

L'équipement de l'organisation industrielle – les ERP à l'usage

Dominique Vinck & Bernard Penz

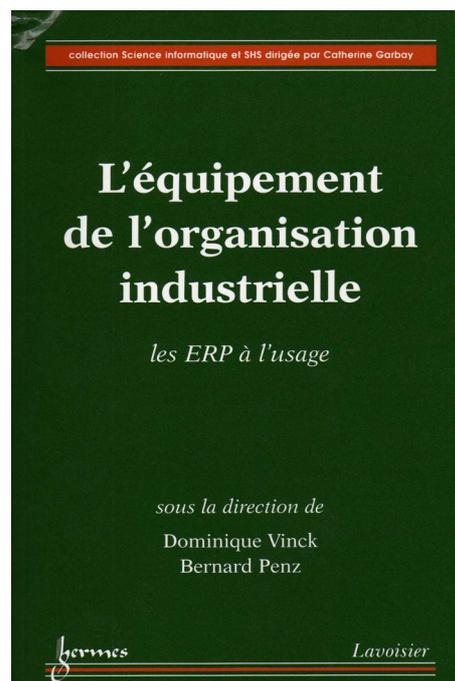
DOI: 10.3395/reciis.v3i2.260en

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The book is made up of various descriptive and critical studies about the implementation and operationalization of ERP (enterprise resource planning) or IMP (integrated management programs) in an industrial situation. ERP is information treatment technology that aims to integrate information systems into a single database for the set of industrial functions. The book's central discussion is concerned with whether ERP can or cannot form an *organizational equipment*, in the sense of changing the organization itself and its way of working and planning.

Put together by Dominique Vinck and Bernard Penz, the book presents the results of the research program "Information society" from the National Scientific Research Center (CNRS) coordinated by the Department of Information and Communication Sciences and Technologies (STIC) and the Department of Human and Social Sciences (SHS). The work counts with the collaboration of researchers and professors from five French institutions, one Irish institution, one Mexican institution and an industrial engineer, dedicated to the management of companies, business and information systems. Vinck is a sociology professor at Pierre Mendès-France University (UPMF) and at the National Polytechnic Institute at the Grenoble Industrial Engineering School and a member of the PACTE laboratory (CNRS/Grenoble University), where he co-directs the transversal device "Science-society". In a way, the book gives continuity to his previous productions: *Ingénieurs au quotidien. Ethnographie de l'activité de conception et d'innovation* (PUG, Grenoble, 1999, with an American edition by MIT Press, 2003), *Pratiques de l'interdisciplinarité* (PUG, Grenoble, 2000) e



**Hermes Science Publications,
Londres; 2008**

ISBN: 978-2746218802

Sciences et société. Sociologie du travail scientifique (A. Colin, Paris, 2007), giving continuity to research in the areas of science and innovation sociology. Bernard Penz is also a professor at the National Polytechnic Institute at the Grenoble Industrial Engineering School and a doctor in applied mathematics from the Joseph Fourier University in Grenoble. A specialist in operational research, he is particularly interested in the optimization of production and logistics systems.

According to the authors, the idea of numerical integration of companies arose in the 1960s, was formalized in the 1970s and had as its main objective the integration of the company's service and function information. The progressive emergence of the concept and of corresponding technologies necessarily went through the automated planning of the raw materials and means of production processes before it extended to a growing number of services (accounting, marketing, purchasing, human resources).

The importance of the phenomenon is due to the fact that ERP diffusion is generalized in large companies in the main industrialized countries and is linked with significant transformations in organizations, both with respect to information exchange rationalization and the instrumentation of work coordination. For the organizers, the phenomenon took place in broader movements, from which three stand out: (1) the *rationalization of work organization* inaugurated by Taylor and the emergence of successive generations of specialists in organizations who introduced a diversity of methods that affected organizational structures; (2) the *automation of production operations and processes* such as CAPM (computer-assisted production management), CIM (computer-integrated manufacturing) and MRP (manufacturing resource planning) and their evolution, both internally (automation of administrative transactions, financial analysis and costs, and externally (network organization, relation with suppliers and clients); (3) the *informatization of offices* that has been taking place for about 30 years and the subsequent development of new communication technologies in companies (especially EDI – electronic data interchange, at the end of the 1980s and the internet and intranets).

