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## **Managing the Implementation of ICTs: A Key Strategic Capability?**

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### **Abstract**

*Part of the literature on management and information systems has presented the new generation of ICTs (especially those that are based on the Internet technologies) as the means to improve considerably communication and team work inside organisations, and therefore to gain competitive advantage. Once more, information technologies are considered as miracle tools able to solve organisational problems in firms as well as in other organisations. As we demonstrate, this discourse is not new, but has proved simplistic and has often resulted in disappointment at each stage of the development of computer technologies.*

*We argue that technological tools in that field are generally not a sustainable source of competitive advantage by themselves, one of the main reasons being product standardisation in the computer business. Therefore, the only means of differentiation between organisations is the way those technologies are used. We use both the recent literature on organisational-level research on technology implementation and a case study on the introduction of ICTs (intranet) in services of the French Ministry of Equipment, Building and Transport to show the potential influence of the process of implementation on technology usage.*

*The process of implementation therefore appears as the key factor to obtain competitive advantage. As this one lies in organisational routines which are at least partially tacit and therefore difficult to replicate, this advantage is potentially sustainable. We finally use the Resource-Based View as a framework to check the coherence of our findings with existing theories in the field of strategic management.*

The emergence of a new wave of Information and Communication Technologies (ICTs) has been one of the focal points of the management literature in the last few years. A significant part of that literature presents those technologies as able to give sustainable advantage by themselves as if there was some systematic relation between those technologies and the performance of the organisations where they are implemented.

Some of the authors even seem to forget that research work on the relations between ICTs and organisations have demonstrated that the effects of those technologies were unpredictable and destabilizing (Pouchol and Jaeger, 1992) and not pre-determined (Warner, 1984 ; Huber, 1990). Those arguments are consistent with former work of the Travistock Institute and more generally with an approach common to several academic disciplines that converge on the opposition to any technological determinism, and by their focus on "*the social shaping of technology*" (Williams and Edge, 1996). But those approaches seem to be much more developed in the sociological and economic fields than in the strategic management literature. As a consequence little has been written on the link between the management of the implementation process of those technologies and the potential competitive advantage they are supposed to bring.

This article therefore consists in demonstrating and testing this link in a strategic management view. Our demonstration is based on both recent literature on technology implementation, on existing case studies of ICTs introduction and on the in-depth field research of one of the authors (i.e. H. Chomienne) on the first stages of an intranet implementation in the French Ministry of Equipment, Building and Transport.

We first recall that each stage of the development of ITs has created equally important expectations and disappointments. Then, we demonstrate that it could be the same for the current wave of ICTs. Those technologies are subject to important network externalities that lead to standardization. Therefore, only the usage of those technologies can give a firm a sustainable competitive advantage. As we show that the management of the implementation process influences the usage of those technologies, a link is established between the management of the implementation process and an induced potential competitive advantage. Finally, this link and the sustainability of this potential competitive advantage are tested through the Resource-Based View (RBV) theoretical framework.

### **From mainframes to Internet technologies: a three stage analysis of IT implementation in organisations**

At the beginning, only large organisations were concerned by computers. The characteristic features of the 60s were the use of big mainframes that necessitated huge investments but had become reliable and effective enough to deal efficiently with the growing needs of data processing in large firms. According to Somogyi and Galliers (1999) « *by the late 1960s most large corporations had acquired big mainframe computers [and] the era was characterized by the idea that 'large was beautiful'* ». The arrival of mini computers, much more flexible and cheaper, contributed to an acceleration of the diffusion of computer technologies at the beginning of the 70s without fundamentally changing the

managerial view of those technologies. This first stage of ICTs implementation in large organisations raised questions of two types:

- the management of information systems conception projects;
- the management of their implementation and their effect on the organisation.

But if an actual evolution can be perceived concerning the development of those systems, the second aspect has often been neglected because of a dominant focus put on technical problems. Thus, many unrealistic expectations, in terms of management, planning, organization and control, were attached to the installation of a computerized management information system (Somogyi and Galliers, 2000). Managed by people with technical (computer science) backgrounds without in-depth socio-organizational analysis, those projects tended to focus on data management problems more than on information management concerns (Allen & Scott Morton, 1995).

