Institutionalism and Information Systems: Current State of the Art and Position of French Research

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CURRENT STATE OF THE ART AND POSITION OF FRENCH RESEARCH

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ABSTRACT

The various currents of institutionalism are used in management science, particularly in the area of information systems. Richard Scott's global model is a fertile framework for the analysis of institutional research. First, we will study the contributions of French research to institutionalism. Then, returning to the fundamentals of information systems (IS), we will show that the interaction between institutions and IS can be analysed via the notion of formal and informal rules. Research carried out at the University of Paris Ouest Nanterre La Défense provides several illustrations, particularly on virtual worlds.

Keywords: Institutionalism, information systems, rules

1. INTRODUCTION

Institutional theory is frequently employed by various disciplines in the social sciences and in many research areas. We will attempt to shed light on the following two questions, even if we are unable to provide definitive answers to them:

1. Does French institutionalism have its own particular characteristics ?

2. Can information systems (IS) be linked to institutions ?

We will draw on the theoretical framework of W. Richard Scott (2008) in our presentation of French institutionalism as well as in our investigation of the links between information systems and institutions. Scott gives a broad definition of the concept of institutions: "Institutions are comprised of regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life." Scott (2008, p. 49). Thus, institutions are multidimensional social structures made up of symbolic elements, social activities and material resources. They are relatively resistant to change and have a kind of solidity which enables them to maintain themselves and persist through time. One of the central questions of institutional theory lies in the study of the evolution of institutions, organisations and actors.

Scott characterises the currents in institutional research in three main pillars:

- the regulative pillar: institutions constrain and regulate the behaviour of actors through rules

- the normative pillar: institutions produce norms and values which help define the goals to attain and describe how to do so

- the cultural-cognitive pillar: institutions are cultural-cognitive structures which promote the sharing of meaning and the internalisation of behaviour

Of course, these three pillars are not mutually exclusive.

The present article is organised as follows: using Scott's general framework as outlined above, the first section examines the main contributions of French institutionalist researchers. The second section analyses the proximity between institutions and IS. The third section shows that institutionalism is very much alive in the IS practices of companies and how it is used in IS research. Finally, the last section presents our ideas on the interaction between formal and informal rules and IS.

2 THE FRENCH INSTITUTIONALIST CURRENT OF THOUGHT

Institutionalism has a long history in the disciplines of economics, sociology and political science, but also in the field of management science. This tradition, which slipped into the background for a while, has made a comeback in France in the past fifteen years with the adoption of two terms: neo-institutionalism (the term generally used in other countries) and the theory of conventions. We propose to trace the history and renewal of institutionalism in France, adopting a global rather than a disciplinary view of "social science". (A. Caillé, 2001)

2.1 French Institutionalism

We will highlight the French institutionalist tradition by presenting four scholars who, in our opinion, have focused on the essential characteristics of institutionalism in

their work.

2.1.1 Emile Durkheim (1858 -1917)

How can people come together in a society which is becoming ever more individualistic? This is the question that Durkheim posed in the context of industrialisation. Traditional societies were based on a mechanistic solidarity involving collective behaviour (the normative pillar) and only slightly differentiated production activities. This solidarity rested on proximity, resemblance and the sharing of history and values (the cultural-cognitive pillar) by human communities. In industrial society, solidarity is founded on interdependence and complementarity. The division of labour (the regulative pillar) creates a social function between human beings. The social fabric may be prone to dysfunction; the division of labour taken too far and/or too specialised may lead to isolation. Social ties might break down if isolation were to triumph over solidarity and sharing in the community.

2.1.2 Maurice Hauriou (1856 - 1929)

Writing on public law and sociology, this scholar emphasises the connection between institutions and the law. Working in an evolutionist framework, he developed a theory of institutions where the institution is a project which is realised and persists legally within a social context. In order to realise this project, an authority, a structure and procedures are created. Hauriou identifies two categories of institutions: living and inherent. Living institutions need the law (the regulative pillar). Inherent institutions are the result of a dual process of incorporation and personification. Through the process of incorporation an institution can no longer be reduced to its component individuals; it acquires individuality. The process of personification creates the effective community through the communion of the institution and individuals (the cultural-cognitive pillar).