In an attempt to define it, we could say that ERP is a system of automated general resource planning, which intends to gather and integrate all the company's data (from finances to HR, including the logistical chain that links production to purchasing and sales) into a single database. It is made up of two "information layers": a generic one made up of management standards and a specific one that can be customized according to the organization's specific needs. Once they have been customized to fit the organization's particularities, the applications supposedly facilitate the circulation and aggregation of information, eliminating multiple entries and simplifying the interface between each function's own databases. The hope is that, thanks to the collection of data generated from application modules for ordinary company functions such as finances, HR and storage, the manager will have a panel of integrated and updated instruments that

will permit him to follow the activity in real time and in a transversal way. In reality, the book reveals successes and failures in reaching this initial objective, leading us to think about the possibilities for implementing these systems. One relevant fact appears right away: in spite of the more than 30,000 implementations carried out in the world, companies find these projects too risky as they consume many resources and reduce competitive advantage. The number of failures or disappointments is high: three quarters of cases, which means this technology is more demanding than promising. Almost all the companies had more than 1000 employees, with half of the companies studied that had more than 50 employees also having implemented these systems.

Considered by the authors as "the greatest phenomenon in the industrial adventure of the late 20th century", it continues to warrant attention both for its route evolutions and for the qualification of the work practice transformations associated to it. Thus the pertinence of studying the theme, since, according to the authors, the adventure is not over. Firstly, because ERP editors and integrators in organizations now aim to extend its market to PME, non-industrial organizations (public offices, hospitals, educational institutions, etc) as well as to "countries that are less industrialized or have different industrial cultures", which supposes the transformation of both the tools proposed and the organizations aimed at.

Secondly, because the companies that installed ERP quickly found out its limits: limited numerical integration and difficulty in generating "exterior" actions like supply chain management and client relations. Program editors soon proposed new applications (SCM, CRM) that tended to offer web modules for extensive support to the whole organization and that were also compatible with internet and cell phone technologies to try to numerically integrate external suppliers and users.

Thirdly because, with use, the "situation actors" (a name given to the system's users), in singular companies and services, ended up transforming these tools into *equipment* that made sense to them. This means the tools transcended the advertised functionalities, as the actors began to invent new ways of using their activities. This motivation (or hypothesis?) forms the basis of the book and its original thread, for there are few studies that reveal the history of these uses and the appropriations of these tools in companies (8.6% in the state of the art surveyed by the authors). The question of what equipment suits an organization is therefore the crux of the matter. Not simply in technical terms, but especially in relation to possible uses discovered on a daily basis by workers forced to invent a pertinent use for the tool and, in doing so, reinvent their organization, activity and function. It is a question of understanding and trying to deal with the sociotechnical dynamics that are effectively put into place in an industrial situation, that is, trying to clarify the processes of learning about the tools, the technical-economic environment and the way the company works.

This original motivation is matched by the methodological choice, which comes from the system users' problems and the way they act to make the technology usable and relevant to them. Thus, their actions deal with skills acquisition, the possibility of using the tool in a way other than planned, the adjustment of practices and routines, the identification of problems, the adaptation or rejection of the tool, the reconstruction of professional identities. They create a role, a place, a sense, a use for the tool. For these reasons, in spite of its multidisciplinary origin, the text belongs, even in its formal aspects such as emphasis on detailed description, more to the tradition of innovation and organization sociology than management, more to "return to experience" than solution recommendation. It is an ethnographic exploration inspired by studies of science and innovation sociology (Law, Latour, Callon) and clinical work analyses oriented by the activity concept (Terssac, Rabardel, Clot, Vygotsky) – although the authors don't make explicit references to this last theoretical line of work study – which is supported by field interviews, observations and open interviews. These methods try to grasp effective practices and processes, following the "actors" and the *intermediary objects*, an expression created by Vinck in another study to describe objects that appear from the interior of a situation and that relate to the dynamics of interaction. The idea is to follow them in a procedural manner, as products that are mobilized, transformed, rejected, forgotten or remembered by workers in their working life. Thus, the narrative has three entry points: the ERP project, the activity and the professional function.