At the end of the 70s, microcomputers and workstations began to be widely used in various types of organisations. At this second stage, computers were no more just a matter of specialists. Those tools were often implemented directly by users on the initiative of their operational units whereas information services often considered those tools as gadgets and high-level management generally only saw potential gains in work efficiency at the individual level. This approach was congruent with the dominant idea that « small was beautiful » and a growing focus on decentralisation, flexibility and reactivity - all effects that the implementation of microcomputers were supposed to produce. But later research has shown that the arrival of microcomputers had had important socio-organisational effects especially in terms of competences, roles, work organisation (Alter, 1985), and operating procedures questioning (Gollac *et al.*, 1996). And because of the relative lack of concern of managers (and of scholars in the management field until the nineties), those important effects were neither mastered nor even often “channelled” (Alter, 1985) and therefore often produced unexpected results (Huault, 1996/97) in addition to an important heterogeneity in technical choices.

Since the beginning of the nineties, the stress has been put on the networking of those different types of computers. The emergence of the Internet has accelerated this trend providing a range of "universal" technologies facilitating the interconnection of networks at an intra-organisational as well as at an inter-organisational level. We argue that this is really a third stage in the implementation of information technologies in organisations. It can be presented as a merger between the two preceding approaches. Because they can connect a wide range of users of different organisations, the implementation of those technologies necessitates both standardisation and some adaptation to the different kinds of users. The role of the top management therefore becomes important to ensure congruency of the general strategy of the firm and its socio-organisational features on the one hand and its strategy in terms of information systems and the features of their technical platforms on the other hand (Allen & Scott Morton, 1995). This articulation between strategic planning and information systems planning appears especially important when one not only expects gains in terms of effectiveness and efficiency but also a significant competitive advantage (Dewett & Jones, 2001). Nevertheless, although this necessary articulation is now widely recognised (Gottschalk, 1999), some of the expectations associated with this new wave of ICTs seem to indicate the persistence of a techno-deterministic view. It is therefore not surprising that the first researches on the implementation of those technologies insist on the difficulties faced by the organisations

implementing those new ICTs (Teo & Ang, 2001) as well as on unexpected results such as a growing weight of hierarchy in some processes (Schwarz, 2002 ; Muhlmann, 2001) or usages different from those that were planned (Orlikowski, 2000).

The technologies used during those three different stages have resulted in different opportunities and constraints, such as centralisation, decentralisation and then globalisation of information flows and interaction modes in organisations. But all those technologies seem to have create unrealistic expectations based on the same techno-deterministic view of their implementation. Lessons gained from previous experiences seem to be questioned by each new wave of ICTs as if they become as obsolescent as the technologies themselves. This is why we argue that this is so important to question the link between ICTs and the potential competitive advantage they are supposed to bring.

### **Are ICTs themselves potential tools for gaining competitive advantage?**

Such an approach centred on the technology itself would be justified only if the technical features of the implemented ICTs were able to bring direct benefits in terms of competitive advantage. But we can show that this is rarely the case.

The first reason is that most of those technologies are available on the market. So, if a firm gained a visible advantage over its competitors thanks to the implementation of such a technology, those competitors would probably imitate it quickly. As stated by Barney (1991) a resource can be a source of competitive advantage only if it is hard to imitate and non-transferable. Of course, it can take some time before competitors identify the technology as a source of technological advantage, but it would be in the interest of the vendor of this 'miracle' technology to diffuse the information (see for example Oracle advertising campaigns presenting the benefits of the implementation of its products for identified customers). Another objection could be that a firm investing in a technology incurs irreversible costs that can make it difficult for it to switch to another technology, even if it appears to be more performing (see for example Shapiro and Varian, 1998). But we argue that a structural trend toward standardization exists in ICTs industries, that diminishes the potential differences between products.

