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A Sceptical Look

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by

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Abstract:
Organizational routines and capabilities have become key constructs not only in evolutionary economics, but more recently also in business administration, specifically strategic management. In this chapter we explicate some of the underlying theoretical problems of these concepts, and discuss the need for micro-foundations. Specifically, we focus on some of the explanatory problems of collective-level theorizing, and what we think are tenuous assumptions about human beings. We argue that individual-level considerations deserve significantly more consideration, and that evolutionary economics and strategic management would be well served by building on methodological individualism.

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Introduction

In little more than twenty years, the notion of *routines* has become a central construct in heterodox economics — mainly evolutionary economics — as well as subsequently in various fields in business administration, mainly organization theory and strategic management. Routines have been defined in many different ways, but the one that arguably best captures the current understanding is the one put forward by Cohen et al. (1996) who define a routine as "... an executable *capability* for repeated performance in some *context* that has been *learned* by an organization in response to *selective pressures*" (Cohen et al., 1996: 683). As the quotation suggests, routines are seen as collective (organization) level constructs that somehow embody prior learning and are somehow selected for.

Indeed, in evolutionary economics, routines are seen as having paramount importance, because they provide "the central unit of analysis," (Becker, 2004a: 643), not only in the sense of being the most "micro" unit of analysis that is conventionally applied, but also in the sense of linking directly up with the evolutionary triad of variation (i.e., variation in routines across a population of firms), selection (i.e., changes in the relative weights of routines in this population), and heredity (i.e., the notion of routines as the social equivalent to genes). In fact, the new evolutionary economics that took off after the publication of Nelson and Winter (1982) is so strongly based on the notion of routine that a "routine-less" evolutionary economics seems almost impossible. Even mainstream economists have made occasional use of the routine notion (e.g., Milgrom and Roberts, 1992: 273-277).

While the notion of routines may not enjoy similar prominence in business administration, the strongly related (and perhaps derived) concept (cf. Dosi, Nelson and Winter 2000b: 4) of *organizational capabilities* has increasingly become a key construct, particularly in the field of strategic management (e.g., Eisenhardt and Martin, 2000; Henderson and Cockburn, 1994; Nelson and Winter, 1982; Teece et al,

1997; Winter, 2003; Zollo and Winter, 2002).[1] Indeed, building on resource-based logic (Barney, 1991) and the notion of organizational routines (Nelson and Winter, 1982), the organizational capabilities approach has become perhaps the dominant way of thinking about heterogeneity and performance in strategic management.

We are less impressed than is apparently the case in the evolutionary economics and strategic management communities by the notion of routines, and its related/derived concepts, such as capabilities (Teece et al., 1997), competencies (Henderson and Cockburn, 1994), dynamic capabilities (Eisenhardt and Martin, 2000), etc., and offer a sceptical look. Sceptical looks at routines and similar constructs have been offered previously (e.g.,; Foss and Foss, 2000; Foss, 2003; Williamson, 1999). In fact, proponents of the notion of routines have often admitted to the definitional difficulties (e.g., Cohen et al., 1996) and terminological anarchy (e.g., Dosi, Nelson and Winter, 2000b) that surround the concept. For example, Becker, a proponent of the routine construct, admits that "[d]espite (or because) its increasing popularity, many ambiguities and inconsistencies in the literature dealing with routines prevail still today" (Becker, 2004a: 643).

While extending some of these critiques, we proffer new, and, we believe, more fundamental ones. In particular, we argue that underlying the definitional, terminological, and operational problems that beset the routine construct is a more fundamental problem of *micro-foundations*. This problem explains why — in spite of over two decades of largely theoretical (and some empirical) work, as well as recent efforts to clarify the meanings of organizational routines and capabilities (e.g., Cohen et al. 1996; Dosi, Nelson and Winter 2000b; Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003; Winter, 2003; Zollo and Winter, 2002; Zott, 2003) — fundamental

[1] While Nelson and Winter (1982: chapter 5) think of capabilities as higher-level than routines, Dosi, Nelson and Winter (2000b: 4) indicate that routines and capabilities are strongly overlapping concepts: "…we think of 'capability' as a fairly large-scale unit of analysis, one that has a recognizable purpose expressed in terms of the significant outcomes it is supposed to enable, and that is significantly shaped by conscious decision both in its development and deployment. These features distinguish 'capability' from 'organizational routine' … subject to the qualification that *some* organizational routines may equally well be called capabilities." Most of what we say in the following about routines also applies to capabilities.

