# USE ORAL HISTORY OF IN THE ANALYSIS OF THE EVOLUTION OF THE ERP SYSTEM IN THE MANUFACTURE

# UTILIZAÇÃO DA HISTÓRIA ORAL NA ANÁLISE DA EVOLUÇÃO DOS SITEMAS ERP NA MANUFATURA

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# Abstract

# Resumo

This paper reports the implementation of an ERP system in the industrial area aiming at improvements in the standard of quality, cost and agility. After consolidation in the area using MRP II, the ERP was extended to the other areas of the organization. The methodology used in this study was oral history in an alternative way to make more relevant the results of academic research, this approach establishes as being of great relevance to the historical constitution of the profession. The objective of this work is to investigate the perception of organizational change that occurred with the implementation of a business management system (ERP) by the agents involved in this process focusing on project manager, project team and end users providing consistent data for analysis and execution of objectives proposed by the study. Two interviews were conducted with a consultant, being conducted face-to-face with a focus on the changes that occurred in the manufacturing module, through the implementation of MRP II. In the discussions proposed with the structured questionnaire, it was possible to notice that manufacturers of ERP systems have followed the evolutions in the manufacturing systems proposed especially integration in the management of the supply chain. In Brazil, ERP systems in manufacturing have presented updates to meet ancillary obligations imposed by the Treasury in the search for reduction of evasion.

**Keywords:** systems. Implementation. manufacturing systems. ERP. oral history.

Este trabalho relata a implementação de um sistema ERP na área industrial visando melhorias no padrão de qualidade, custo e agilidade. Após a consolidação na área usando o MRP II, o ERP foi estendido para as outras áreas da organização. A metodologia utilizada neste estudo foi a história oral de forma alternativa para tornar mais relevantes os resultados da pesquisa acadêmica, esta abordagem estabelece como sendo de grande relevância para a constituição histórica da profissão. O objetivo deste trabalho é investigar a percepção de mudança organizacional ocorrida com a implementação de um sistema de gestão empresarial (ERP) pelos agentes envolvidos nesse processo, com foco em gerente de projetos, equipe de projeto e usuários finais, fornecendo dados consistentes para análise e execução. dos objetivos propostos pelo estudo. Duas entrevistas foram realizadas com um consultor, sendo conduzidas face-a-face com foco nas mudanças ocorridas no módulo de manufatura, por meio da implementação do MRP II. Nas discussões propostas com o questionário estruturado, foi possível perceber que os fabricantes de sistemas ERP acompanharam as evoluções nos sistemas de manufatura propostos, especialmente a integração na gestão da cadeia de suprimentos. No Brasil, os sistemas ERP em manufatura apresentaram atualizações para atender as obrigações acessórias impostas pelo Tesouro na busca pela redução da evasão.

**Palavras-chave:** sistemas. Implementação. sistemas de fabricação. ERP. história oral.

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# Introduction

According to Chung and Synder (2000), in a competitive environment, organizations need to adapt their business in order to fulfill their corporate visions, but for this goal to be achieved needs to be structured to achieve these goals. To support these objectives, information technology (IT) needs to be aligned with the organization's mission.

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In this context, and as is Chung and Synder (1999), in the 90s, the Enterprise Resource Planning (ERP) software was created to offer an integrated IT solution in the case of a major investment for many organizations. The records of the evolution of ERP systems, known to integrate all areas of an organization and facilitate planning of resource development and functionality needs, has been studied by researchers as Wortmann (1998); Kumar and Van Hillegersberg (2000); Chen (2001); Chung and Synder (1999 and 2000) and Pairat and Jungthirapanich (2005) among others argue that under varied optical study, as analysis of the implementation and maintenance processes, difficulties and opportunities and the importance of these systems for organizations and how to rely on these in data generation, planning and control, benefits and problems associated with use with other software and Padilha and Marins (2005) reinforce this aspect, yet treated here approach will be to analyze the oral history focusing on ERP consultant and so further studies in this light the context of ERPs.

