The role of routines, rules and habits in collective learning: Some epistemological and ontological considerations

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Abstract. – In this article the role of habits, rules and norms for collective learning will be discussed. These concepts, although usually shown as being quite different, have certain similarities and complementarities. Routines and habits in the Veblenian tradition are two inseparable notions. In Simon's work, routines are explained more as a cognitive tool to avoid exhaustive deliberation. Rules and routines in Simon's work are identified using the artificialist approach and defined with analogy to the computer. This perspective, which is quite different to that proposed by Veblen, can be used to explain human problem solving and bounded rationality in organizations. The definition of routines from a cognitive perspective proposed by Nelson and Winter in 1982 is far removed from the Veblenian legacy and Simon's work. Here the notion of tacit knowledge is introduced in order to show that it is difficult to duplicate routines and that the artificialist approach cannot always be used to tackle the many different kinds of knowledge anchored in routines. Despite the important work conducted by Nelson and Winter, routines are nevertheless difficult to decipher in organizations and their different ontological levels (concrete and abstract levels) can give rise to some confusion for observers. For this reason, most authors now admit that it is possible to describe routines using the concrete level on the one hand and with their formal representation on the other (as a general rule). Notions of rules, routines and habits are sometimes assimilated, sometimes distinguished/separated depending on the ontological or epistemological level which is being referred to. Although the debate surrounding this issue is important, it is crucial not to forget the existence of the cognitive and political dimensions of every rule, routine and habit in collective learning. This is probably the main conclusion of this article, beyond the epistemological and ontological discussion.

Introduction

A number of contemporary economists have given thought to the question of rules and conventions used by agents in order to take decisions and act in a non-stationary environment (Orléan, 1994; Dosi *et al.*, 1996; Lesourne and Orléan, 1998). The question involves many schools of thought from game theory, to the economics of conventions

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and the "regulation school" on to the evolutionary approaches. The objective is to iden-
tify constant behaviour types which occur at a specific time, in a range of situations and
which contribute to the coherence of economic exchanges. Norms, conventions, rules,
routines and habits can also be seen as coordination mechanisms which explain these
interactions beyond the standard paradigm, which sets price as the only mutually agreed
adjustment factor for agents.

The conventions described by Keynes (1973) attempt to decipher behaviour when con-
fronted with the unknown. Organisations based on the Veblenian tradition highlight the
reason why some habits, whether social or not, are an important factor in the behaviour
of individuals. At a more microeconomic level, there are rules, routines and habits which
create decision-making and learning tools for individuals and firms.

The objective here is not to look at the interactions between collective behaviour and
individual action, as some authors have already done (Boyer, 1996); but merely to observe
the link between seemingly very similar notions: rules, routines and habits. Routines are
in fact a very common expression employed in contemporary evolutionary theory to
account for knowledge and performance in firms (Cohen *et al.*, 1996). But the same
notion is used quite differently in Veblen's earlier work and in Simon's perspective. In
effect, Veblen (1899), Simon (1945), and Nelson and Winter (1982) use these terms for
different applications and they draw on relatively dissimilar methodologies. These differ-
ences have even extended into recent work on the notion of routine (Cohen *et al.*, *ibid.*).

As many authors have employed rules, from game theory to the economics of conven-
tions to mention only the main uses in economics, it is important to remember that rules
and routines can be either complements or substitutes, depending on the application
(Hodgson, 1997).

In what follows, I begin in Section 1 by giving Veblen's definition of routines and
habits and illustrate the similarity of these two terms in his work. Then, in Section 2, it
will be shown how Simon defines routines and habits in a common unorthodox way. His
methodology, inspired by artificial intelligence, has led to a very specific definition of
these terms. In Section 3, I turn to Nelson and Winter (1982) who based their work on
Simon's theories, which they then redefined. Consequently, their definition of the notion
of routines goes well beyond the previous approaches. Finally, in Section 4, the different
ontological aspects of rules and routines will be highlighted and the distinct and comple-
mentary nature of these two concepts will be demonstrated.

1. Routines and habits according to Veblen: Two inseparable notions

According to Veblen, man in society is governed by mental habits inherited from the past
and based on institutions. Man has instincts ("the instinct of curiosity", "the instinct of
workmanship", ...) and working practices linked to the community he belongs to. These
"instincts" are ways of responding to different stimuli and give man a certain mental bent
or "habits of thought". Institutions are a breeding ground for thought and so are a
dominant cognitive vehicle which has extended into society (Veblen, 1899). For Veblen,
social structure operates a kind of natural selection for "habits" allowing them to be
renewed. In this context, man is no longer defined as a rational and calculating "homo

oeconomicus", the way he is considered in neo-classical theory, but as a creature with a coherent structure of inclinations and habits which are revealed and expressed depending on the actions mobilising him (Veblen, 1898). To summarise, historical and social traditions have selected certain dominant cognitive schemes which frame current habits of thought. Individuals have patterns of behaviour automatically activated and habits which are mobilised daily. For Veblen, these routines and habits are closely linked and are two sides of the same coin. This is particularly striking in his book "The instinct of workmanship" (Veblen, 1914).