questions about the origins and foundations of routines, and therefore the theoretical and empirical status of the approach, still persist (Becker 2003; Sidney Winter in Murmann et al., 2003). Specifically, we explicate some of the deficiencies of current routines and capabilities-based work, zooming in on those that stem from its reliance on a *collectivist* mode of theorizing, which sidesteps numerous individual-level considerations, including individual action and *a priori* individual heterogeneity. In order to develop this point, we implicitly rely on seminal work in the philosophy of social science on methodological individualism and collectivism (e.g., Elster, 1989; Hayek, 1952; O'Neill, 1972; Popper, 1959; Udehn, 2002). We emphasize the value of clearly articulating the philosophical underpinnings of theory (cf. Powell, 2001), as underlying, philosophical assumptions, though often not explicitly stated, not only take sides in ongoing philosophical debates, but also drive the questions being asked in scientific fields (Rosenberg, 1995: 3-4).

The chapter is designed as follows. We begin by providing a brief history of the notion of routines, adding to Becker (2004a&b). Although writers who make use of the routine construct often make reference to works in behavioralist organization and management theory (notably, Simon 1945; March and Simon 1958; Cyert and March 1963), the real problems with the routine construct can be rather unambiguously traced to Nelson and Winter (1982). In contrast to earlier writers, Nelson and Winter define routines as partly unobservable, emergent, collective-level constructs, but fail to provide a micro-foundation for routines. Virtually all subsequent writers on routines and related (and derived) concepts such as capabilities or competencies have adopted this understanding, and most have failed to provide a micro-foundation for routines (or related collective level constructs). We then document the methodological collectivist tendency in current work on routines and capabilities, before we move on to discussing some of the explanatory problems caused by this collectivism. We end by outlining some ideas for an alternative, individualist research program.

We should note that the overarching scepticism on our part is not so much with the notion of routine *itself* (nor its potential existence), but rather with what is theoretically

sacrificed by focusing on this collective construct. That is, a number of more micro-level considerations logically deserve primacy prior to speculating about more collective level phenomena. After all, logically the latter may simply be artefacts of the former. However, we are concerned that an artificial separation between levels and disciplines in the case of organization science may result in underdetermined theory. Both the notions of routines and capabilities are arguably cases in point.

Routines: a Brief History of the Concept

In his magisterial review of the work on routines during the last two decades, Becker (2004a) argues that routines are usually defined as "patterns," but that it has been unclear to what exactly the relevant patterns refer. Thus, it is not always clear, he argues, whether routines denote non-observable, individual level "habits of thought"; observable, individual level "habits"; collective-level, non-observable thought patterns; or observable recurrent interaction patterns. For our purposes, Becker's taxonomic distinctions are very useful for casting light over the doctrinal history of the notion of routines. Thus, in the following we shall argue that there has been an overall tendency in the literature to change the interpretation of the relevant pattern *from the individual to the collective level and from the observable to the non-observable dimension*.[2]

Behavioralism and Modern Work on Organizational Routines

Contributors to the organizational routines literature often invoke the work of behavioralist organization theorists, notably Herbert Simon, James March and Richard Cyert (e.g., Dosi, 2000; Knudsen 2004; Nelson and Winter 1982). Nelson and Winter are quite explicit about their indebtedness to the behavioralist tradition. Thus, when discussing "the need for an evolutionary theory," they observe that their "… basic

[2] This is in conflict with Becker's (2004a: 646) interpretation. He argues that the collective nature of routines has not been generally recognized, because of "… a sometimes ambiguous presentation of the issue in crucial passages of important works" and he explicitly lists Simon (1947). In contrast, we read Simon as a staunch methodological individualist, who did not emphasize the "collective nature" of routines or similar constructs.

critique of orthodoxy is connected with the bounded rationality problem" (p.36), and that, therefore, they "… accept and absorb into [their] analysis many of the ideas of the behavioral theorists" (p.35-36). In particular, they are attracted to the behavioralist notion that short and medium run firm behavior is determined by relatively simple decision rules (Cyert and March 1963).[3] They also make use of behavioralist models of satisficing search (Simon 1955). In a later contribution they note that "[t]he view of firm behavior built into evolutionary economic theory fits well with the theory of firms contained in modern organization theory, especially the part that shares our own debt to the 'Carnegie School' (March and Simon, 1958; Cyert and March, 1992)" (2002: 42). In a reading stressing continuity, Nelson and Winter (1982) may be seen as going significantly beyond behavioralism by examining populations of firms with different routines, by addressing the interplay between changing external environments and changing routines, and by trying to bring bounded rationality together with tacit knowledge in the notion of routine (for this interpretation see Pierce, Boerner and Teece 2002).

Behavioralist Precursors?