This is the second reason why we argue that a sustainable competitive advantage cannot be gained through the technologies themselves. Examples for standards in this industry are numerous both for hardware and software products: the PC is a dominant design made of several standards, modems, faxes or mobile phones respect international norms (e.g. V90, V92, GSM), even word-processors keep to Microsoft Word compatibility. The explanation for this trend mainly lies in network externalities. The value of certain technologies rises when the number of users of that technology grows (Katz and Shapiro, 1985). This is especially true for ICTs, not only for telecommunication networks, but also in the computer and software markets (Langlois, 1992 ; Campbell-Kelly, 2001). Due to a high proportion of R&D costs, scale economies are also important in those sectors (Williams and Edge, 1996). This is why we argue that this trend toward the emergence of standards is a structural one. Constrained by those standards, competitors in the market face difficulties to differentiate from each other. Another feature of those markets still

reinforces this trend: it is often difficult to protect a technology from imitation whether because patent applications are often rejected (software) or because the main competitors are linked with each other by global cross-licensing agreements (see Grindley and Teece, 1997). Therefore, at least after a standard or a dominant design has emerged, the differences between the competing products are generally too small to ensure a significant competitive advantage to the user of such a technology over users of competing technologies. Those differences can be more important in the case of new technologies, still in their fluid phase (in accordance with the Abernathy and Utterback model: Utterback and Abernathy, 1975 ; Abernathy and Utterback, 1988), but investing in such technologies can be very risky precisely because the main features of the products are not stabilised and the standard has not emerged yet.

Of course, the fact that competitive advantage rarely lies in the technology itself does not mean that a firm cannot gain a sustainable competitive advantage from investment in ICTs. We simply argue that this advantage comes more from technology usage than from the technology itself.

### **Technology usage as a differentiating factor**

Orlikowski (2000) distinguishes between technology as an artefact and “technology-in-practice”. She argues that technology not only shapes users’ action but is also shaped by users: “*in their recurrent practices, users shape the technology that shapes their use*” (*Ibid.* : 407). Many studies confirm the role of users’ *enactment* of technologies. Although the features of ICT global systems such as intra/extranets (standardization, interconnectedness and interdependence) may imply that they are less malleable than second stage computer technologies (Orlikowski, 2000), those studies show that users still shape significantly ‘technology-in-practice’. Williams and Edge (1996) insist on the “customisation” of integrated applications. Orlikowski (*op.cit.*) illustrates her theoretical analysis by an empirical study of the different uses of the same basic product (Lotus Notes) in three different structures. Muhlman (2001) shows that the implementation of a bundle of groupware products on salesmen’s portable computers has resulted in very differentiated usages of the different tools depending on the strategic interest of the actors. Beaudouin *et al.* (2001) show the importance of the initiative and creativity of some individuals in the shaping of the intranet of France Telecom.

We can show that those different usages influence the company performance. Orlikowski (2000) infers three types of enactment of Lotus Notes:

- *Inertia*: users utilize technology to retain their existing practices. This structural status quo may hardly induce significant gains in performance.
- *Application*: users utilize technology to improve their existing way of doing things. In that case there is a significant improvement of work processes, but without structural change.
- *Change*: the introduction of the new technology is the support of structural change. This latest case is the type of usage that may result in the most important gains in performance although they are not automatic.

This analysis shows that the way users utilize new technologies will be different from an organization to another depending on the existing structures, work practices or corporate culture and that it results in different gains in performance. Therefore, although technology as an artefact can rarely be a sustainable source of competitive advantage in the case of ICTs, it can be the case for technology-in-practice. But this observation is really useful only if managers can influence the way those technologies are used.

### **Usages of ICTs and the process of implementation**

Sociological approaches to this problem often insist on existing structural features as determining factors of technology usage. But the role of managers should not be underestimated. Managers control some of the resources that can influence technology usage such as company-sponsored training, resource support or recruitment of new employees experienced with the technology (Gallivan, 2001). They also control the limits of freedom in the usage of technologies to a certain extent (this is never a total control). Beaudouin *et al.* (2001) show that the will of upper-management to encourage creativity among employees have resulted in a high degree of freedom (sometimes misunderstood by the middle management) given to France Telecom employees in their usage and direct shaping of the company intranet, notably through personal pages and forums.