Despite various research, Chung and Synder (2000) reported that there is research done to provide guidance to managers on the potential of ERP to their organizations and useful information about the ERP can be found by examining the technological evolution of ERP and MRP (*materials requirement planning*). This article by analyzing the ERP systems the light of a structured interview and examination of the oral history of a consultant to assist future studies in this light complementing the previous theoretical essays and associating concepts field experience.

# THEORETICAL FOUNDATION

# **Oral history**

Meihy (2002) reports mentions that the modern oral history appears around the 50, at Columbia University as necessary to record experiences of combatants, families

and victims of the Second World War possible through the use of available technology record oral histories and narratives or tenderers life story of a wide range of factors and thus an option for the study of personal and professional backgrounds.

This approach sets out to be relevant to the historical establishment of facts and professional context allowing reconcile practices, class struggles, life experiences and social and ideological contradictions of the profession as quoted by Demartini (2001), and also complements the sources oral enable grasp not only unknown facts, but also representations of different characters involved in the educational process as teachers, students, ethnic groups etc. and in this regard argue about theoretical and actual relationships.

When designing the Oral History enables ponder the various aspects enables by talking to people, realize and understand more about its key feature, establish relationships between lived memories of the past and their social peers as constitutive of a collective memory in Coutinho (2011) and Pereira (2000) show how dialogue between history, sociology, anthropology and others in a multidisciplinary way. Even as a methodological concept, Queiroz (1988) mentions that oral history can be a data collection technique, a broad term that covers reports about events not recorded by other documentation or if either supplement obtained by interviews in different ways and that records the experience of an individual (life story).

Meihy (2002) also comments that oral history is a modern device used for preparation of documents, archiving and studies on the social life of people and a history of the present time and also known as living history. As the history of contemporary, oral history has to answer to a sense of practical and immediate use. (Meihy, 1996, p.13).

Alberti (1990), oral history is a broad method, various techniques to collect and analyze data in order to understand historical events through people who experienced or witnessed and appropriate to capture the various ways that individuals seized and interpreted the event.

According Meihy (2002) oral narratives are subdivided into three types of oral history referred to as: oral life history, oral history and oral tradition.

Oral history of life- primary subject is the witness, considered the official portrait
of the witness and the truth is presented in the version, the narrator reveals or hides
cases, situations and people. Questions should be broad, placed in large blocks,

indicatively to the events and the chronological sequence of the trajectory of the respondent. The interviewer should not challenge the interviewee.

- Oral History Theme- The one that approaches the common and traditional solutions of presentation of analytical work in different areas of academic knowledge. The interview is another document, consistent with the pursuit of understanding (clarify) and role of the interviewer in the most explicit conduct, part of a specific, predetermined subject, direct objectivity around a question or opinion of the interviewer on defined event and have some version of an event that is debatable or anti-establishment. Interviewer more active and can challenge and personal details of the narrator's life interest in revealing aspects useful to the central thematic information.
- Oral tradition- The permanence of myths and vision of communities with values
  filtered by referenced the remote past mental structures, manifested in folklore and
  previous generations and the interviewee is more collective and less individual as
  studies of tribes and clans, who resist modernity and the interview should cover
  attached people in the traditions.

Specifically, this study will be used oral history of life of a consultant and supported by Queiroz (1988, p. 20), "the story of life is defined as the story of a narrator about their existence through time, trying to reconstruct the events experienced and transmit the experience gained. " In this context, as Meihy (2002) has a subjective character marked by life experience chronicling their perception of the facts about what happened in their individual and social existence permeated by subjectivity and the researcher should check whether the assumptions are effectively able to fill spatial and temporal gaps that may emerge during the testimony and observe emotions, feelings, singularities that are noticeable considering the interviewee's voice inflections, facial expressions not often perceived in written form, making oral history more original and applied as Carvalho and Fischer (2006) and Atkinson (2002).