2.1.3 François Perroux (1903-1987)

This scholar advocates an interdisciplinary and globalising principle for analysing capitalism. The aim of political economy should be to make reality intelligible by taking into account the historical fullness of social events and through the use of an inductive method. He criticises orthodox economics which cuts itself off from the other social and human sciences by limiting itself to an axiomatic system removed from the real state of the world. Hence François Perroux calls for an "economics of the human race" just as his pupil, Henri Bartoli (1918-2008), would later call for "multidimensional economics".

2.1.4 Pierre Bourdieu (1930-2002)

According to this scholar, the capacity of dominant agents to impose their cultural and symbolic productions (the cultural-cognitive pillar) plays an essential role in the reproduction of social relationships. Symbolic violence is the ability to have the arbitrariness of these symbolic productions misconstrued and hence accepted as legitimate. The differentiation of social activities has led to the formation of social "sub-spaces" which Bourdieu calls fields. Possessing relative autonomy, these fields are hierarchically ordered and their dynamics stem from the competitive battles waged by social agents. Bourdieu also developed a theory of action based on the concept of *habitus*. Social agents develop strategies founded on a small number of dispositions acquired through socialisation which, albeit unconsciously, are adapted to the necessities of the social world.

2.2 French Neo-institutionalism

There are several currents of thought in France which can be considered neo-institutionalist. The first is very clearly aligned with the international current known as New Institutional Economics. The second, made up of economists and sociologists, is called the theory of conventions or economics of conventions. Finally, it is worth mentioning one last current: the economics of institutions or the economic analysis of institutions. [1]

2.2.1 New Institutional Economics

A recent publication coordinated by E. Brousseau and J.-M. Glachand (2008) assembles the main French scholars of new institutional economics as well as other authors of various nationalities. Although the core discipline here is economics, this book is faithful to the institutionalist tradition insofar as it makes connections with law, organisational theory and management, in particular the theory of resources. [2]

In this book, P. Garrouste and S. Saussier show that the strict theoretical separation between market and hierarchy prevents us from describing the subtleties of alternative economic and social modes of coordination that have been set up in companies.

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[1] B. Lemennicier (1995), who can be said to belong to the anarcho-liberal or libertarian tendency of the economics of institutions, drew on an article on the history of patents in the 19th century (Machlup & Penrose, 1950), for a lecture on the intellectual property of inventions.

[2] The theory of resources is rooted in the work of Penrose (1959) who incidentally also worked a great deal on patents.

Eric Brousseau investigates the imperfection of contracts and the necessity of adopting broader institutional frameworks to remedy this.

Analysing governance mechanisms together with socio-cognitive problems, E. Raynaud observes that there is no optimal solution to company organisation. Hierarchies, hybrid solutions and markets must be considered as complementary design tools.

The analysis of power-grid industries (J.-M. Glachand, Y. Perez) reveals that de- and re- regulation reforms depend on initial conditions relating to technology and the structure of power. Reforms are progressively implemented through the interplay of different powers which are themselves evolving. As decision-making mechanisms are weakly linked, the results of these reforms are hard to predict, their efficiency is not guaranteed and the risk of failure cannot be ruled out.

Among the French scholars who can be associated with new institutional economics, we should mention Marie-Laure Djelic (2006, 2003), although she is nearer to the area of corporate management. Her most recent publications are about transnational institutions and her conception of institutions is similar to that of R. Scott.

2.2.2 French convention theory (*l'économie des conventions*)

"Conventions" – shared analytical frameworks without which no form of exchange would be possible – are a system of reciprocal expectations between people about each other's behaviour. In order to have exchange and coordination, there must be either formal "conventions" (contracts, agreements) or informal "conventions" (tacit rules). The convention can therefore be seen as a framework in which conflicts are conceived, instigated and resolved. The following questions are raised: How are conventions developed ? What principles and references are they based on ? The "economies of worth" model (Boltanski & Thevenot, 1987) attempts to answer these questions by rejecting the cleavage between the sociological view that social ties are founded on rules, habits and cultures and the economic view whereby trade and the flow of goods through markets and its power equations are the source of human relationships. According to these scholars, the possibility of ties forming between people depends on systems of shared equivalences: the economies of worth. These systems of equivalence allow each individual to find his bearings in worlds ruled by the coherence of the principles which operate there. The authors identify the inspired world (artists), the domestic world (family), the world of fame, the civic world (the common good, the law), the market world and the industrial world (science). These different worlds mobilise very different systems of equivalence. Incidentally, French convention theory has given rise to the publication of a book on management (Amblard, 2003).