We question this interpretive lens. While there can be no doubt that modern work on organizational routines is in some important dimensions critically indebted to behavioralism in organizational theory, in some other equally important dimensions, it represents a departure from behavioralism. Perhaps the most important way in which later work departs is that it breaks with the important idea in social science of methodological individualism, that is, taking individual actions (rather than collective entities) as explanatory primitives. Thus, the notion of routines as it is being used by contemporary writers breaks with this idea by taking routines (and capabilities) as explanatory primitives. In contrast, behavioralism as stated in the classical works of Simon (1945), March and Simon (1958) and Cyert and March (1963), was explicitly methodological individualist in stressing that organizational theory must be built from

[3] Winter (1964b) wrote an early and favorable review of Cyert and March (1963). In a later paper (Winter, 1986), he is keen to place Nelson and Winter (1982) in the behavioralist tradition.

a individual-level foundation of bounded rationality. Modern work on organizational routines goes significantly beyond the alleged precursors by stressing the collective, often non-intentional, tacit, emergent, and non-observable aspects of routines, and by neglecting to build a foundation for routines in individual level considerations. To see this, consider Simon (1945), March and Simon (1958) and Cyert and March (1963).

In his development of organizational theory, *Simon* (1945) often refers to the benchmark of the economics model of the agent. Although his development of the notion of "administrative man" as one whose beliefs and values can be influenced by conscious management of course goes significantly beyond this benchmark, Simon's intention is in no way to break with the reductionist mode of explanation that is characteristic of economics. Indeed, his whole view of administrative behavior revolves around the individual, taken up as it is with "… the factors that that will determine with what skills, values, and knowledge the organization member undertakes his work. These are the 'limits to rationality' with which the principles of administration must deal" (1945-46). Tellingly, Simon's discussion of "group behavior" (1945: 80-82) is entirely in conformity with methodological individualism.[4]

March and Simon (1958) mention "routine" a number of times, mainly in connection with the "theory of rational choice put forth here" (p.160), so that the connection to individual level behavior is emphasized. There is a brief mention of "activities" being routinized, but it is unclear from the context, whether this refers to organizational activities or individual activities. It would be strange if Simon's fascination with the computer wasn't reflected in his contributions to organizational theory – and, of course, it is. For example, in March and Simon (1958) there is a long discussion of "performance programs in organizations." This is where they come closest to later discussions of routines and capabilities. However, although they emphasize that performance programs will be reflected in the minds of employees, and thus have a

[4] In a comment written much later, Simon (1945/1997: 89) once refers to routines, citing Nelson and Winter (1982). However, Simon seems to have standard operating procedures in mind, and he points out that the "… establishment of such rules and routines is itself a rational decision, and when we speak of rationality in organizational decision-making, we must include them and the process for establishing them."

cognitive component, they stress that program may "function as control" (which requires specification of "variables that are observable and measurable," p.166) and may "contain specifications of quality and quantity" (p.166), and therefore are very largely designed and "rationally adapted to the organization's objectives" (p. 167) (depending on how bounded rationality is).

Cyert and March (1963: 1) open their book by saying that it is "… about the business firm and the way it makes economic decisions." They rather quickly move on to address the familiar problem of how goals can meaningfully be ascribed to organizations. They do so from a methodological individualist perspective, stressing, among other things, bargaining and side-payments as important features in the process of creating goals that can be ascribed to collectives (i.e., coalitions). Subsequent collective level entities (e.g., their notions of organizational "goals," "expectations" and "behavior") are founded in individual level considerations. This is also the case for the construct that is sometimes seen in the contemporary organizational routines literature as a precursor for the notion of routines, namely "standard operating procedures." Their examples of such procedures and how they are composed are very concrete ones, such as explicit task performance rules, records and reports, planning rules, and so on. Note that these are all examples of concrete, explicit rules that have been consciously designed (although they are modified in the light of their effects).

The upshot of this brief doctrinal *excursus* is that claiming that Nelson and Winter (1982) and subsequent work founded on the notion of routines derive from the earlier behavioralism of Simon, Cyert and March is somewhat problematic. True, one can indeed find shared themes, some of which are important (Pierce, Boerner, and Teece 2002), but in a number of other aspects — that we consider to be crucial — there are divergences. Thus, in contrast to later work, the behavioralists do not see routines as largely emergent, difficult-to-observe and mainly cognitive entities. And whereas the behavioralists consistently adhered to methodological individualism, later theorists

working on routines and capabilities have — more or less consciously— abandoned this principle.[5]

Nelson and Winter on *Individual* Skills and *Organizational* Routines

One way in which Nelson and Winter (1982) closely mirrors March and Simon (1958) and Cyert and March (1963) is by developing their theory on the basis of a critique of and comment on "orthodoxy," notably the neoclassical theory of the firm. However, there is an important difference already here: Whereas the behavioralists mainly took issue with this theory because of its simplistic portrayal of *decision-making* in organizations, Nelson and Winter's main problem with orthodox theory is that *firm level heterogeneity* is at best exogenously determined, and more likely suppressed, because of the constraining assumptions of neoclassical production theory; therefore, it cannot form the basis of an evolutionary theory. In other words, the critical points of departure are thus different.