Any search method is criticized in relation to its validity and oral history interviews to share criticism and possible biases, however, Thompson (1992) argues for written documentation little criticism. In the context of subjectivity, Alberti (2004, p.23) explains that "we can never grasp the real, as it is, nevertheless, insist on getting an increasingly accurate approximation of it, to raise the quality and quantity our knowledge" and still Alberti (1990) mentions that it is up to the researcher to seek other

sources to confirm or not what was said as for oral history is worth the memory of witnesses and thus subject to vulnerability memory, deponent risk distorting reality, have memory failures or err on their account as well as the representativeness of the informants which is also a concern in any qualitative technique. Meihy (1996) has cited concern about the acceptability and respectability of the method commenting that in a first moment, conservative groups doubt the oral and not enough story to explain the social whole being something temporary, but it shows an integral part of contemporary history and the researcher should have the responsibility for maintaining the intelligibility of the facts and for this to prepare for situations not discuss in order to question them or check their veracity, but to respect the voice that was given to the deponent; this perspective, all that he was said to be taken as real considering that they've experienced this context, it is not for us to judge what was reported and yes, analyze and interpret the collected information and then compare with other facts.

# Concepts, characteristics and uses of oral history

Oral history allows the dialogue between several areas in the human sciences, constituting an interdisciplinary research effort (CAMARGO, 1984), conceived as a method or technique of research with typifications, specificities and limitations and for Pereira (2000) multidisciplinary dialogue between history, sociology, anthropology and education, among others and different authors who compose about oral history or who use it conceptualize according to Verena (1990) as a research methodology and for Queiroz (1988) to be a technique of data collection in this way a term broadly covering a number of reports of events not recorded by other documentation, or whose documentation is completed with interviews of various forms and records the experience of an individual (life history) or different individuals of the same collectivity (oral tradition). (Queiroz 1988, p.19). According to Meihy (2002, p.13), "oral history is a modern device used for the preparation of documents, archiving and studies on the social life of people" and conceived as technique, since Alberti (1990) a search method (historical, anthropological, sociological, etc.) that focuses on interviews with people who participated in or witnessed events, situations, worldviews and thus approach the object of study, producing reference sources (interviews) for other studies. It complements Alberti (1990), which should be understood as a method that uses techniques for collecting and analyzing data in order to understand historical events

through the persons who have experienced or witnessed them, and how these individuals have apprehended and interpreted the event.

For Denzin (1989), the story of life is understood as a research strategy integrating the biographical experience and managerial processes of learning and its relation to the individual and their interactions, as the manager interacts with different stakeholders and in this context applies the study. Still Deleory-Momberger (2012) and Denzin (1989) and Xing and Sims (2012) reinforce this difference in method emphasizing the presence of emotions, interactions between people and events seeking to understand the forces that shape, distorting and altering experiences (BERTAUX1993 and HATCH aND WISNIEWSKI 1995) and enable respondents to establish itself motivations, values and career choices (Smith, 2012) and Delory-Momberger (2012) adds that vocations

To Hatch and Wisniewski (1995) the possibility of living history approach helps in understanding objective aspects as data on the economic, political, historical and social and subjective context allowed by this methodological strategy favoring an interdisciplinary view of contemporary careers, enriching investigations on the issue and increasing their understanding.

# **Evolution of ERP system**

According to Kotter (1996) justifies, organizations, driven by economic forces, are increasingly concerned to reduce costs, improve the quality of their products and services, find new growth opportunities and increase their productivity.

The ERP acronym - Enterprise Resource Planning, means more than resource planning, but the focus of the organization (KOCH, SLATER and Baatz 1999). In this context, adds Chopra and Meindl (2003) that the ERP allows tracking globally view the information on the organization and throughout the supply chain to supply enabling better decisions.

Corrêa et al. (1999) comments MRP concepts (manufacturing resource planning), MRP II (Manufacturing Resources Planning) and its features and importance to the ERP. In this context explores the importance of higher or lower depending on the industry or the company and the form of adopted programming logic (such as finite). For the authors migrate modules for a "plug-in" situation due to its need and will use the database to generate suggestions of the most appropriate action to the particular needs in

question.