In this book, Veblen illustrates the evolution of knowledge and technological practices, from primitive techniques rooted in a small community and transmitted by the elders, to much more advanced skilled techniques, including invention and innovation which mobilise specific routines and conventions at the same time. Professional dexterity depends on habits and routines based in the execution of daily tasks:

> "Workmanship proceeds on the accumulated knowledge so received and current, and turns it to account dealing with the material means of life. Whatever passes current in this way as knowledge of facts is turned to account as far as may be, and so it is worked into a customary scheme of ways and means, a system of technology, into which new elements of information or acquaintance with the nature and use of things are incorporated, assimilated as they come. The scheme of technology so worked and carried along in the routine of getting a living will be serviceable for current advance in technological efficiency somewhat in proportion as the knowledge so embodied in technological practice is effectively of the nature of matter of fact" (Veblen, 1914, pp. 39-40).

Craftsmen accumulate empirical knowledge through daily experience. Different conventions and beliefs can be included in this practice which allows different "habits of thought" and different routines. The industrial revolution was to change these collective ways of doing things to include a rigorous management of working time, "time standard", based on Taylorian principles and a non-theological vision of work. Nonetheless, to a certain extent this revolution was relative, because the first industries depended essentially on manual labour and even with the arrival of mechanisation, the practices were still based in professional dexterity despite the fact that managers try to control these specific abilities. As Veblen observes:

> "Such a fashion of conceiving the operations and appliances of industry seems at the same time to fall in closely with the men's natural bent as given by the native instinct of workmanship; and fostered by the constant drift of daily routine under the handicraft system this attitude grew into matter of course, and has continued to direct man's thinking on industrial matters even long after the era of handicraft has passed and given place to the factory system and the large machinery" (Veblen, 1914, p. 236).

The way Veblen assimilates the notion of habits to that of routines is quite obvious here. "Habits" are individual bents based on larger institutions that partly determine the individual cognitive schemes and routines at a given moment. These habits are transformed and evolve through a range of historic events that change them. Consequently, for Veblen, routines are defined between instinct and tradition and are a certain way of doing

things at a given time. For Veblen, both the cognitive aspect and the dynamic nature of "habits" are important. This enables habits to be distinguished from a purely sociological approach, describing the social structures of society [1].

Nevertheless, even though habits and rules have been used in the past to criticise the proponents of standard rationality, today, these notions can be used to explain a whole range of behaviour which manifests itself when individuals are confronted with risk or uncertainty Hodgson (1997). Keynes (1973), for example, argues that in financial markets imitating a neighbour could be a rational strategy. Here, conventionally accepted practices and habits were not simply rational calculation and optimisation, which is useless when confronted with the unknown, but simply imitation of neighbours. In fact, as Hodgson (1997) has also pointed out, it is deceptive to apply the often-used argument of "habits" as a means of tracing the limits of heterodox and orthodox fields of analysis. Many authors, who have mobilised the substantive rationality of the individual and his maximisation behaviour, have used more or less tacit rules. Game theory illustrates this phenomenon. Here, agents are allocated certain 'rules of the game', which limit the scope of their action before determining the particular strategy.

Although many economic approaches suggest the existence of rules, they differ in nature. Certain rules determine economic behaviour and habits *ex ante* (game theory). Others are constructed and induced by a range of interactions and historical processes which must be understood. Basically, this means that in a market situation, individuals do not follow predetermined rules that establish their behaviour, nor do they rely on complicated calculations to adjust their behaviour and maximise their own utility. Instead they follow social conventions and habits which are part of the normal running of any market.

The labour market is a typical case of habitual and non-formalised regulations, where certain professional practices, certain habits and routines provide a pivot point for industrial relations. This equilibrium point is central to many internal compromises within a firm, in different trades, companies or in inter-firm relations [2]. Del Sol (1999) illustrated this with the example of the fishing industry. In particular, she focussed on the existence

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[1] In effect the sociological notion of "habitus" seems at first to be very similar to "habits". The notion of "habitus" developed by the French sociologist P. Bourdieu is nonetheless different from the Veblenian notion of "habit". For Bourdieu "habitus" is a collection of social and cognitive attitudes which are part of a social structure which imposes limits on the possible range of actions of the actors. The position of individuals, in particular their social origins, influences their individual attitudes which themselves are subject to filtration by a range of social institutions : standards, tacit and formal game rules, language and codes (in other words the range of perception and appreciation blueprints) (Bourdieu, 1992). It can be seen that "habituses" even if they are individual attitudes, are different because they are deeply rooted into social apparatus, institutions and the social positions of individuals, without any consideration of how they evolve over time. Even though Bourdieu's approach is neither historical nor ethnological, his theories are interesting because they fill out the notion of institutions and illustrate certain of their facets. Thus, tacit and formal rules are important and filter individual attitudes while at the same time having a retroaction on social structures.