From this short survey, we can conclude that French institutionalist research bears the following characteristics: a multidimensional and multidisciplinary approach, the organisation seen as an open system and an approach to complexity based on limited rationality. These characteristics are found in every institutionalist current and do not therefore constitute a fundamentally distinctive national feature.

# 3 PROXIMITY BETWEEN INSTITUTIONS AND INFORMATION SYSTEMS (IS)

Our intention here is to analyse the proximity of the concept of institution to that of information systems. Generally speaking, the purpose of IS is to process the information in organisations. We will present our ideas beginning with the concept of information and then move on to that of IS.

3.1 Review of the definition of information

The earliest theoretical contributions to the concept of information are found in the work of Shannon (1949). Information is one dimensional: a code travels along a communication axis. This technician's view of information was completed by the administrators; they attached meaning to the code. Information thus became two-sided; technology deals with the code and meaning is attached to it (or not) by people. It is worth comparing this duality of information to the concept of the sign found in the Saussurian school of linguistics (1916). For Saussure, the linguistic sign is a psychic entity with two facets: the signifier and the signified. The relation between the signifier and the signified is arbitrary; it depends on collective habits or conventions. The main consequence of this two-part conception of the sign is that there is no problem of contingency because any reference to the outside world has been removed; we are operating in a closed internal system, that of signs. Administrators initially adopted the same approach, excluding the world that the information referred to. This is the case for example when one agrees that a profitability indicator must reach a specific value for the project in question to be accepted, without taking the project's nature or context into account.

The school of pragmatism proposes to go beyond this dual view. Peirce (1931, 1935) defines the sign as something which conveys knowledge about something else. For Peirce, the sign is triadic, made up of a signifier, a referent and an interpretant. This triad fits information systems perfectly. The signifier can be likened to the code of information. The referent is the object in the real or imaginary world which is related to the signifier. The interpretant is the rule of interpretation which can explain the present and future relationship between the signifier and the referent (see *figure 1*).

Figure 1 : Triadic information (Quinio, 1998)
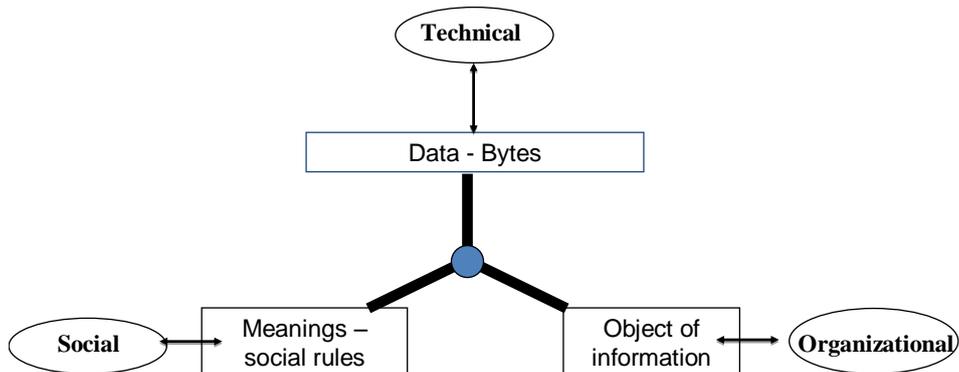
A space for choice comes in between the code handled by technology and the object of the information defined by the rules of the organisation. The interpretant or rule of interpretation depends on the cognitive process of the actors. (Quinio, 1998).

This triadic view of information involves the intervention of human beings, working within organised systems, who attach meaning to the information they use. Formal rules are present in the referent of the information and informal rules in the mind of the interpretant.

The proximity of this definition of information to the institutional approach is evident as it comprises interactions between rules, technical resources as well as human and social components.