The framework presented in this study aims to investigate the perception of organizational change occurred with the implementation of an ERP by the agents involved in this process (project manager, project team and end-users) focusing on the changes in the manufacturing module by deployment of MRP II.

According to Chopra and Meindl (2003) the evolution of information systems supported by the way impactful technology in this process to ERP and use MRPII and under previous authors MRP and MRP II enabled to industrial areas significant improvements in the standard of quality, cost and agility and ERP the solid base used MRP II, expanding them to other areas of the organization.

In the view of Lima et al. (2000) an ERP impacts the organization in various aspects such as culture, technology and organization with their adoption exercising production controls, financial, informational, providing real-time data and information for decision making.

The text Orlicky (1975) describes and details the MRP logic and needs encoding levels and Hehn (1999) presents the ERP as an evolution of MRP II and the integration and sharing of data and Cunha (1998) comments as a management model based on corporate information systems seeking the integration of processes to support strategic decisions.

The MRP of the movement that takes place between 1970 and early 1980 motivated by the need for integration between the areas in the organization and facilitated by technology (CORREA et al. 1999) and 1990 increased possibility for it to the organizational structure data integration. As an example of this context Dempsey (1999) comments on the interconnection of manufacturing and accounting from other applications to ERP and clear with the complexity and the problems associated with care.

Akkermans and van Helden (2002) in a study continuing the Nah et al. (2001) features 21 named CSF success factors (Critical Success Factors) adopted in implementation of ERP compiled from other literature Information Technology, reengineering business processes (Business Process Reengineering) and Project Management (Project Management) starting with models process standards, generic and allow adjustment of functionality through parameterization and customization; integrate organizational areas; considering the cost of hardware, infrastructure, acquisition of

license to use, training and deployment; frequency of updates (upgrades), fixes problems and errors; have to change in the production and administrative processes to adapt to the system; impact on human resources of the organization as well as pay attention to the fulfillment of installation and budget deadlines. That way the active participation of senior management; manage changes seeking to reduce the "fear" of users; Users identify the key; choice of the Project Manager; planning and conducting training; adapt the system to the company and vice versa (good practices); use proper advice (know-how) and Quality Assurance with the use of models and more streamlined solution.

In summary, to Davenport (1998), ERP through a software that seeks to cater to all types of organizations influenced by their culture, integrating data and generating information, contributing to the strategy of the organization. Designed to reflect best practices. Figure 1 show the stages of development of the ERP system.

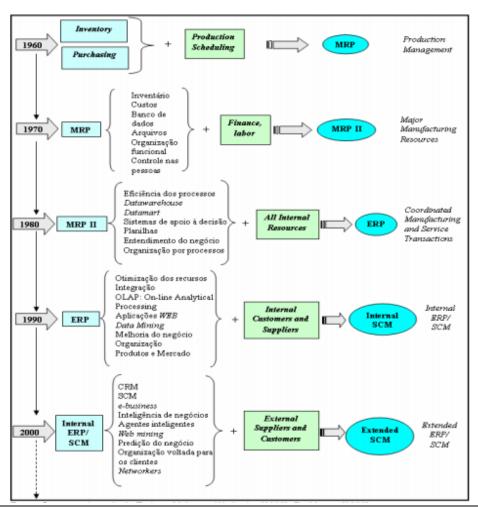


Figure 1 - the ERP system development phases

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Source: Oliveira (2006)

**METHOD** 

According to Fraser and Gondim (2004) the interview is considered a form of

interaction between two or more people in order addressed to a defined purpose that is

not the satisfaction of the conversation itself but of information and Haguete (2001) and

Lodi (1991) state where the concern with the reduction of uncertainty about what the

speaker says and that values the floor.

Lodi (1991) the interview is a data collection option providing opportunities to

motivate and clarify the respondent; allow flexibility and choosing appropriate words as

well as control over the situation and further evaluation of the validity of the answers by

observing the non-verbal behavior of the respondent and thus as a method used in this

study had been prepared a structured questionnaire and semi validated by experts in the

field.