[2] For an example of the implementation of rules in inter company relations, see Cassier and Foray (1998) on the good conduct rules in the case of biotechnology consortia trying to channel "free rider" behavior; see also the step by step rule (Lazaric and Lorenz, 1998), the aim of which is to informally regulate the implementation of specific assets and allow progressive commitment to cooperation avoiding the abusive appropriation of any one of the partners.

of rules allowing members of the crew to take a certain volume of the haul as payment in kind. A Spanish ship owner tried to question the practice, known as "the feast", and provoked an unprecedented strike in a Breton company in France. In fact, as a number of authors have pointed out, it is not only the professional market of small business fishermen but every type of industrial relations which can be described as being situated somewhere between custom and tradition (formal or informal rules). Further, the extent of the institutionalisation and the codification in industrial relations, depends on the country involved (Gouzien 1999; Del Sol, 1999; Hénaff, 1999).

Beyond the existence of rules, the question can be asked: What is their role in relation to routines and habits and what are the links between rules, routines and habits? In fact, following the ideas of Veblen, many authors have assimilated habits to routines (Hodgson, 1997; Del Sol, 1999; Gouzien, 1999). Habits, like routines, are attitudes and bents that individuals follow without deliberation. They are traditions of behaviour rarely questioned by the individual because they are anchored in cognitive and social automatisms. However, if habits are based on rules, the link between rules and routines is not automatic. In addition, the relationship between habits and rules arises from a common form. These notions are complementary but cannot be substituted for each other. Hodgson recognises this:

> "Rules are conditional or unconditional patterns of thought or behaviour which can be adopted either consciously or unconsciously by agents. Generally rules have the form: in circumstance X, do Y. Habits may have a different quality: rule following may be conscious and deliberative whereas habitual action is characteristically unexamined. Rules do not essentially have a self-actuating or automatic quality but clearly, by repeated application, a rule can become a habit. Typically, it is easier to break a rule than to change a habit, since our awareness of our own habits is often incomplete and they have a self-actuating character because they have become established in subliminal areas of our nervous system. However, habits still have the same general form: in circumstance X, action Y follows (....). Both apply to situations that, in essential terms are actually or potentially repetitive and non-unique" (Hodgson, 1997, p. 664).

The link between rules and routines still needs to be examined. In particular, is there the same complementarity between rules and routines as is found between habits and rules? It could be thought that the answer is positive to the extent that, in the Veblenian tradition, routines and habits are notions that are interwoven, even virtually identical. In fact it will be shown that the debate is not as simple as it first seems and that it depends strongly on the epistemological approach used. For Simon, routines do not in fact have anything to do with habits and are assimilated more to a mosaic of programs mobilised by the individual. Let us examine this approach.

2. Simon's artificialist perspective: A new and controversial approach

In Simon's work individual habits are questioned in the same way. In *Administrative Behaviour* (1945), Simon attempts to examine why habits prevent rational decisions.

Habits are opposed to rational behaviour, because the period of hesitation preceding a choice, a period in which the mind considers the different possible options and the consequences of actions, does not exist. Instead, habits belong to a stimulus/response model where the stimulus is sufficient to set off habitual behaviour without any further thought or consideration. This mechanism economises on efforts made by the memory by eliminating pure deliberation, because the simple recognition of a situation is enough to set off the response (Simon, 1945). As we shall see, this definition of habit leads Simon to move away from the Veblenian perspective given that he opposes it with an the analogy drawn from computer programming.

Simon pursued the analysis of the individual and collective decision making process by analogy with computer programs. According to him, a functional analogy exists between the human mind, the computer and organisations. The organisation and its decision structure are considered to be a mosaic of programs. The rules in the organisation are not fixed once and for all as a function of optimisation criteria, but are based on adaptive rationality (March and Simon, 1958) [3]. Simon's objective, which he was to pursue in the work conducted with Newell, was to identify the formal rules that underlie all learning. In this concept, routines are the programs or the formal rules that must be identified in order to understand organisations better (Newell and Simon, 1976).

In the opinion of March and Simon (1958) organisations have a limited capacity to process existing information. In order to reduce this informational complexity, they resort to "rules of thumb" or empirical rules. The organisation depends upon a hierarchy and on its capacity to organise and distribute tasks within the company and use empirical rules. This can create a rather stereotyped notion of a company organisation [4], reduced to algorithms or software sub-programs centrally coordinated by a hierarchy (Barreau and Eydoux, 1999; Lazaric, 2000; Mangolte, 1998). Simon fully assumes that every decision – from the most routine to the most innovative – depends on programmed and so potentially reproducible decisions.

From these hypotheses, Simon and Newell then searched for the formal decision rules used by company managers, which must be formalised to anticipate decisions in companies. Simon therefore sought empirical rules that oppose the rules of profit maximisation. The game of chess is a perfect example to illustrate combined reasoning, heuristics and emerging strategies. The formal and simple logic of this game allows the emergence of routines to be seen with increasing informational complexity. In other words, the game of chess demonstrates routine processes where the player, faced with a multiplicity of possible options, will follow procedures and set up routines. Nonetheless, although these formal rules can emerge during a game of chess, a number of authors have highlighted the fact that transposition of the ideas into the organisational world is not always so

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[3] In effect, these authors consider a range of activities as routine when the choice has been simplified by the development of a determined response to given stimuli: "If the search for solutions has been eliminated, but choice still exists in the form of a routine involving systematic and clearly defined evaluation, the activities are described as routine". (March and Simon, 1958, p. 142).