Over the course of the narrative, the work proves a series of hypotheses:

- that the introduction of a prescriptive tool such as ERP opens up the question of industrial innovation more than it closes it;
- the question of what equipment is suitable for the action is at the center of the opening and the "actors in a situation's" resistance to change;
- the projectors and "integrators" are not the only ones who determine what ERP does, as users invent uses in a situation that must be analyzed in order to conclude the process of tool conception and evolution (new customization, new tool generations) so that it can be said that ERP is co-produced with the users;
- the workers, during the introduction of this type of equipment, learn things that are not central, as they work at the same time as cause and consequence of industrial change and the transformation of professions;
- the introduction of ERP is a sociotechnic process that mixes elements as heterogeneous as material artefacts, management speeches, actor games, data flow, managing methods, etc. ERP is not limited to material technologies (which originate only from scientific skills for engineers) nor to management methods, nor to philosophy, nor to managing ideology;
- the introduction of new equipment is the *locus* of a tension between a project that mobilizes industrial transformation and efficacious management routine;

- the new equipment meets activities that resist the logic brought by the tool.

The book is divided into four parts. The first, made up of three chapters, is a presentation of the ERP tool (history, evolution, potentialities) and the book's central problematic. It begins by describing its great principles and technical philosophy in relation to three great evolutions: industrial computing, industrial management and the needs of the management tool. Then, it clarifies the questions around customization, considered the tool's largest phase when it is implemented in organizations. Then there are some examples of the system's limits as when, for example, there is a desire to modify different functional models (a commercial order that should cause an external purchasing action by activating the "commercial" module and the "purchase" module) or when different teams (creators and "key users") work in parallel without fully understanding the transactions behind the customization operations.

In the second chapter there is a rigorous review of the theme's state of the art (550 scientific publications from between 1997 and 2007) and a typology is proposed about the published works, explaining the diversity of theoretical approaches used by the authors (structure theory, grounded theory or a theory based on data, structural equations, contingency theory, network-actor theory), the various disciplinary fields (sociology, computing theory, information systems, management sciences), research methodologies (questionnaire application, semi-directive interviews, speech analysis, ethnography), the themes focused on and the gaps found.

Then comes an exposition of the main theories found in literature about the connection between technology and innovation (technical determinism, social constructivism, co-construction, sociotechnical network). Thus, analysis shows that technique can be studied in different ways: emphasizing the tool to characterize its philosophy and intrinsic constraints, emphasizing the analysis of social determinants or the constructivist analysis, considering the strategies of the actors, who give sense and form to the tool and who determine its "impacts".

The last chapter of the first part focuses on the "equipment work" problematic. This is a notion the authors use to describe a productive organization that appropriates machines, management programs and work methods, putting into practice a dynamic of interaction that is defined in a situation between actors, objects and environment. In this way, "work equipment" is seen to be at the same time a result and a process. The idea is that nothing happens as long as technology is not given meaning, inserted in practices, made useful and usable in a situation, that is, valued and legitimized by its users.

It is not simply applied and used. For it to become equipment, the actors must make the instrument more plastic and construct relations between other elements which have in themselves been transformed and adapted (personnel formation, procedure and work practice trans-

formations, Excel spreadsheet and visualization table reconstruction). A two-fold task: directed simultaneously at the instruments and the work collective.

The three other parts of the book present a series of case studies in large companies, some important multinationals. The second part looks at the learning that develops from the moment new equipment is selected up to its introduction, explaining the possible problems and movements that occur in the company. The third part deals with the question of ERP based on the activity that will become a new management tool. It is a question of understanding how they equip themselves, using the instrument that is proposed or imposed on them. Chapter 7 focuses on construction of indicators, more specifically the optimization of stock management. The next chapter reflects on decision making, for there it becomes clear that ERP doesn't serve the purpose it was installed for and that the actors use a lot of creativity to make the company work.

Chapter 9 asks questions about the equipment's paradoxes. The fourth part is still based on the activity, the function, to try to understand how some functions are recomposed: how the actors' teams and equipment are reconstructed, how professional identities are altered and new professional figures emerge. In this way are explained the professional evolutions of purchase and storeroom workers (chapter 10), specialists' constructions and practices (chapter 11) and how power relations within a company emerge in the study of human resources direction (chapter 12).

A contemporary and current book that instigates thought, provokes debate and demonstrates work practices. By making a rigorous analysis of the literature dealing with the theme and showing real work, it contrasts with the management ideology treaties that some publishers have presented to readers, which are so ominous for those interested in thinking about the future of work and its management within companies. 