As Chase (2005) and Riessman (2005) reported in narrative research enables the

reduced number of participants for a unique life story can reveal behaviors and

techniques, values and ideologies (DELORY-MOMBERGER, 2012) and Riessman

(2005) states that if the demand time and dedication is limited both participants as

researchers is not recommended large number of respondents (Riessman, 2005) was

limited in this study a respondent due to sufficient wealth of data for analysis and

continuity to the objectives proposed by the study.

Conducted two interviews with a consultant, conducted in-person and held form

on 15 to 16 June 2017.

The respondent was a consultant with over 35 years of professional experience

in the implementation of ERP systems. Experience in management was one of the

criteria adopted for the choice of this participant. The consultant deployed in more than

150 companies modules Planning Programming and Production Control, Industrial

Maintenance, Manufacturing and Theory of Constraints applied to projects. In this

period, we followed the evolution of the ERP system and the improvements

implemented by system manufacturers.

The consultant has a degree in Business Administration, a graduate degree in

Management and Production Operations and Master in Business Administration.

The questions were based on the literature on the subject, which provides material on the improvements and additions that have been made on the shop floor in the planning systems of the company's resource needs.

Still on the issues, they were prepared based on theoretical frameworks that address the evolution of ERP systems in manufacturing in the last 30 years.

# **Analysis of Results**

In this topic, an analysis of interview responses held with the consultant will be held. In this way, they will be analyzed the topics generated to the questions that take into account developments in ERP systems.

The first question of the interview dealt with the evolution of ERP systems over the past 35 years. The consultant interviewed pointed out that since the 90s there was great manufacturing process of integration with other areas of the organization, for example, demand forecasting and quality management, contract management. From the 2000s the big development was due to the integration with the supply chain by integrating support systems for the supply chain. Also, the relationship management with customers was another improvement incorporated in this time of ERP systems. Another highlight is the integration with the WMS (Warehouse Management System - Warehouse Management System), which supports the work of warehouses and distribution centers. The consultant also pointed out that the ERP system manufacturers have sought, over time,

The second issue revolved on developments that had the greatest impact on ERP systems from the 80 modules available from the 80's were complemented in the 90s, with emphasis on engineering modules and product configurator. The product configuration module is a specific module for companies that develop a single design for clients according to specific settings for a particular customer's request. Another module that has undergone evolution was the industrial maintenance module, encompassing improvements as calibration for control of measuring instruments calibration; Fleet Control for fleet management, their supplies, maintenance, documentation, control and use of tires, industrial maintenance management control, allowing the physical and financial control of the maintenance area.

On organizational culture, identified as prevalent in ERP systems implementation projects, the consultant points out that the implementation of an ERP system impacts the organizational culture. Organizational culture is also an important factor for the success of the project, but the deployment project impacts the culture. Some professionals regard the change as an opportunity for professional growth, while others are taken out of their comfort zone to which they are accustomed. This often causes conflicts during the project. As the center of power often changes with a project of this size and nature, it is natural that people who feel some kind of insecurity and threat to their "status quo", react harmful way to the project.

In question four on Lean Manufacturing and ERP systems, especially when considering its applications in manufacturing. The objectives of an ERP system can be translated as providing information with high accuracy organizations. About Lean Manufacturing, we can see that there is an integration of objectives between Lean Manufacturing and the information provided by ERP systems, and it is possible to integrate philosophy of Lean Manufacturing and ERP system.

In question five was explored the evolution of ERPS systems, as the addition of new modules to support the strategy of supply chain management (SCM - Supply Chain Management). Several modules were implemented to add value to SCM, such as Sales Price Administration for the control and calculation of sales prices and margins; Supplier Evaluation for quality management of supply, terms and amounts; Sales contracts and supply to reduce the daily transactions Orders Sales and purchases when the partnership established conditions; Packaging control for the management of returnable packaging; Sales forecast; Drawback performing the management of the materials included in this modality and audited by tax authorities; Manaus Free Trade Zone is a module that includes all the controls required by legislation in this area; WMS - Warehouse management with inventory control bar code or RFID - Radio Frequency Identification; Shipping management by controlling freight and shipments; Fleet management with the effective control of use and maintenance of the organization's vehicles.