[4] Opponents to Simon's theories speak in this context about "thought Taylorism" to describe this project. The firm here, is reduced to automatisms or formalisable rules which guide its behavior just as a computer is guided by its software (see Barreau and Eydoux, 1999).

simple. Coordination processes inside firms go beyond simple formal rules and depend on conflict and negotiations, which should not be ignored. In short, these are the limitations of the "artificialist" approach, because it is based on processes that are too far removed from the real life of organisations. In the process of search for formal rules, it is easy to forget the ubiquitous presence and fundamental ingredient of all learning: namely tacit knowledge. This knowledge, which is articulated with difficulty if at all, is very difficult to transpose to computer language because of its implicit content. But this kind of knowledge (according to Polanyi's terminology) is the very essence of all learning processes which cannot be reduced to single non-ambiguous pieces of information (Lazaric, 1999; Lazaric and Mangolte, 1999).

It can be seen that Simon did not aim to capture real learning processes as they are effectively encountered in firms. Rather, his aim was to understand decision making and the implementation of viable automatisms avoiding expensive and non-operational deliberations. Routines emerge from these mechanisms as a by-product of other automatisms defined in a restricted sense. The important point here concerns not the cognition or learning mechanisms, but the discovery of formal rules which allow the way decisions are made by individuals to be understood as well as their "execution scheme" based on "procedural rationality". Routines are thus defined by analogy with computational mechanisms, in other words as formal rules. They are no longer the product of history, as in the Veblen model, but are defined in an abstract and functional way within the framework of artificial intelligence (Mangolte, 1998).

3. Nelson and Winter's renewal of the routine approach

In 1982, Nelson and Winter defined the term organisational routine in order to account for the process of innovation and change. In practice, contrary to the standard framework, firms do not have as their sole objective the maximisation of their profit but rather they seek to obtain a "satisficing" level of profits in an unpredictable world.

This debate is not entirely new and much has already been written on the subject both in past and in contemporary economic debate (Hodgson, 1994; Barreau and Eydoux, 1999). To summarise briefly, during the 50's, Malchup (1946) and Friedman (1953) criticised those who defended the principle of marginal calculation and showed that decision making depended on routines and not on behaviour involving marginal calculation. Lester (1946) conducted a study involving 430 company managers. The empirical results from this study enabled the authors to conclude that company bosses do not use complicated calculations to make decisions but instead rely on simple empirical rules. Nonetheless, their conclusions did not lead them to reject the neo-classical model on decision making but instead, paradoxically, to reinforce it. Malchup (1946) highlights that company managers are not always aware of the method they use to calculate. Indeed if they follow routines at all it is to avoid more complex computation mechanisms. If they follow informal rules, their final decision conforms to a true marginal calculation. The criterion for maximisation of profits is in fact a routine process and Friedman concludes that it doesn't matter whether or not they apply maximisation principle theories to the letter; the final result is identical. Everything happens "as if" the entrepreneurs were

maximising their profits since those who don't do this cannot survive in a competitive environment (Friedman, 1953).

Nelson and Winter take up the argument of "natural selection". They underline that in the long term, the firms which survive are those which have satisficing routines and satisficing technology, and are therefore capable of generating sufficient profit in their environment. According to Nelson and Winter, decision-making processes depend on specific heuristics in a world of bounded rationality. They refuted the criticism of "natural selection", arguing that the decision process cannot attain the ideal type which standard theory would want. Relying on the notion of the "bounded rationality" of firms, Nelson and Winter have defined the organisational routines of the firm. Their argument is not the Veblenian one, but rather relies on a heterodox model of the firm and in particular on a behaviourist perspective and on "bounded rationality".

Routines are repertoires of knowledge partly activated by the members of an organisation (Lazaric and Mangolte, 1999; Lazaric, 2000). They are the organisational memory as a whole and the daily knowledge mobilised by its members. So routines are simultaneously both a set of repertoires which are inert and temporarily dormant, and knowledge which is used and performed daily.

It can be seen via these proposals that the chosen baseline is directed towards the cognitive background which guides firms. But Nelson and Winter (1982) have chosen to include the notion of tacit knowledge in their analysis, going beyond the inclusion of knowledge which is explicit and can be formalised in the form of an algorithm. They base their theory on the work by Polanyi (1958) illustrating the tacit character of knowledge which resists the process of articulation and explicitation in the form, for example, of natural mathematical or symbolic language, and in particular in the form of a computer program. By basing routines in knowledge which is partly tacit, the Simonian legacy is reinterpreted. It is true that companies rely on bounded rationality in the normal running of affairs, however, these heuristics, which are partially tacit, cannot be exclusively represented as formal rules.