According to Orlikowski and Hofman (1997), the effectiveness of the implementation of ICTs in firms depends on their capability to align three key dimensions which are the technology, the organisational context and the change model used to manage change. The interaction among these three dimensions must be compatible in order to adapt both the organisation and the technology to changing organisational conditions but also to use existing practices and technological capabilities. In such an environment, managers should dedicate resources to provide ongoing support for a change process considered as made up of opportunities and challenges which are not predictable at the start. This requires attention on the part of individuals in the organisation to identify and recognize opportunities and unexpected outcomes as they arise and initiate organisational and technological adjustments that will enable to overcome or take advantage of them. Management should create a suitable overall framework based on shared set of values and norms that guide the ongoing change process.

Scarbrough *et al.* (1999) call for the reinforcement of the link between ICTs and human needs and suggest to focalise on people management issues and organisational development. In order to recognise new development as an opportunity, organisational members should consider the situation they are facing as generating a potential holding meaningful gain and that they will be able to stretch existing capabilities by accessing to competencies and resources (Hamel, 1994; Barney, 1991) necessary to develop that potential (Dutton and Jackson, 1987).

## **A paradoxical management problem**

The management of the implementation of ICTs is therefore a rather difficult task. The balance between planned processes and areas of freedom, creativity and users' appropriation of technologies depends on the main objectives of the introduction of the technologies (notably in terms of structural change), and the context in which those technologies are implemented. This fit between goals, context and implementation process is critical. Gallivan (2001) cites the example of a large company in the insurance field that had been conservative in the use of ITs until the implementation of client/server development technologies in their Information Service (IS) division. One of the goals of this implementation was to change the roles and skills of the employees as well as the culture of the IS division considered as "not very customer-oriented". The implementation process was centrally planned, with extensive financial support and training facilities. This rather bureaucratic process, reflecting the organisational culture of the company and responding to the expectations of the IS division employees, led to a success in terms of technology diffusion but not in terms of cultural change. This illustrates the difficulty of such a case, because if the direction had decided to create a cultural change by modifying the usual way of making change in this company, the risk would have been high to result in a failure in the adoption of the technology itself.

This paradoxical situation can be partially resolved through the inclusion of a dynamic dimension. A succession of swaying movements between directive and participative periods may permit to challenge the existing structure (whether it is considered as too centralised or too decentralised) without a frontal opposition between this structure and the implementation process. This is congruent with Tyre and Orlikowski's (1993) analysis of the process of adaptation to new technologies. According to them, this adaptation occurs in a discontinuous pattern with bursts of adaptive activity followed by periods of stability. The role of management is then to create "windows of opportunities" to burst adaptive change and to validate and institutionalise the changes at the end of those periods. The periods of intense adaptive change can be supposed to be more participative. Therefore, there is a natural swaying movement that can be intensified or softened, for example by direct implication of the management in the adaptive process. Martinet (2001) utilizes the term of "equilibration" to refer to such a way to manage paradoxical problems. It adds a dynamic dimension to the concept of equilibrium.

While considering the problem of new technologies, one of the advantages of presenting the problem of new technologies implementation as an equilibration process is to show how complex a management problem it is and therefore how it can be a source of sustainable competitive advantage.

## **An example : the case of the French Ministry of Equipment, Building and Transport**

After ten years of implementation of microcomputer applications, the French Ministry of Equipment, Building and Transport has decided to change its management of the process in a way that illustrates both the (non)management of computer projects during the second phase and the new need for "channelling" this process while keeping some freedom for users in their enactment of the technology in the third one. One of the authors has been directly involved in the process. He managed think tanks inside the Ministry (more precisely in decentralised services of this Ministry) and conducted about one hundred individual and collective interviews (for more details about the methodology, see Chomienne, 2001).

From the mid-eighties to the mid-nineties, the process of implementation of microcomputer applications was clearly decentralised. The actors involved in the process recognise that many qualitative gains can be imputed to those ICTs (i.e. office automation applications, technical applications, workgroup applications, PC networks and electronic mail) and that they have become indispensable in their work, but also that they consumed an increasing share of the resources. The managers also regret the lack of homogeneity of those tools and more generally the absence of control on the process. As a result, they experienced difficulties in justifying the use of financial resources allocated to their services by formalised gains in performance.