3.2 Review of the French school's definitions of IS

Jean-Louis Le Moigne was the first to define IS drawing heavily on systems theory. Without delving into the richness of this great researcher's work[3], we will note that he considered IS to be a double interface between IT (technical) and organisation, on the one hand, and the organisation's performance management system and

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[3] Systemics, modeling, and constructivist epistemology greatly inspired by Peirce's pragmatism and Simon's neo-positivism.

operational system on the other (Le Moigne, 1986).

Robert Reix, who worked hard to have IS recognised in the field of management science, proposes the following definition: "...an organised set of resources: hardware, software, personnel, data, procedures enabling people to acquire, process, store and communicate information... in organisations." (Reix, 2004).

Jean-Louis Peaucelle sees IS as a communication language built to represent the organisation's activity. The efficiency of its representation mechanisms lies in the repetivity of the organisation's acts (Peaucelle, 1981).

Finally, and more recently, for Frantz Rowe and Rolande Marciniak, "an IS is a system of social actors who memorise and transform representations via information technologies and operating modes." (Marciniak & Rowe, 2009).

Each in its own way, these definitions evoke Scott's three pillars: regulation, norms, and cognition, as well as their interactions.

Returning to the definition of information given above and drawing on Peirce's semiotics, we can further describe the nature of IS. It is a triad: technical artefact (signifier), social actors (interpretants) and organisation (referent), which processes the information (*cf*. figure 2).

Figure 2. Nature of IS : a triad
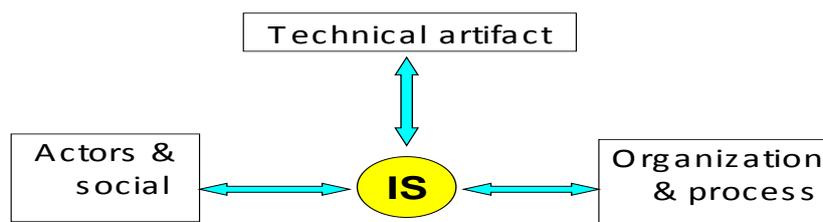
Specifying the nature of IS allows us to clarify the following points:

- IS is quite distinct from the IT system

- IS does not encompass the entire organisation

- IS is both a system for producing information and a system to assist in performance management (decisions)

- we can clearly see the interaction between (organisational) rules and cultural and cognitive aspects.

IS is therefore close to the concept of institutionalism in the very definitions adopted by the academic community.

4 IS AND INSTITUTIONALISM

Having described the proximity of the concepts of institution and IS, we will now see that institutionalism is very much alive in the IS practices of firms and how the institutionalist approach is employed in IS research.

4.1 Institutionalism in the IS practices of organisations

Information systems are artefacts which constitute one of the five vectors which contribute to institutionalisation.

A survey of the implementation of IS in organisations reveals the appropriateness of Scott's model.

The regulative pillar is present in the legislation concerning the legal areas of IT (security, databases, software licences, domain names, e-commerce...) freedoms and ethics (personal data protection, cyber surveillance, and the legal validity of electronic documents). It is present in the software which handles the formal rules of business administration and organisation and in the security clearances which specify individuals and their responsibilities concerning electronic data. The regulative pillar also concerns the security clearances for specifying and monitoring the responsibilities assigned to each IS user: what data he has access to and what he can do with this data (consultation, update, destruction).

The normative pillar covers not only all the IT standards (ISO, IEEE, or *de facto* norms) but also frameworks: CMMI, ITIL, COBIT, etc.

Informal rules appear when tools are appropriated by users in the context of the socio-cognitive pillar.

At the industry level (organisational field) the strategies of technology providers and consulting firms come up against those of corporate users and their user clubs in a more or less conflictual fashion. Mimesis is common in large companies, in particular through professional associations. Mimetic behaviour involves the choice of technical infrastructures, package software and consulting firms.

4.2 Institutional contributions to IS research

We have identified the proximity of IS definitions with the three pillars defined by Scott: regulative, normative and cultural-cognitive. Let's take a look now at the

scientific publications in the field.