Cyert and March's legacy (1963) which postulates the problem of coalition, conflicts and bargaining inside organisations is also reinterpreted. In effect in Cyert and March there is always a potential internal conflict between members of the firm, defined as a coalition and which has to cope with contradictory preference systems generating different sub-coalitions. The conflict is the result of the different resources and goals inside organisations. In order to prosper and to survive, the firm has to face these conflicts and must achieve a "quasi resolution of the conflict". That is to say that the political dimension may be a brake for economical development if the conflicts are permanent preventing the firm from performing efficiently.

In order to focus on the cognitive dimension, Nelson and Winter propose the truce hypothesis. In this hypothesis, conflicts must be canalised in order to see routines in action. These conflicts exist but are seen as latent. They are set and considered outside of any relevant time-scale, in order better to observe cognitive processes (Nelson and Winter, 1982). In fact, this very convenient hypothesis allows the dynamic study of collective learning and also supposes that political processes are static. Although this premise seemed attractive it quickly drew criticism from a number of authors who remarked

on the co-evolution of political and cognitive mechanisms (Coriat and Dosi, 1997; Cohendet *et al.*, 1995; Lazaric and Mangolte, 1998, 1999; Lazaric, 2000).

In effect, this hypothesis means that the interests, the conflicts and the discretionary behaviour between the members of an organisation must be maintained within a certain boundary. The social interactions of individuals and the set of agreements interwoven between them are stabilised. This status quo makes it possible to study the cognitive processes that are initiated, assuming that political processes do not interact with the repertoires that are created. The focus is on routines in operation and their mobilisation in a competitive environment. In this case it is important to see how, when the firms activate these routines, specific skills are created which can only be replicated with great difficulty. This can be described as a neo-Schumpeterian perspective [5], where the focus is on the supply of emerging products whilst ignoring the social context in which these skills and know-how saw the light of day.

Nelson and Winter thus reformulated the notion of routines by basing their theory in cognitive processes. This approach allowed them to differentiate their ideas from the Cyert and March's perspective and not to have to follow Simon's recommendations to the letter. These authors focussed on the cognitive repertoires of the organisation and their transformation over time. They also put forward an evolutionary concept of the firm which is contrary to the stereotypical vision of the firm, which allocates production factors for which neither the material value nor the benefit is clearly understood (Nelson and Winter, p. 63). They emphasised how simple empirical rules followed by firms could have an impact on their performance and their long-term survival. This is one of the reasons for the relative success of this approach, which generated a flurry of work on skills and routines in firms [6]. All of this very productive work on the notion of routine had a rather varied impact on the diffusion of the notion. In fact, each author reinterpreted the notion of routines from a different perspective, which led to an attempt to summarise it by the evolutionary school of thought [7].

In a recent Santa Fe working paper presented by Cohen *et al.* (1996) various proposals for the development of this notion can be identified:

1) Proponents of an extension of the Simonian and "behavioral" perspective, which argues that routines should be studied from a basis of experimental economics, in order to be used as a formal illustration of learning processes;

2) Partisans of an investigatory approach, such as "ethno-methodology", who emphasise that routines (which are partly tacit) can only be observed after extensive empirical

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[5] Nelson and Winter indicate in the introduction to their book that the two authors to whom they were most indebted were Simon for his concept on bounded rationality and Schumpeter for his non-static vision of capitalism (Nelson and Winter, 1982).

[6] See Lazaric (2000) for a survey of the contemporary evolutionist work on the subject of routine and skills.

[7] For example the Egidi perspective is in the same spirit as the Simonian's legacy, whereas the Warglien approach is not very far from the Veblenian perspective and Dosi and Coriat are quite close to the Cyert and March perspective in arguing for the co-evolution of political and cognitive dimension (Egidi; Coriat and Dosi; Warglien in Cohen *et al.,* 1996).

studies, the purpose of which are to make an inventory of the knowledge situated and distributed in organisations [8];

3) Detractors of the Nelson and Winter approach, and in particular of the truce hypothesis, who suggest that routines should be analysed and observed in their dual dimension and little is accomplished in evolutionary research which does not examine the governance structure of collective learning.

The first two trends represent the positions held by the proponents of a need for a deeper understanding of the cognitivist perspective on the one hand in the Simonian sense and in the Veblenian sense on the other (to the extent that in the second case the social and physical environment of routines must be extended in order to understand their material aspect and the role of objects or any other type of environment which could modify the existing repertoires and thus the routines in operation). The directions of work are completely divergent and the methodologies different, since in the first case the objective is to see concrete modes of expression of routines and in the second there are only abstract representations. In the third trend, the debate needs to be empirically or theoretically enriched if one is to really grasp the co-evolution of the social and cognitive mechanisms, thus leaving behind the legacy of Cyert and March.

The Santa Fe group reached a rather vague compromise definition of routine based on these divergent ideas:

"A routine is an executable capability for repeated performance in some context that has been learned by an organisation in response to selective pressures" (Cohen *et al.,* 1996, p. 33).

This definition implies the following two points:

1) routines are interconnected into broader learning processes and in particular into company performances, which cannot be ignored;

2) routines can be placed on two analytical levels between concrete forms of expression and modes of representation.