In that context, the Ministry management decided to elaborate a "computerisation plan" consisting in the formulation and management of an implementation strategy aimed to:

- reduce uncertainty entailed by the previous stage of ICTs implementation thanks to an organisation-wide diagnostic phase;
- channel the action of the different actors in the sense of the strategic goals of the organisation while giving some latitude to users in their appropriation of the technology.

In the specific context of this Ministry, structures are compartmentalised and geographically spread out in more than a hundred medium decentralised units and many small territorial sub-units. Decentralized unit's directors expect the new wave of ICTs to help to manage the paradoxical situation of their services. The reduction of financial and human resources has led to a situation where many of their territorial sub-units may become too small to be really effective while the merger of some of those sub-units would be very difficult to realise from a political point of view. Nevertheless, many actors are sceptical about a mechanical link between the implementation of computer-based networks and the reality of a network organisation.

The "computerisation plan" therefore appears to be a tool that can help both to accelerate the process of diffusion and infusion of those technologies (it attributes specific roles of project managers to some individuals, especially directors of those services) and to link the reflections about ICTs implementation to the wider problem of managing the dispersion of operational units in a context of diminishing resources. The process itself, involving strategic reflection, information exchange and discussion between the different actors involved is designed to be a first step

towards a more cooperative organisation. It can also help to clarify the role of services and actors in this organisational and technological change, which had been disturbed by the previous phase of ICTs implementation. Finally, it could be a tool for organisational learning in the field of ICTs implementation management, limited to local and informal networks, up to now.

Although it is too soon to evaluate the results of this process, this case reveals the potential benefits that can be gained from a managed process of implementation combining organisational concerns and some latitude for local actors. It also shows that it is at least as important to design the implementation process in relation with the strategic goals pursued by the organisation as to choose the right technologies.

### **Is the ability to manage ICTs implementation a potential source of sustainable competitive advantage?**

We have showed that ICTs could rarely be sources of competitive advantage by themselves, but that the main factor of differentiation between firms was the way those technologies were used. We have also demonstrated that the implementation process had an influence on technology usage and that it was a complex management problem. Therefore, our proposition is: *the ability to manage ICTs implementation can be analysed as an organisational competence that is likely to be a source of competitive advantage for its owner.*

We have chosen to use the Resource-Based View (RBV) framework to test the plausibility of this proposition. One of the main contributions of this approach is precisely to propose a framework to evaluate if a firm resource can be a sustainable source of competitive advantage. According to Priem and Butler (2001), the most widespread framework used in the RBV literature was proposed by Barney (1991). The argument is that resources that are both rare and valuable can give competitive advantage, and that those which are simultaneously neither (easily) imitable, substitutable nor transferable may produce a sustainable competitive advantage. As outlined by Priem and Butler, these conditions are necessary but not sufficient. So they can be used only to demonstrate a potentiality in producing competitive advantage. This model therefore appears adapted to test if the ability to manage the implementation of ICTs is a *potential* source of sustainable advantage. We confront this competence to each of those conditions.

- **Rarity.** According to a Peat Marwick survey on 300 large companies at the end of the nineties, 65% of IT projects were considered as failures, whether in terms of delays, budget and/or performances (Pinto and Millet, 1999). Various studies confirm the difficulties of many organisations in implementing information technologies. This suggests that the ability to manage the process of implementation of such technologies is far from being a competence possessed by every organisation. Therefore, it can be considered as “rare”.
- **Value.** A resource is considered as valuable if it contributes to firm efficiency or effectiveness. We have shown that the way the process of implementation was managed

influenced the technology-in-practice. This technology-in-practice can result in inertia, application or change with very different results in terms of performance. In other terms, there is a relation between the process of implementation and the way the technology enhances the efficiency of the organisation.