To be sure, a theory of endogenous firm-level heterogeneity may conceivably be constructed from explicit behavioralist foundations (and for such attempts, see Egidi 1996; Egidi and Narduzzo 1997), but this is not, it turns out, what Nelson and Winter are trying to do. Instead, they begin, not from an explicit theory of bounded rationality, but from the notion of "skills" to the analysis of which they devote a whole chapter (Nelson and Winter 1982: chapter 4). By a skill, they mean "… a capability for a smooth sequence of coordinated behavior that is ordinarily effective relative to its objectives, given the context in which it normally occurs" (1982: 73).[6,7]

The attractions to Nelson and Winter of the notion of skill seem to be the following. First, skills and their (alleged) organization-level counterparts — routines — allow

[5] Foss (1998) argues that the heavily methodological collectivist work of Thorstein Veblen is perhaps the most obvious precursor of routines and capabilities work. See also Becker (2004b) for a discussion of precursors.

[6] While skills provides an analogy to the behavioralist notion that behavior is often guided by relatively rigid decision rules, the notion is not derived from considerations of bounded rationality.

[7] Notice how the definition of *routines* given by Cohen et al. (1996) (as cited in the Introduction) almost repeats verbatim this definition of *skills*.

Nelson and Winter to introduce the rigidity in the behavioral repertoire that is necessary in an evolutionary approach, the argument being that skilled behavior implies specialization which in turn involves reduced flexibility. Second, skills involve tacit knowledge that may be transferred through apprenticeship-like mechanisms. The notion of skill therefore introduces an analogy to heredity.[8] Third, the notion of skills is used by Nelson and Winter to establish a link between individual action and organizational behavior. That link is developed in a metaphorical (rather than theoretical) manner: "… directly relevant to our development here is the value of individual behavior as a *metaphor* for organizational behavior" (1982: 72; emphasis in original). In turn, "organizational behavior" is addressed in terms of "routines" that serve as organization-level metaphorical equivalents to individual skills. Like skills, routines represent stable sequences of actions (i.e., they coordinate actions) that are triggered by certain stimuli in certain contexts and which, in a sense, serve as memories for the organizations that embody them. However, because routines are social phenomena, they go beyond the individual skill and must raise issues of motivation and coordination. Nelson and Winter sidestep the motivation issue, postulating that routines represent "organizational truces."

In Nelson and Winter's treatment, quite a lot is packed into the notion of organization routine, including a variety of behaviors (e.g., heuristics and strategies), organizational processes and arrangements, cognitive issues (e.g., "organizational memories"), and incentives ("truces"). This is considerably more ambitious and far-reaching than the mundane interpretations of the standard operating procedures of Cyert and March (1963). The reason for this all-inclusiveness arguably is that "routine" is a catch-all

[8] As Knudsen (2004: 2) argues, " …routines are persistent containers of encoded instructions for behavior or thought. When this information is passed on … routines can function as *replicators*." The Nelson and Winter (1982: 134-136) notion of "routines as genes" also makes this point; as they note, "[e]ssential coordinating information is stored in the routine functioning of the organization" (p.134). While Knudsen (2004) is careful to note that individual level skills may also qualify as "persistent containers of encoded instructions," most proponents of evolutionary economics have followed Nelson and Winter in conceptualising the basic "container" as organization level, collective, mainly tacit routines. Presumably, the underlying idea is that the "phenotype" is represented by the firm and it is the firm that is subject to direct selection.

concept for those collective-level aspects of an organization that may contribute to the relative rigidity of firm-level behavior is so important in Nelson and Winter's theory.