Linked with regulation, the economic neo-institutionalists' approach, and in particular the theory of transaction costs, has been used to study IS outsourcing (Barthélemy, 2003). The results of various neo-institutionalist studies on IS outsourcing still cannot be interpreted clearly. The measurement of transaction costs remains a major problem (Quinio, 1998). The importance of the relationship's frequency has not been proved empirically (Watjatrakul, 2005). As for uncertainty, its multidimensional nature makes it difficult to integrate in a study model (Barthélemy, 2003). Finally, the recent phenomena of IS insourcing are not explained with this approach.

At the crossroads of the regulative pillar and the cultural-cognitive pillar, agency theory has been used to study the economic evaluation of IS projects. The pursuit of the agent's own interests helps explain why IS projects are so rarely subjected to a serious economic appraisal (Quinio, 1998). Moreover, a study has shown that some users conform to the decisions proposed by the DSS (decision support system) for two main reasons: lack of knowledge about the subject in question and also for strategic conformity, even in cases where they would have personally preferred a different decision (Rowe, 2005).

The cultural-cognitive pillar of neo-institutional sociology has formulated the concept of isomorphism for the analysis of institutional pressure, the quest for legitimacy and the evolution of organisations (DiMaggio & Powell, 1983). The concept of isomorphism[4] has given rise to some studies in IS. Benders et al. (2006) use it to explain the spread of ERP in organisations. They clearly show that competitive pressure alone cannot explain the widespread use of ERP in certain sectors. The reasons for choosing an ERP system stem from institutional pressures (consultancy, standardisation, order givers, etc.). They propose the term "technological isomorphism" to refer to the quest for legitimacy through the use of a particular technology. Several studies at the crossroads of management accounting and IS have drawn inspiration from institutionalism. Institutional pressure can help to explain, for example, the joint evolution of the organisation and information systems at a large Spanish corporation (Tsamenyi et al., 2006). The concept of isomorphism is also used to study the adoption of inter-organisational information systems (Teo et al., 2003). These authors show that coercive, normative and mimetic pressures act together in the adoption of systems such as EDI.

Lastly, we have found an article which makes explicit reference to Richard Scott's model. It is a study of the information systems which formally take into account the characteristics of the industry within which the organisation operates (Chiasson & Davidson, 2005). This study laments the little consideration that the institutional environment is given in IS research and demonstrates its contribution to the global understanding of the evolution of IS.

Whether explicitly or not, research work on IS uses the regulative and cultural-cognitive pillars of institutionalism defined by Scott. On the other hand, we have not

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4 An organisation can adopt a certain behaviour due to coercion, through mimesis or under pressure from current standards. These three mechanisms are called institutional isomorphism.

found any explicit reference to the normative pillar, despite its importance in practice and few articles refer directly to Scott's global model despite its richness.

## 5 THE CEROS TEAM'S RESEARCH ON IS

The CEROS laboratory at the University of Paris Ouest Nanterre - La Défense operates an IS research programme. Drawing on our experience and past work, we will propose a model for analysing the interactions between formal and informal rules and IS. This model is illustrated by a study of governance and an analysis of two extreme (in our opinion) cases: ERP systems and Web 2.0. Finally, our recent research on virtual worlds highlights one particularity of these subjects.

5.1 A model of how rules are handled in IS

The relationship between IS and institutions can be apprehended by analysing the interaction of IS with formal and informal rules. This view of institutions is incomplete, but it makes sense. We show that, depending on whether they are formal or informal, the rules are incorporated into the IS more or less easily.

The formal rules are programmable and can be written into the IT tools. The informal rules can be partially linked to social rules so as to attach meaning to the information processed by the IS. These "usage" rules are more complex to handle than the formal ones. Using the conception of the institution as a body of organs producing and being modified by rules, we can represent the interaction between the IS and the rules with the model in *figure 3*.

Figure 3 : Interactions between IS and rules
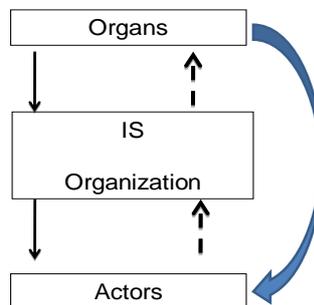
In *figure 3* above, the solid downward arrows represent the formal rules. The IS allow these rules to be written into the technical artefact and thus to impose them on the actors. The assignment of a unique number to each invoice, for instance, will be automatically performed by the accounting software application.