- **Imitability.** A resource will be harder to imitate if it consists in complex organisational routines (Grant, 1991) and is difficult to codify tacit knowledge (Teece *et al.*, 1997). Of course, it is always possible to codify part of the process of ICTs implementation, but part of the adoption and “enactment” process keeps too complex to be fully codified. The subtle balance between planning and freedom, necessary to ensure an effective use of these technologies, cannot be reduced to written procedures. Moreover, as the actors and the structures change, it is not possible to reproduce the same process management with the same results whether at another period of time or in another organisation.
- **Substituability.** As the way the process of implementation is managed is not the only factor influencing the result of the introduction of new ICTs in an organisation, some other resources (e.g. individual technical competences) can be partially substituted to a better implementation process. Nevertheless, we argue that no other factor is perfectly substitutable as the process of implementation will always have some influence on the results.
- **Transferability.** This concept refers to the possibility to purchase such resources on markets. Can the ability to manage ICTs implementation be purchased on a market? A priori, the answer could be yes. Consultants apparently sell such a competence. But a deeper analysis shows that the contribution of a consultant can be analysed only in relation with the organisation he is working for, especially its organisational routines and structures. In other words, the effectiveness of such an intervention depends partially on the features of the client organisation. It is therefore impossible to purchase the whole mastering of the process of implementation, although some competences can be hired to help manage this process.

With all those conditions respected, we can affirm that the ability to manage the process of implementation of ICTs is a potential source of sustainable competitive advantage. As a consequence, in a period of technological mutation partly based on a new wave of ICTs, it can be considered as a key strategic competence.

The managerial process of implementation of ICTs has often been neglected both in the academic literature and in many organisations. It has resulted in disappointments in proportion with the unrealistic expectations of some managers and gurus. We demonstrate that this is a serious deficiency as the analysis of the literature and some case studies show that the results of the implementation of new technologies depends heavily on this managerial process. The example of the French Ministry of Equipment, Building and Transport illustrates this will to channel actors behaviour while letting them with sufficient latitude. This article emphasises the fact that the implementation of ICTs cannot be dealt with without considering the fit between technological implementation on the one hand, and managerial and organisational processes on the other hand. Obviously, much work still needs to be

done to end up in operational prescriptions. It is therefore only the first step of a long term research work.

## References

- Abernathy, W.J. & Utterback, J.M. (1988) "Patterns of Industrial Innovation" in Tushman, M.L. and Moore, W.L. (editors), *Readings in the Management of Innovation*, HarperBusiness, New-York, p. 25-36
- Allen, T. J., Scott Morton, M. (1995), *Information Technology and Corporation of the 1990s: Research Studies*, New York: Oxford University Press
- Alter, N. (1985), *La bureautique dans l'entreprise : les acteurs de l'innovation*, les Editions Ouvrières
- Barney, J.B. (1991) "Firm resources and sustained competitive advantage", *Journal of Management*, vol. 17, p. 99-120
- Beaudouin, V.; Cardon, D. & Mallard, A. (2001) « De clic en clic – Créativité et rationalisation dans les usages des intranets d'entreprise » (Creativity and rationalization in using company intranets), *Sociologie du Travail*, vol.43, n°3, p. 309-326
- Campbell-Kelly, M. (2001) "Not Only Microsoft: The Maturing of the Personal Computer Software Industry, 1982-1995", *Business History Review*, vol.75, p. 103-145
- Chomienne, H. (2001), *Le rôle du management dans la modernisation des organisations administratives françaises : le cas de l'informatisation de services déconcentrés du Ministère de l'équipement*, unpublished doctoral thesis, University of Versailles Saint-Quentin-en-Yvelines
- Dewett, T. & Jones, G. R. (2001) "The role of information technology in the organization: a review, model, and assessment", *Journal of Management*, n°27, p. 313-346
- Dutton, J. E., & Jackson, S. E. (1987) "The categorization of strategic issues by decision makers and its links to organizational action", *Academy of Management Review*, vol.12, p. 76-90
- Gallivan, M.J. (2001) "Organizational Adoption and Assimilation of Complex Technological Innovations: Development and Application of a New Framework", *The DATA BASE for Advances in Information Systems*, vol.32, n°3, p. 51-85
- Gollac, M.; Mangematin, V.; Moatty, F. & de Saint Laurent, A. F. (1996) « A quoi sert donc l'informatique ? » in Foray, D. & Mairesse, J. (dir.), *Innovations et performances*, Editions de l'Ecole des Hautes Etudes en Sciences Sociales
- Gottschalk, P. (1999), "Implementation of Formal Plans: the Case of Information Technology Strategy", *Long Range Planning*, vol. 32, n°362-372
- Grant, R.M. (1991) "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation", *California Management Review*, vol.34, Spring, p.114-135
- Grindley, P.C. & Teece, D.J. (1997) "Managing Intellectual Capital: Licensing and Cross-Licensing in Semiconductors and Electronics", *California Management Review*, vol.39, n°2, p. 8-41
- Hamel, G. (1994) "Strategy as Revolution", *Harvard Business Review*, juillet-août, p.69-82
- Huault, I. (1996/97) « Micro-informatique et organisation du travail : paradoxe et complexité d'une relation », *Revue de Gestion des Ressources Humaines*, n°20, p. 19-40

