual" concept in accounting has evolved to be a core of the intrinsic logic of periodic income accounting. Periodic income is a part of a socially constructed reality that has a self-reproducing capability once it is instituted. This Information System has the same basics.

This tool has been adapted to a public transport firm. How?

Considering the **space**, it is divided considering territories served by the coaches of the firm: it is needed to highlight possible negative results of single bus lines composing a whole travel. Whenever a firm will consider the general view, negative results from specific lines will not be revealed, because they can be outpaced from other, best-performing ones.

Considering the **time**, it is divided into infra-annual periods (month, quarter, etc.), in order to give useful information, intervening in processes to correct them as soon as possible if they reveal some kind of problems. The inscription of time allows trends to be extracted from the past and projected into the future. A significant part of the organizational present is concerned with the strategic projection and

calculation of the future, often in accounting (capital budgeting) terms. The writing of time has brought the future into the present.

Moreover, time analysis is more important than cost analysis for a public transport firm: the punctuality in the delivering of services has a very important role, and the competitive advantage can be built on it. If coaches are not on time, the performances will drop, even if the firm correctly manages everything (new coaches, low tickets, and so on), because consumers will perceive this service as a low-quality one.

It is also well known that the Performance Measurement can accomplish its function to improve the overall results of a firm only if it can give frequent information during the year. So, observing the overall results by the end of the year is very important, but having disaggregated information all over the year is far more important: otherwise, you cannot correct any mistakes.

Mixing those two variables, an Operating Profit Margin analysis can also be conducted. By this analysis, a firm can highlight some negative bus lines, and then decide what to do: it can invest in them, eliminate them, or understand how another line should perform to outweigh those losses.

So, it is crucial to constantly monitor the operations and the processes of a firm, in order to understand what kind of bus lines are making the firm lose money, and deciding if (and how) modify them, because they give rise to new costs, and increase the overall duration of the production and distribution cycle, without generating value for the firm.

Even if there is not a single path, which can ensure success when implementing a new Management Information System, there is a basic development plan, made up by seven steps, to create and implement this kind of Information System.

- 1) **Groundwork**: the firm should involve all its business units in this “change”, understanding the issues each unit can face during the process, and identifying some persons in charge for each business unit: they will have to lead the whole unit through the change.
- 2) **Interviews**: each responsibility center’s leader (as told, he usually is the manager of each unit) has to receive the required material about this Information System, as well as internal reports that describe the company’s (eventual) new vision and mission, or the strategy indicating the path to reach new company’s goals through this Information System. The facilitator (an external consultant, or an employee) handle interviews with these leaders (and – eventually – with shareholders), to collect their input on the activities

- made by that unit and tentative proposals for their measures.
- 3) **Executive Workshop**: the top management and the facilitator go through the process of developing the Information System. Usually, during these workshops, people discuss the suggested mission and vision, and the strategy to adopt, until harmony is reached. In the end, this group develops a basic Information System, encompassing all the operational measures to reach the objectives.
 - 4) **Interviews**: the facilitator reexamines and consolidates the output from the workshop, and then he should interview the leaders about the proposed Information System, asking them for some kind of issues or suggestions.
 - 5) **Executive Workshop**: the business units' leaders and their direct subordinates have to debate about vision, mission, strategy and the implementation system. They can build up an implementation plan, they can propose measures or highlight controversies. By the end of the meeting, leaders and subordinates are demanded to establish objectives for each of the proposed indicators, and a targeted percentage of improvement. Then, the leaders meet to come up to a final consensus on vision, mission, strategy and Information System implementation.
 - 6) **Implementation**: eventually, a new team is created for the implementation. This team develops the implementation plan, including putting measures into a real-time database which automatically keeps itself up-to-date, communicating the Information System throughout the organization. As a result, a tool that links every business unit in the organization, from the top management to the "shop floor" could be established.
 - 7) **Periodic Reviews**: each month (or, in case, each quarter) a sort of "book" is prepared, for top management analysis or consultations with business units' managers. Obviously, the Information System should be revised annually, as part of the strategic planning, goal setting, and resource allocation process.

CHAPTER 3

This is what happened in A.IR. Autoservizi Irpini s.p.a., one of the most flourishing public transport firms in the South of Italy. During the last few years, firm's growth made it become the protagonist of important projects.

One of the projects in which the firm has been involved, was the creation of a new Management Information System, which has the basics presented in the previous chapter. As already told, firms usually hire external consultants to support employees in implementing this kind of tools, and this also happened to A.IR. Autoservizi Irpini s.p.a. Consultants always work closely with employees, giving

their expert help, but they should not do all the work: without the proper support from the internal employees, there would be no understanding of how the system has been implemented, or how the system should be maintained. In these cases, the tool will be useless to the company. The trained employee who grows with the system, on the other hand, will make the system expand, will make the company evolve. So, he will be a true asset to the company more than the Performance Measurement system itself.

Moving toward the Information System, it's important to have clear in mind the main variables, space and time.

Time analysis is a crucial variable in a transport company, even more important than cost analysis: timeliness in services delivered to external customers is one of the most important determinants in creating competitive advantage. Even with an optimal managerial behavior, the efforts can be useless if services are not delivered in time: customers would perceive that service as a low-quality one, even if there are low-cost tickets or new investments in infrastructures and coaches.