In issue six, the question on the use of the information set of ERPS systems, we can draw in the interview that companies that have a high degree of accuracy in its information systems better use the resources offered by information technology. Some companies use the accuracy of the information to export information for BI systems

(Business Intelligence). Other business groups have low degree of maturity in relation to ERP systems and do not have the ability to leverage the information are in a single database using spreadsheets to process the data, which causes more time for reporting and cross-checking.

As for the size of the company in question seven, the consultant pointed out that few companies accomplish adhesion test when choosing the ERP that best fits your business. The adhesion test consists of a series of questions, usually distributed by departments or processes, which aim to verify the adherence of the ERP system to be chosen the organization and its processes.

A key difference pointed out by the consultant regarding the implementation process refers to the dedication of time of key users in the deployment. Large companies provide resources for a project for implementation of an ERP system can be accompanied by users who provide time for the project. Small businesses lack the resources and staff absorb the deployment tasks while performing their routine tasks, which causes higher probability of failure in the projects in this segment companies.

In issue eight was discussed with the consultant's relationship Theory of Constraints and ERP systems in manufacturing. The book The Goal, written to spread the concept of the theory of constraints in organizations, is used by many executives of manufacturing. The integration of ERP systems with the theory of constraints and so fruitful that the world-class ERP manufacturers have developed modules that address the application of the theory of constraints. Organizations interested in improving their production systems found the application and use of the APS modules (Advanced Planning and Production), using theories spread by Goldratt in his book The Goal. The consultant also highlights the high demand of organizations for the implementation of the APS systems in its operations.

In discussing tax issues in manufacturing, just to have on the horizon the delivery of the K block tax sped, the manufacturing modules of ERP systems will have fundamental importance in this delivery process this accessory obligation. As discussed in the interview, the K block is a recent requirement. Software suppliers have at the moment a new challenge, which is to face another change imposed by the government to the ancillary obligations of SPED group.

# FINAL CONSIDERATIONS

This article aimed to address the evolution of ERPs systems based on the experience of a consultant who works in the software market and has participated in over 150 projects to implement ERP systems, specifically in the manufacture of modules and materials.

We discuss the evolution of the ERP system in the last 30 years, during which time the respondent consultant has been working on the implementation of ERPs systems in manufacturing market.

We can observe during the interview that the companies in which the consultant has experience sought, over time, incorporate into its product manufacturing area trends, going from the modifications of systems to meet the requirements planning and production control, improvements to incorporate the shop floor control, and improvement for on-demand production systems, which require the use of a product configurator to meet the client's project requirements.

A point discussed and that can contribute to new studies, is the difference of the organizational culture of small medium and large companies and their respective impact on the implementation of ERP systems. It is remarkable in the interview to check that large companies go through more robust deployment processes from the point of view of the use of available resources for the project. What to consider these variables in the ERP system implementation in the manufacturing function in the organization of the size and other organizational factors, such as training of the people involved in the project and the meritocracy and motivation systems in larger organizations.

Japanese philosophies that have contributed to the improvement of manufacturing systems, has been designated by software producers according to the consultant, since long, to attach to manufacturing modules features that assist applied in manufacturing systems for the reduction of losses processes. One of the philosophies outlined in the study was the Lean Manufacturing.

Another aspect considered in this study is the relationship between manufacturing and supply chain management. Software vendors have followed the evolution of supply chain management, which integrates manufacturing with the inbound supply chain and outbound.

The limitations of this study, we can indicate the option of the interview with a

single manufacturing area consultant and implementation of ERP systems. Thus, only the impression of a consultant was considered not allowing generalization. In addition, the consultant despite the extensive experience with the implementation of ERP systems in the manufacturing area, have no experience with all market ERPs, and their impressions can be expanded to the size of companies in which the professional has experience.

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