This is one reason for the relative confusion that has characterized the subsequent organizational routines literature (as documented by Becker 2004a), and related literatures, notably the organizational capabilities literature in strategic management (Felin and Foss 2004). However, another source of problems lies in the absence of a clear foundation, rooted in individual behavior, for the notion of routines. As indicated, this problem is also manifest in Nelson and Winter (1982). Although bounded rationality is frequently invoked in the book, very little real use is made of it, and, in general, it is fair to say that there simply is no micro-foundation for the key collective level constructs of routines and capabilities in Nelson and Winter (1982). In a recent paper, Nelson and Winter (2002: 31) argue that "[I]n contrast to the usual quest for microfoundations in economics, seeking consistency with rationality assumptions, our quest is for consistency with the available evidence on learning and behavior at both the individual and organizational levels." It turns out that what they mean by the "available evidence" may be somewhat idiosyncratic. They go on to argue, in this paper, that "[w]ith respect to individual learning, the plausibility of our behavioral foundations for evolutionary economics has received support from an unexpected quarter. Studies linking cognitive abilities and brain physiology have established the existence of anatomically distinct memory processes supporting the skilled behaviors of individuals" (Nelson and Winter 2002: 33).[9] Not only is such memory "highly durable," it also "… functions in some ways that are alien to theories of calculative rationality" (p.34).

While the cognitive sciences seem to provide compelling support for the notion of skilled behavior, the evidence that Nelson and Winter present in support for the critical move from individual skilled behavior to organizational routines (or the collective-level) is less so. The only cited evidence is an experimental study of card-playing teams

[9] No references are given, but presumably they have in mind the kind of work described in Damasio (1994).

(Cohen and Bacdayan 1994) that demonstrated that team level skills (i.e. "routines") acquired under one specification of the played game made the adaptation to a new specification of the game sluggish. While this has much to do with skilled and inertial behavior and problems of adaptability on the level of teams, it is not clear what exactly all this has to do with bounded rationality, and its implications for firms are unclear.

Routines (and Related Constructs) After Nelson and Winter

The Nelson and Winter notion of routines, as we have alluded to above, have recently been extended into strategic management. There it has been argued that routines provide a rather static picture of organizational behavior (Eisenhardt and Martin, 2000), and thus dynamic capabilities — or, routines for routines (Collis, 1996) — provide a more accurate conceptualization to help understand the dynamics of collective heterogeneity. Organizational capabilities and "dynamic routines" did, of course, get some attention in Nelson and Winter's work (e.g., 1982: 96-136), and it can even be argued that relatively little real theoretical development has occurred since their work on these issues (Foss 2003). Nevertheless, no matter who gets credit, simply put, capabilities are argued to be higher level or second-order routines (Winter, 2003), and have proven to be an increasingly important construct in strategic management. Overall – to again distinguish routines from capabilities – the latter reflect the ability of the organization to reflexively revisit what it routinely does, particularly in dynamic, changing environments. Eisenhardt and Martin (2000) argue that these capabilities are relatively simple rules that organizations follow and that these capabilities more practically reflect things like the ability to ally, or customer service.

One important problem with the capabilities literature, whether in evolutionary economics or in strategic management, is that it has prematurely moved to higher level or higher order constructs, without first getting clarity on the underlying notion of routines. Routines still have an ever-pervasive flavor — routines as truce, memory, genes etc. — that defies careful theoretical definition, let alone empirical measurement. Capabilities may have a nice ring to them, but unfortunately they seem to deflate under closer inspection. As noted by Williamson (1999), this kind of work has the danger of

becoming mere retrospective story-telling – once a successful company is identified, capabilities are pointed out post hoc. Sampling on the dependent variable like this is problematic as it does not allow for theoretical prediction or falsification (Bacharach, 1989).

As in the case of routines, capabilities also have an *extra*-individual connotation. This has, however, remained rather implicit. As an example, Henderson and Cockburn (1994) implicitly presume in their highly cited article on organizational capabilities that individuals are homogeneous, and that heterogeneous organizational factors drive overall outcomes (Felin and Hesterly, 2004). However, there is a clear problem of individual-level self-selection, which confounds collective effects. Thus, one can readily presume that a highly promising scientist has every incentive to select into the best possible environment, thus challenging the notion of random distribution — again an underlying assumption in much of routine and capabilities based work (see Stern, 2004 for an example). Simply put, the notion of self-selection suggests that organizational effects may simply be artefacts of individual level *a priori* inputs.

The levels related problem of individual-level homogeneity and collective heterogeneity (or primacy), as well as the problem of the suppression of models of individual action, suggest a set of more fundamental critiques of the whole notion of routines (one that applies with equal force to derived concepts, such as capabilities). First, "routine," as the notion is currently being used, is a collective notion that does not have a solid micro-foundation. Second, it is highly problematic to treat it (or derived concepts) as an explanatory primitive, as is currently being done in evolutionary economics (e.g., Dosi 1995) and strategic management (e.g., Winter, 2003). Third, it is conceivable, and perhaps even likely, that collective concepts such as routines and capabilities are in actuality epiphenomena that may even blur the understanding of more foundational and theoretical individual-level effects. In the following, we discuss these critiques in greater detail.