For analytical purposes the two levels are considered as one, which implies that each researcher can focus on different levels without any existing hierarchy between the forms observed. This allows the different methodologies to be reconciled without the definition of a "one best way". However the disadvantage is that there are no clear directives on the way to tackle them.

This methodological problem and the difficulties of apprehending the duality of routines from the concrete to the abstract levels will now be discussed in greater detail. It will be emphasised that the difficulty in is not specific to routines, since the same problem and duality of debate can be found when considering the notion of rules. This is a more general way of representing collective learning under different modalities and at different ontological levels.

4. The different ontological levels of rules and routines

In the evolutionary literature on routines, it is quite common to highlight the different levels of routines. To this effect, Winter clearly distinguishes routines in operation –

[8] For a definition and discussion of the notions of situated and distributed knowledge, see Lazaric (1999).

"a routine in operation at a particular site... a web of coordinating relationships connecting specific resources" – from their abstract representation – "the routine per se – the abstract activity pattern" (Winter in Cohen *et al., ibid.*).

Thus, on the one hand, there are concrete routine modalities which can be "recurrent action patterns" and on the other a more general level for the expression of these patterns. This distinction between concrete content and abstract form assumes that it is possible to distinguish and observe repetitive situations put into practice by individuals in an organisation and that they can be formalised. But, as Winter emphasises, this implies an extreme simplification and a stripping down to bare essentials of repetitive situations, because at a symbolic level, neither their benefits nor even the context when they first appeared can be understood (Winter, 1994).

Several methodological problems can be identified here. Firstly, to what extent can routines be apprehended by the actual observation of a team, for example? The implicit contracts that individuals make with each other and their hierarchical superiors, the motivation of individuals and the rules explaining their behaviour, all run the risk of being rather vague. The "ethno-methodological" vision tends to observe routines in action and implementation without being able to grasp all the social and institutional compromises arising from the past. Secondly, how can tacit knowledge be observed, given that it is distributed between the individuals and the organisation and given that by its very essence it is not articulated? This knowledge can seem opaque to the observer even if meticulous observational means are used.

Finally, the use of archives can enable the passage from the concrete modality to the abstract at an empirical level to be observed, however this gives a rather fossilised vision of routines without providing any understanding of the context of their emergence:

> "Patterns of action and their diffusion are hardly traceable and measurable over long time horizons, while at least some kind of representations are usually recorded in organisational archives. They may not tell us the story about routines, but like fossil evidence, they supply important cues for understanding organisational evolution" (Warglien, in Cohen *et al.*, p. 32).

It is easy to see the difficulty of the exercise whatever the ontological level we observe. Routines in operation are difficult to tackle at a political or cognitive level. In order to represent these notions either the symbolic level must be used, which massively simplifies the process which is implemented, or the archive level, which gives a rather faded image of the reality of organisations.

Despite these methodological problems, it seems important to distinguish the two levels of routines and to highlight the observational limits for each level. These two levels are more complementary than substitutable, despite their respective gaps.

To simplify the debate, a number of authors have suggested observing routines from one side and rules from the other. Rules are defined as modes of expression abstracted from routines and their representation system. Here it is possible to distinguish abstract rules and concrete representations: namely routines. Rules and routines are observed in their complementarity (Becker, 1998; Reynaud, 1998), as opposed to the Simonian framework in which formal rules are assimilated into routines.

For B. Reynaud, the procedures and algorithms which can be based on a computer program are quite opposite from routines. The main difference between the two notions

is the codified nature of the algorithm which is defined as a finite list of instructions to be executed in a given order and which should give a result which can be reproduced in other situations. Routine, on the other hand, refers to "a transformation device designed to obtain a result" which is exclusively tacit. Routine is "a practical way of solving a problem for which rules give a theoretical, abstract and general answer. Rules are the backdrop of routines" (Reynaud, 1998, p. 473). Thus rules are not formal here but more or less incomplete and more or less specified. Routines provide the pragmatic field of action where interpretation can be made.

Consequently, they can be compared to jurisprudence, which provides practical legal solutions derived from habitual acts performed by individuals in society. These solutions are complementary to the legal framework within which legal decisions are applied with possible leeway for interpretation over time:

> "Routines like habits also show their incredible capacity for adaptation to the environment of the world of work. The law cannot make provisions for every possible situation any more than can collective bargaining or work contracts. How can the infinite number of details concerning the daily life of employees be resolved - their place of work, rest time, the size of notice boards, holiday or end of year bonuses, clocking-in conditions....?" (Hénaff, 1999, p. 67).

Confronted with the incomplete nature of rules, the question can be asked what is the real place left for routines? Several issues should be raised here. First of all, there is the tacit nature of routines. Secondly, there is the definition of routines on the basis of rules, which implies that this concept does not have any real autonomy and that it needs associated notions – namely rules or habits – in order to be defined.