The broken-line upward arrows represent the informal rules. Most of these rules come from the social sphere. They are then introduced into the IS via the actors' behaviour and their use of the tools. If these informal rules are generalised, they can act as a vector of institutions' evolution and even turn into formal rules. This interaction can be illustrated with an example: the author of an email can show his mood using emoticons (smileys), this will then help the addressee to attach a precise meaning to the message content.

5.2 IS governance: rules, frameworks and confidence

Governance refers to the capacity of an organisation to monitor and regulate its operations in order to avoid conflicts of interest between the various stakeholders (Marciniak & Gueugnon, 2008). IS governance refers to the administrative and regulatory methods which the organisation has set up to achieve its objectives. The purpose of IS governance is to encourage good practices and to avoid slippage by implementing the necessary safeguards. It is not confined to IT and extends to the company's various business departments.

Basic IS activities include running the applications portfolio and related technical infrastructures, as well as the design and execution of new projects. Other activities such as quality assurance, security, development planning, purchasing and subcontracting come into play to support these two basic functions. IS governance depends on the organisation of these activities and on the frameworks, methods and tools with which they are managed. Appearing after ISO standards, IS frameworks built their success using an approach where processes are progressively improved. The three most commonly used frameworks are: ITIL, for the production of IT services, CMMI for the development of IT projects and COBIT for auditing and managing risk. Although setting up these frameworks may appear to constitute a direct route to total quality, it is nevertheless necessary to steer clear of the trap of abstraction. While these models describe what needs to be done, they don't spell out how to get there; they merely provide a structure for improving the IS department.

The implementation of IS governance must be guided by three main principles.

Principle 1: Applications portfolio management (assessment and pruning)

It is necessary to assess, understand and monitor the average age of IT resources, both hardware and software. The most important cost-reduction driver of an IS department is the elimination of unused applications. Application pruning is a shared responsibility in the company.

Principle 2: Division and sharing-out of responsibilities

The IS department cannot and must not be the only department responsible for

the evolution of the applications portfolio. The responsibility for IS asset management (Marciniak et al., 2009) lies with all the departments in the company. IT governance is a partially decentralised process resting on the subsidiary principle: delegating as much as possible to the local level. Managing the portfolio of requests and projects is a responsibility shared by the departments which are clients of the IS department. The negotiation of the service contract which defines the level of service expected is the opportunity for the IS department to understand its clients' business expectations and for the client departments to understand the IS department offering.

Principle 3: Building confidence

On complex subjects such as enterprise architecture[5], the utility of services, project selection, formalisation and rationalisation all have their limits. The IS department cannot deal with them relying solely on its own competencies and merits. Confidence must be fostered between the various stakeholders: head office, IS department, business departments and service providers.

The normative pillar is present in the governance frameworks approach and the regulative and cultural-cognitive pillars are found in the 3 principles outlined above.

5.3 From ERPs to Web2.0: two modes of interaction with the rules

Implementing an ERP system involves choosing management processes from among the set of best practices offered by the developer/vendor (Benders et al., 2006). Experience shows that the more the enterprise sticks to the processes offered and the less it tries to adapt these processes to its own specificities, the greater the success of the ERP implementation (Hong & Kim, 2002). Because of this, writing the formal rules coming from institutions into the ERP processes tends to standardise the functioning of organisations and make the actors' behaviour uniform. Although recalcitrant actors may attempt to resist or hijack the tools, this type of behaviour is made difficult by the integration of packaged software.

When the institutional model evolves, (new regulations, for example), organisations rely on the new version of ERP produced by the developer to comply with these new rules. In this case, the IS acts as a conduit bringing the formal rules and regulatory system to the actors.

Some tools originating in Web2.0 – widely used in the private sphere – are beginning to make an appearance in the business world (Quinio & Marciniak, 2007). The use of blogs for certain functions (e.g. business) and wikis for work teams (e.g. group projects) can help facilitate informal discussions and non-formalised knowledge sharing (Noy & Ruiz, 2007). This usage is partially governed by the informal rules coming from the internet community where knowledge sharing is considered normal, the writing is relaxed and speed is a fundamental characteristic.