Besides timeliness in services to external customers, the company should monitor timeliness in delivering services or information to internal customers (other responsibility centers). How can the company – using the Management Information System already presented – improve the timeliness of internal communications?

First, the company had to collect – using a bottom-up method, interviewing persons in charge in each responsibility center – all the activities made by those centers. Then, considering the tasks from which life and death of the company depend on, objectives and indicators are given by the top management. Persons in charge must fill a sheet, and then send the report to another center (*Performance Management Center*, PMC), which will acquire necessary information from the centers, will give them a score, and then will transmit everything to the top management in order to have the final judgment. The system simulates the market: each business unit (doing “downward activities”) becomes a customer, looking for information or a service; these are given by centers considered as “backward” ones. So, “client” centers are involved in the Performance Measurement of “supplier” centers.

Another important variable to consider is the “space”. As space, the company means all the territories served. Analyzing the Operating Margin for the single lines made by the company means highlighting – eventually – lines with negative economic results and then taking decisions: the company can eliminate the line, modify it, massively invest on it, or – at least – know how many kilometers another travel has to do in order to overcome that negative result.

As told, analyzing the Operating Margin, a firm can also decide to invest on a bus line, as happened to the Avellino-Rome line. A lot of people benefits from two daily round trips, so the firm decided to add another round trip to satisfy the growing market demand. The decision was made after considering positive results from the Operating Margin analysis.

Sometimes it's hard to find reliable data about Public Transport in Italy, because the analysis is often based on numerous and different sources. The only certain thing, at the moment, is that this industry is in a deep crisis, characterized by scarce resources and uncertain laws. Lower funds are given to public companies, and those companies are forced to fire employees, to use obsolete vehicles, and – above all – they don't invest in this industry: this led to a decrease in the quality perceived by the customers. On one hand, there's the need for new investments in the industry; on the other hand, sometimes there's no certainty even about necessary resources to guarantee services delivered until nowadays. But the scarcity of resources is not the only one problem: there's no long-term view in doing business in this industry. This led Italy to have an expensive and inefficient public transport system, and the gap between Italy and other European countries is still widening.

During the last few years, a strong reduction in Government's aids destined to Public Transport was made. A.I.R. Autoservizi Irpini s.p.a. also faced this difficulties, but it is still closing years with positive financial results: in 2014, the company has a profit of €124.912, the only one firm in Campania with positive financial results. Firms usually look for new, innovative ways to keep costs at a certain level, and to increase the revenues. Improvements made in A.I.R. Autoservizi Irpini s.p.a. – from the beginning of the implementation of the Management Information System presented into this work until nowadays – are under everybody's eyes, and these improvements are supported by positive financial results of the company.

Many things happen around these systems, and it is difficult to separate their developments from those in management control and/or corporate integration. This causes significant effects in the firm. These systems force involved actors to go out of their way to solve problems and create solutions, to work with the Performance Measurement.

The case study illustrates that integration among different business units (our "responsibility centers") can be explored and managed in various ways in relation to this Performance Management system. Integration between separate entities that are mutually dependent (or – at least – have become so) is less a goal than a

problematizing activity, because the ambition to achieve the full integration cannot be always fulfilled: the mutual dependence between these centers is a highly demanding task for a firm, because the higher the integration, the heavier the inefficiencies to which these linkages can lead the firm. All these things can make companies' performances collapse, unless companies themselves would figure out coordination mechanisms – already implemented in that Performance Management System – to manage the integration. This tool points out, introducing a client-supplier architecture and simulating the market mechanisms, that management control system can play a crucial role in achieving this goal.

By investigating time and space in the implementation of the Performance Measurement system, a new way of doing business is born: space and time are significant resources to put forward a number of more contemporary views as to how space and time are both managed and experienced. Concepts of space and time are crucial to the manner in which an organization is managed and organized. As already seen in this dissertation, a firm constantly monitoring time and space can make informed decisions about its processes, or about services delivered to its customers: the Public Transport company studied in this work, in fact, adopt this system to highlight positive or negative results in its bus lines, and to take decisions about it: investing in the positive ones, modifying the negative ones before it would be too late.

As A.I.R. s.p.a. has applied this system, it has been noticed that it represents a significant change in the basic hypotheses about Performance Measurement. Conventional Performance Measurement systems point out the particular tasks they want employees to accomplish and then measure performances to see if those employees have – in fact – performed their tasks: widespread systems try to control employees' conducts.

This new system, on the other hand, is suitable for the kind of organizations many firms are trying to become. The strategy – not the control – is the focus of that system: it establishes objectives, but it takes for granted that people will adopt every necessary behavior or take every necessary action to arrive at those objectives. Measures are designed to push people toward the global vision. Managers know what kind of final result should come, but they cannot tell employees how to achieve that result.

This new system is uniform with the initiatives undertaken in many companies nowadays: cross-functional integration, client-supplier partnerships, a tendency to continuous improvement, team rather than individual liability.

With all of these basics already in mind, and considering that a lot of MIS implementation efforts end in failure, excellent planning, incorporating employee – or external consultants – involvement (this means involving the right employees and treating them with respect and recognition), and good communication should be at the top of any organization’s list when considering these efforts. Success is not warranted, but this is definitely a major part of the equation. Without these notions, a company would be wasting its money and its time, not using these tools to their fullest capabilities.