First of all, it seems relevant to emphasise that although tacit routines are not compatible with algorithms, they are not exclusively tacit as suggested by Reynaud (1998). In fact, routines include a whole range of non-articulable and articulated knowledge, mobilised during the course of action and which are not entirely separable. A typical example is the project team, which includes more or less formalised interconnected knowledge, such as the rules for the preparation of future collective work sessions, and a set of tacit knowledge, which is held by each member and is extremely dependant on the context in which it was developed (Divry, 1998; Nonaka and Takeuchi, 1995). Tacit and explicit knowledge are more complementary than substitutable and depend on specific processes and incentive mechanisms within each firm to explain their tacit part (Divry and Lazaric, 1998; Denis and Lazaric, 1999).

Secondly it would seem futile to always want to define routines as an associated part of rules, as does Reynaud, or in relation to habits alone (Hénaff, 1999). In effect, routines do not only arise as part of the incomplete nature of institutions, nor can they be assimilated to habitual actions; they have their own logic which cannot be ignored. If the labour market is a good example of the interconnectedness of these notions, where institutional constraints play a key role in firm practices, it is not the only environment where economic exchanges occur. Other markets can suggest other processes and other political and cognitive dynamics. In addition, the importance given to wage rules leads to an exclusive focus on the institutional and political content of these rules, ignoring their cognitive dimension.

Thus we think that it is important to differentiate these two notions and yet still to pay heed to their complementarity. We believe that in certain cases, expression and representation

should be differentiated, as Winter (1995) suggests for routines, and Reynaud (1998) suggests for rules and routines, because such differentiation can clarify the debate from an epistemological point of view. However, in practice it is very difficult to disentangle them. The risk is that a continuum of empirical rules is observed that are more or less explicit, more or less abstract, more or less reproducible and more or less interpretable and whose content varies in accordance with the differing uses. Finally, we believe that the duality of rules and routines (considering their political and cognitive content) must be respected and that the "dosage" of the two contents depends on the situation. Rules and routines are nonetheless the two sides of the same coin, much as is the case for habits which include both knowledge and social and institutional compromises.

Conclusion

Several traditions can currently be used to study habits, rules and routines. One school of thought, inspired by an ethno-methodological approach, aims to track the concepts longitudinally in a Veblenian perspective. A Simonian tradition attempts to identify the processes at a formal level. Dichotomy is found in recent work on routines where researchers have not generally used the same methodology, but instead have adopted approaches that are more or less formal, and more or less based on unwieldy empirical investigations. Paradoxically, when Nelson and Winter tried to break free from the Cyert and March and institutionalist traditions by defining routines in relation to collective learning in a Schumpeterian context, the dichotomy reappeared. This paradox is accepted by evolutionary scholars who admit that the level of abstract representation differs from its concrete expression. This argument, far from closing the debate, extends it to rules, which can also be considered as the abstract representation of routines.

From an ontological point of view, rules and routines are definitely complementary. However, if the same sort of complementarity is observed for rules and habits, the concepts of routines and habits are nevertheless epistemologically distinct. This is because Nelson and Winter have opened the debate more into cognitive dynamics whilst forgetting the social and institutional foundations of individual and collective behaviour inside organisations. This is one of the crucial points of the debate as far as collective learning is concerned. In effect, irrespective of the current epistemological dichotomy and the different levels of analysis, it seems highly unlikely that rules, habits and routines can really be defined without situating them in both a cognitive and a political perspective.

References

Barreau J., Eydoux A. (1999) *Routines, gestion du travail et performance de l'entreprise*. In: Hénaff G. (Ed.), *Habitudes et routines dans les relations d'emploi*, Presses Universitaires de Rennes, Rennes.

Becker M. (1998) *Routines revisited: A contribution to an evolutionary theory of recurrent action patterns*, unpublished working paper for the EAEPE Conference, 5-8 November, Lisbon.

Bourdieu P. (1992) *Les règles de l'art*, Seuil, Paris.

Boyer R. (1996) From institutions to individual behavior, *IIASA Conférence*, June, Vienna.

Cohen M.D., Burkhart R., Dosi G., Egidi M., Marengo L., Warglien M., Winter S. (1996) *Routines and Other Recurring Action Patterns of Organizations: Contemporary Research Issues*, unpublished working paper, November 1995, Santa Fe, to appear in *Industrial and Corporate Change*.

Cohendet P., Llerena P., Marengo L. (1995) *Learning and organizational structure in evolutionary models of the firm*, unpublished working paper, Eunetic Conférence, Strasbourg, Octobre.

Coriat B., Dosi G. (1997) Learning how to govern and learning how to solve problems: On the co-evolution of competences, conflicts and organizational routines. In: Chandler A.H., Sövell O. (Eds.), *The dynamic firm: The role of technology, strategy, Organization and Regions*, pp. 103-133.

Cyert R.M., March J.G. (1963) A behavioral theory of the firm, Prentice Hall, Englewood Cliffs.

Del Sol M. (1999) Travail, emploi, routines: quelles connexions ? In: Hénaff G. (Ed.), *Habitudes et routines dans les relations d'emploi*, Presses Universitaires de Rennes, Rennes.

Denis B., Lazaric N. (1999) How and why routines change: Some lessons from the codification of knowledge with ISO 9002 implementation in the food industry, *EAEPE Conference*, Prague, November.