Missing Micro-foundations for Routines

Methodological Individualism versus Collectivism

One of the classical dividing lines both within and across disciplines in the social sciences is the one between methodological individualists and methodological collectivists (Udehn, 2001, 2002).

For the former (e.g., historically Popper 1957 and Hayek 1952, and more recently Coleman, 1990 and Elster, 1989) explaining collective phenomena (whether institutions, organizations, culture, or social movements) is "… to show how they arise as the result of the action and interaction of individuals" (Elster, 1989: 13).[10] To be sure, methodological individualists are a diverse lot. For example, one disagreement within the overall methodological individualist program concerns the relative importance of unintended versus intended social phenomena (contrast, e.g., Brennan and Buchanan, 1985 and Hayek, 1973). In fact, those methodological individualists, like Hayek, who strongly stress unintended consequences may occasionally come close to holding positions that smack more of collectivism than of individualism (e.g., Hayek, 1973). Such theorists may disagree with methodological individualism in its purest form, namely the position that only individuals are real, that they "exhaust the social world" without remainder (Kincaid, 1997).[11] Many methodological individualists do not espouse this strong form (Agassi, 1960). However, all methodological individualists deny the *primary* causal influence of collectives on individuals, and insist that ultimately collective phenomena must be reduced to and explained in terms of individuals — that is, individual endowments, intentions, desires, expectations, and goals (cf. Boudon, 1998; Elster, 1989, 1998; Hayek 1952).

[10] A point worth noting at this juncture is that the link between the individual and collective level has proven to be among the toughest Gordian knots in the social sciences — whether economics (e.g., Arrow, 1951) or sociology (e.g., Coleman, 1990). This said, however, the fundamental starting point for analysis must be the individual level, indeed, our assumptions about individuals and human nature are absolutely fundamental to our theories (Simon, 1985; also see Coleman, 1990: 2-8), and thus cannot simply be brushed aside. While various patterns manifest themselves at the collective or firm level, *explanation* is best done at the individual level.

[11] In fact, some radical methodological individualists have advocated the complete reduction of all social phenomena to psychological analysis of the mental states and characteristics of individuals ("psychologism" e.g., Watkins, 1952).

Collectivists, however, argue that culture, institutions, and other collective phenomena are *sui generis* and thus must be studied as real things, which determine individual action, desires, and outcomes (cf. Durkheim, 1952). In thus suggesting that collective concepts can be employed as the key independent variables, there is an implicit or explicit suggestion that the individual can in effect be rounded out, or that individuals are infinitely malleable by cultural or collective-level factors. Overall, there are several, critical explanatory problems with collectivist theorizing, which we specifically highlight below in light of the routines and capabilities-based work. Although only few of those who work on capabilities and routines have explicitly defended methodological collectivist approaches,[12] or have at all noted the methodological implications of their approach, work on routines and capabilities nevertheless have a distinctly collectivist flavour.

The Individual-Organizational Link

As we noted above, the behavioralists were acutely aware of the thorny issues involved in going from the individual to the organization (collective) level. Perhaps because their concern was not decision-making in organizations, but firm-level behavior, Nelson and Winter sidestepped, as we have argued, the aggregation problem of moving from individual action to organizational outcome by reasoning *metaphorically* from individual skills to organizational routines. Skills, as developed by Nelson and Winter are individual-level capabilities "for a smooth sequence of coordinated behavior" (p. 73). Outcomes therefore are a function of individual skills and abilities, which indeed can be fairly automatic, which however should not discount the fact that significant heterogeneity in skills and abilities may already exist at the individual level. While the conceptual (metaphorical) leap from individual skills to organizational routine has by now been readily accepted by scholars in the domains of evolutionary

[12] But see Kogut and Zander (1992), Dosi (1995), and Hodgson (1998) for some quite explicit methodological collectivist statements. Howard Aldrich has recently summarized the efforts of the present collectivist approaches to strategy and their underlying assumptions about as follows: "… if we truly focused on routines, competencies, practices and so on, we would *not* follow people anymore in our research" (Aldrich in Murmann et al., 2003: 25-27; emphasis in original text). It is not clear from the context whether Aldrich actually supports such a view.

economics and strategic management, we want to carefully revisit this link and its underlying (implicit) theoretical assumptions.