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[5] Enterprise architecture is defined as the interaction (in an economic model) between business processes, the associated IS and the underlying technological infrastructures.

The main difficulty of using such tools in organisations lies in the way they are managed. If management is too strict – trying to enforce formalised guidelines – the users will turn away from the "official" tool and once again use private tools for professional purposes. The organisation then loses out on the greater part of the expected benefits. If management is too lax, the organisation may find itself facing serious security problems (information leaks, virus attacks, etc.).

Coming back to the model in *figure 3*, we can see that the pressure of informal rules is harder to cope with than that of formal rules because they come from the social sphere and not from standardisation bodies. In addition, these informal rules infiltrate the organisation through the actors' behaviour and not through the most structured part of the IS.

5.4 Illustration from the study of virtual worlds

A virtual world is a persistent environment in 3D connecting a human community by means of avatars which can interact directly and freely within a virtual social network and in a virtual environment, creating and/or modifying objects and contexts (Quinio & Réveillon, 2008).

In the past few years, virtual worlds have become a craze among the general public for personal purposes (mostly entertainment). More than 300 virtual worlds have been catalogued around the world with an estimated total of 300 million online users and 50 million mobile phone users. More recently, these new environments have caught the attention of companies (Limayem et al., 2008 ; Ives & Junglas, 2008 ; Marciniak et al., 2007).

What do companies do in these new environments? An analysis of their activities using Michael Porter's value chain (Quinio & Réveillon, 2008), shows that the crucial point is their capacity to bring back a value acquired in the virtual world in order to use it later in the real world. Value creation was observed in the following areas: institutional communication, collaborative work, recruitment, training, simulation, R&D, marketing, sales and after-sales service. The main difficulty for companies is not technical, but managerial. The key point is knowing how to choose opportunity-bearing activities and to do so they have to be studied in detail not just superficially.

Returning to the triadic nature of IS presented above, we can describe what a virtual world represents. For each virtual world taken in its entirety, the social component allows us to characterise the type of users targeted by the virtual world: teenagers, wage-earners, clients, prospects, etc. The organisational component differentiates virtual worlds from pure social networks (meeting others), virtual game worlds (have fun and learn), and virtual simulation worlds (live, shop, work). The technical component comprises: the platform (client server, multi-instance, multi-tenant and peer-to-peer), the type of visualisation (2D isometric and 3D) and the degree of openness (open source or proprietary).

The principle of persistence combined with the capacity of avatars to provide content (User Generated Content), allows formal and also informal rules to be written into the virtual world. For example, in the virtual training world set up by Michelin, the

course of study (the formal sequence of modules) is rendered as a road inside the virtual world complete with intersections and road signs. Informal rules are manifested in the appearance of avatars and the parties which are held virtually between two courses or two series of exercises.

Returning to the global schema presented above on the interaction of IS with formal and informal rules, we observe that with virtual worlds these two types of rules can be written into the technical tool. Thus it is possible for them to be generalised or at least communicated to all of the actors.

6 CONCLUSION

If we return now to the two questions raised in the introduction:

1. Does French institutionalism have its own particular characteristics ?

2. Can information systems (IS) be linked to institutions ?

The answer to the first question is "no". French institutionalism exists and is dynamic, but does not present any specifically national features.

We feel that the answer to the second question is "yes". Set in an organisational and therefore social framework, the use of information technologies requires that formal and informal rules be dealt with. This interaction between IS and rules originates in the very nature of IS: information. It continues with the embedding of formal rules in applications and software packages. The interaction with informal rules is more common nowadays and raises several difficulties. How can informal rules be managed without rigidifying them ? How and when should an informal rule be transformed into a formal one ? Is there not sometimes an advantage to be gained from making a formal rule informal ?

We believe that Scott's global model is a fertile framework for analysing the interaction between institutions, the organisation and IS from different angles. Future IS research ought to make use of this model.

International comparative research, particularly on the socio-cultural pillar of IS, offers an opportunity to study IS using the institutionalist approach explicitly. This year, between France and Brazil, there is an excellent opportunity to undertake comparative studies on IS and institutions.

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