- Huber, G. P. (1990) « A theory of the effects of advanced information technologies on technologies on organizational design, intelligence, and decision making », *Academy of Management Review*, vol. 15, n°47, p. 47-71
- Katz M.L. & Shapiro C. (1985) "Network Externalities, Competition and Compatibility", *American Economic Review*, vol.75, n°3, p. 424-440
- Langlois, R.N. (1992) « External economies and economic progress : The case of the microcomputer industry », *Business History Review*, vol.66, n°1, p. 1-50
- Martinet, A.C. (2001) "Le faux déclin de la planification stratégique" in Martinet, A.C. et Thiétart, R.A. (dir.), *Stratégies : actualité et futurs de la recherche*, Vuibert, Paris, p. 175-193
- Muhlman, D. (2001) "Des nouvelles technologies à l'image des vieilles organisations" (New technology in the likeness of old organizations), *Sociologie du travail*, vol.43, n°3, p. 327-347
- Orlikowski, W.J. & Hofman, J.D. (1997) "An Improvisational Model for Change Management: The Case of Groupware Technologies", *Sloan Management Review*, vol.38, n°2, p. 11-21
- Orlikowski, W.J. (2000) "Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations", *Organization Science*, vol.11, n°4, p. 404-428
- Pinto, J.K. & Millet, I. (1999), *Successful Information System Implementation – The Human Side*, Project Management Institute
- Pouchol, M. & Jaeger, C. (1992) « Codes et désordres dans les bureaux » in Linhart, D. & Perrault, J. (eds), *Le travail en puces*, PUF
- Priem, R.L. & Butler, J.E. (2001) "Is the resource-based "view" a useful perspective for strategic management research?", *Academy of Management Review*, vol.26, n°1, p. 22-40
- Scarborough, H.; Swan, J. & Preston (1999), *KM : A Review of Literature*, London: Institute of Personnel and Development
- Schwarz G.M. (2002) "Organizational hierarchy adaptation and information technology", *Information and Organization*, article in press
- Shapiro, C. & Varian H.R. (1998), *Information Rules. A Strategic Guide to the Network Economy*, Harvard Business School Press
- Somogyi, E.K. & Galliers, R.D. (1999) "Information technology in business: from data processing to strategic information systems" in Galliers, R. D.; Leidner, D. E. & Baker, B. S. H. (editors), *Strategic Information Management*, Butterworth Heinemann, p. 1-24
- Teece, D.J.; Pisano, G. & Shuen, A. (1997) "Dynamic Capabilities and Strategic Management", *Strategic Management Journal*, vol.18, n°7, p. 509-533
- Teo, T.S.H. & Ang, J.S.K. (2001) "An examination of major IS planning problems", *International Journal of Information Management*, n°21, p. 457-470
- Tyre, M.J. & Orlikowski, W.J. (1993) "Exploiting Opportunities for Technological Improvement in Organizations", *Sloan Management Review*, vol.35, n°1, p. 13-26
- Utterback, J.L. & Abernathy, W.J. (1975) "A Dynamic Model of Process and Product Innovation", *Omega*, vol.3, n°6, p. 639-656
- Warner M. (1984) « New technology, work organizations and industrial relations », *Omega*, vol. 12, n°3, p. 203-210
- Williams, R. & Edge, D. (1996) "The social shaping of technology", *Research Policy*, vol.25, p. 865-899