Specifically, what gets missed with the leap from individual skills to organizational behavior is that it is individuals rather than organizations that act and behave. In other words "organizational" action, behavior, and outcomes are simply proxies for a group of individuals who take action, behave, and create the overall outcomes. While there is general awareness of Simon's (1964) warning to not reify organizations, or put differently, to attribute individual-level qualities or characteristics to organizations, nevertheless there has been a steady increase in organization-level constructs — organizational identity, organizational learning, organizational memory — that has not been accompanied by carefully establishing the theoretical linkages between the individual and the organizational levels (cf. Coleman, 1990). For all organization level constructs, the question of how the individual exactly fits in — other than the "cog in the wheel" — deserves careful consideration. After all, organizations are populated by individuals with various *a priori* predispositions, experiences, characteristics, talents, and abilities. Even if we presume the existence (and we have no problems with this) of organizational phenomena such as routines, the readily apparent question then is their origin (cf. Coleman, 1990: 2-5), thus again demanding an individual-level starting point.

Related to the above, the move from the individual to the collective level also has significant "levels of analysis"-related repercussions, which often get sidelined for analytical convenience. While it can be argued that "everything" is a multi-level phenomenon, at some point theories need to *idealize* (Mäki; 1994; Schütz; 1932; also see Nelson and Winter, 1982: 134), or more specifically, theories need to commit themselves to the primary, *causal* drivers. Given the pervasive collective level focus — that is, routines at the collective or organizational level drive overall differences in outcomes —, the underlying assumption about individuals are worth some thought. When specifying a collective as the key level of analysis — the implicit assumption about individuals is that they are homogeneous, and that collective heterogeneity drives overall outcomes (cf. Dansereau et al., 1999). Put differently, differences in collective

settings drive overall differences in individual outcomes. The assumption of homogeneity is, of course, potentially warranted in some settings – but when thinking about heterogeneity in organizational performance (the *raison d'etre* of strategic management) – the assumption seems tenuous at best. Put differently, can we assume that individuals are randomly distributed into organizational settings? We suggest not. That is, *a priori* individual-level mechanisms may drive much of the collective differences that are observed. It deserves to be reiterated, organizations are made up of individuals, and simply stating that "organizations are strong situations" (Davis-Blake and Pfeffer, 1989), does not make it so. Granted, individuals do work within collective settings such as groups and firms, but nevertheless their talents and skills cannot be brushed aside. That notions of routines and capabilities do precisely this will be argued next.

Routine Collectivism and Its Consequences

There are several problems worth noting in light of the present collectivism in knowledge-based work. We highlight what we consider the most important sources of problems — including definitional problems, the problem of origins, problems of empirical measurement, and finally, concerns related to practice.

Definitional Problems

We agree entirely with Becker (2004a: 643) who recently concluded that no clear definition of capabilities has been advanced to date (e.g., Cohen et al. 1996). While definitions proffered have been as broad as "ways of doing things" (Winter, 1986: 165), other definitions have included "ordered sets of actions" or "grammars of action" (Pentland and Rueter, 1994: 489). Cohen and Bacdayan suggest that routines are "patterned sequences of learned behavior involving multiple actors who are linked by relations of communication and/or authority" (Cohen and Bacdayan, 1994: 555). Unfortunately, two decades of work have left little consensus on what routines are (cf. Cohen et al., 1996).

When writers try to proffer definitions, they often pack so much into routines and capabilities that they effectively become identical to the organization itself, including heuristics, strategies, organizational processes and arrangements, cognitive issues (e.g., "organizational memories"), and incentives ("truces") (Levitt and March 1988; Nelson and Winter, 1982). Overall, it is one thing to claim that ontologically, things are a mess; it is another thing to openly admit the mess into the analysis. If there are no individualistic foundations for the analysis of routines and capabilities, we submit that the mess is simply unavoidable.[13] That is, arguing that individuals *a priori* are homogeneous (cf. Klein et al., 1994) or largely malleable leads to a tenuous assumption about human nature (cf. Simon, 1985), which directly conflicts with established theoretical and empirical arguments from the cognitive sciences emphasizing the role of the innateness of knowledge – thus challenging the prevalent "organizations as strong situations" argument (Davis-Blake and Pfeffer, 1989).