Divry C. (1998) Mémoriser et innover : objets d'évolution et système d'incitation, *Revue Internationale de Systémique* **12**, no. 1, pp. 99-118.

Divry C., Lazaric N. (1998) Mémoire organisationnelle et codification des connaissances, *Revue Internationale de Systémique* **12**, no. 1, pp. 3-11.

Dosi G., Marengo L, Fagiolo G. (1996) *Learning in evolutionary environments*, unpublished working paper, prepared for the 6th International J.A. Schumpeter Conference, Stockholm, June.

Friedman M. (1953) The methodology of positive economics. In: Friedman M. (Ed.), *Essays in Positive Economics*, University of Chicago Press, Chicago.

Gouzien A. (1999) Routines, institutions et transformation des relations d'emploi. In: Hénaff G. (Ed.), *Habitudes et routines dans les relations d'emploi*, Presses Universitaires de Rennes, Rennes.

Hénaff G. (1999a) Les usages d'entreprise, entre la permanence et le changement. In: Hénaff G. (Ed.), *Habitudes et routines dans les relations d'emploi*, Presses Universitaires de Rennes, Rennes.

Hénaff G. (1999b) *Habitudes et routines dans les relations d'emploi*, Presses Universitaires de Rennes, Rennes.

Hodgson G. (1997) The ubiquity of habits and rules, *Cambridge Journal of Economics* **21**, pp. 663-684.

Hodgson G. (1994) Optimisation and evolution: Winter's critique of Friedman revisited, *Cambridge Journal of Economics* **18**, pp. 413-430.

Keynes J.M. (1973) The general theory and after: deference and development. In: *The collected Writtings of John Maynard Keynes*, Vol. XIV, London, Macmillan.

Lazaric N. (1999) Routines et apprentissage dans la théorie évolutionniste: portées et limites des fondements cognitifs. In: Baslé M., Delorme R., Lemoigne J.-L, Paulré B. (Eds.), *Approches évolutionnistes de l'entreprise et de l'industrie*, l'Harmattan, Paris

Lazaric N. (2000) Apprentissage collectif, routines et compétences : richesses et apories de la théorie évolutionniste. In: Tanguy C., Villacencio D. (Eds.), Special issue: Apprentissage et

innovation dans l'entreprise: une approche socio-écononomique des connaissances, *Technologies Idéologies Pratiques Revue d'anthropologie des connaissances* **14**, no. 1.

Lazaric N., Lorenz E. (1998) *Trust and Economic Learning*, E. Elgar, Londres.

Lazaric N., Mangolte P.A. (1998) Routine et Mémoire organisationnelle: un questionnement critique de la perspective cognitiviste, *Revue Internationale de Systémique* **12**, no. 1, pp. 27-49.

Lazaric N., Mangolte P.A. (1999) Routines in practice: some criticisms of the cognitive perspective, *Revista di Economia Contemporanea*, Janeiro-Junho, no. 5, pp. 23-39.

Lesourne J., Orléan A. (1998) *Advances in self-organization and evolutionary economics*, Economica, Paris.

Lester (1946) Shortcomings of marginal analysis for wage employment problems, *American Economic Review* **36**, pp. 63-82.

Malchup F. (1946) Marginal analysis and empirical research*, American Economic Review* **36**, pp. 519- 554.

Mangolte P.-A. (1998) *Le concept de 'routine organisationnelle', entre cognition et institution*, Thèse nouveau régime, Université Paris XIII.

March J.G., Simon H.A. (1958) *Organizations*, Wiley, New York.

Newell A., Simon H.A. (1976) *Human problem solving*, Prentice Hall, Englewood Cliffs.

Nelson R., Winter S. (1982) *An Evolutionary Theory of Economic Change*, Harvard University Press.

Nonaka I., Takeuchi H. (1995) *The knowledge-creating company*, Oxford University Press, Oxford.

Orléan A. (1994) *Analyse économique des conventions*. Presses Universitaires de France, Paris.

Polanyi M. (1958) *Personal Knowledge, towards a post critical philosophy*, London Routledge & Kegan Paul.

Reynaud B. (1998) Les propriétés des routines: outils pragmatiques de gestion et modes de coordination collective, *Revue de Sociologie du Travail*, no. 4, pp. 465-477.

Simon H. ([1945], 1976) *Admistrative Behavior*, 3rd edn, Free Press, New York.

Simon H. (1999) The many shapes of knowledge, *Revue d'Economie Industrielle*, no. 88, 2e trimestre, pp. 23-39.

Veblen T. (1898) *Why is economics not an evolutionary science?*, The Viking Press, New York.

Veblen T. (1899) *The Leisure class*, French translation (1970): *La théorie de la classe de loisir*, Gallimard, Paris.

Veblen T. (1914) *The instinct of workmanship*, The Viking Press, New York.

Winter S.G. (1994) Organizing for continuous improvement: evolutionary theory meets the quality revolution. In: *Organizational learning*, Oxford University Press, Oxford.

Winter S.G. (1995) *Four Rs of profitability: Rents Resources, Routines and Replication,* unpublished working paper IIASA, WP-95-07.