The Origins of Routines

A fundamental, readily apparent problem with extant collectivist capabilities-based work is the lack of clear (causal) understanding of the origin of routines and capabilities. Winter has recently explicitly noted that "… the question of where routines and capabilities come from … deserves vastly more attention" (Sidney Winter in Murmann et al., 2003: 29). Zollo and Winter (2002: 341) further add: "To our knowledge at least, the literature does not contain any attempt at a straightforward answer to the question of how routines – much less dynamic capabilities – are generated and evolve". If organizational routines and capabilities indeed are the fundamentally heterogeneous component driving firm performance (cf. Eisenhardt and Martin, 2000) – the question

[13] Recent work has also argued for the existence and importance of aggregates or collections of routines and n^{th} level capabilities (Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003; Winter, 2003; Zollo and Winter, 2002). However, this has only further muddied the already muddy waters. Clarity on the basic construct is first required, before more elaborate explications. For example, Winter (2003) recently attempts to clarify the notion of dynamic capability by introducing a zero level capability in the capability hierarchy. The zero level capability manifests itself in an organization at equilibrium, where "… an organization keeps earning its living by producing and selling the same product, on the same scale and to the same customer population over time" (Winter, 2003: 992). A first-order 'dynamic' capability is, for example, product development, or geographic expansion (Winter, 2003: 992; also see Eisenhardt and Martin, 2000).

of their origin is absolutely fundamental. Strategic management after all is concerned with *purposeful* heterogeneity, that is, understanding *intentional* sources of performance differences. The observed collective heterogeneity after all can simply be a function of randomness and luck (Alchian, 1950). The collectivist orientation underlying the capabilities approach provides a radical departure from the *raison d'etre* of strategic management, which ought to provide actionable and useful theoretical insights for the practicing manager (Rumelt et al., 1991). The present capabilities-based work relies heavily on the importance of the environment in determining overall collective outcomes, but these environments largely equally influence all firms and thus the sources of advantage must logically originate from nested levels (cf. Barney and Hesterly, 1996). In a subsequent section (see "Deep Structure and the Question of Who") we provide some preliminary theoretical development for answering the question of origins, with particular attention to individual-level foundations.

Problems of Empirical Application

Problems of definition are almost bound to produce problems of empirical application, and the issues of testability and operationalization have indeed plagued this stream of research since its very origins (cf. Williamson, 1999). Put more bluntly, an agreed upon, or even a simple, rudimentary operationalization has remained elusive despite more than two decades of work (see Winter's related comments in Murmann et al., 2003: 29; see also Cohen et al. 1996). Thus the very existence of routines is based on a hope for the primacy of collectives in embodying knowledge and ways of doing things, which however, in reality, are executed with various levels of proficiency by individuals. Empirically, capabilities-based work has recently seen individual-level measurement, though the confounds (including problems of causality and endogeneity) are readily apparent in the clear conflict between collective theorizing and individual-level measurement (Lacetera et al., 2004). Overall, empirical measures for routines and capabilities should be forthcoming as theoretical statements must be subject to empirical verification and falsification (Bacharach, 1989) or else simply give way to more measurable and scientific alternatives.

There are a few studies worth briefly highlighting in terms of empirical measurement (see Becker, 2004 for a more thorough review), particularly in light of the arguments we have made above. Routines have been the source of empirical investigation through experiments (e.g., Cohen and Bacdayan, 1994), ethnographic methods (e.g., Edmondson et al., 2001; Pentland and Rueter, 1994; Weick and Roberts, 1990; Winter and Szulanski, 2001), and archival, quantitative methods (e.g., Henderson and Cockburn, 1994; Knott and McKelvey, 1999). The vast majority of empirical studies use various ethno-methodological approaches, thus underscoring the imprecision of the notion of routine. In fact, what ultimately often gets measured are various individual-level observables – such as mobility or individual characteristics – ironically quite contrary to the collective-level theory. Knott and McKelvey (1999) do provide a recent attempt at measuring routines, though their indirect measures of routines seem to simply measure the effects of scale economies, rather than routines directly. In another highly cited and even foundational empirical piece – Henderson and Cockburn (1994) discuss and empirically test the concept of organizational competencies (directly derived from routines). The problems of empirical measurement are readily apparent in this work as the scholars wrestle with the individual-collective problem by explicitly having to presume that individuals *a priori* are homogeneous (and thus can safely be rounded out), and thus organizational competencies provide the key driver of outcomes.

Discussion

Possible Conceptual Directions for Future Work

Overall we have discussed the current collectivist focus of extant capabilities-based work, and argue for the need for micro-foundations. In the following, we develop some conceptual directions for future research. It should also be noted that while we do not advocate a completely atomistic, individualistic approach, we do believe that a weak form of individualism provides an adequate amount of consideration for individuals, though it also recognizes the potential (secondary) causal influence of routines and other collective structures. Specifically, in this section, building on

theoretical insights and findings from psychology and organization behavior, we develop a broad framework for the origins of organizational routines and capabilities, and their heterogeneity.

As noted earlier, the origins of organizational routines and capabilities have received little if any attention (Zollo and Winter, 2002). The origins are largely considered to be experiential (Eisenhardt and Martin, 2000; Zollo and Winter, 2002), and overall, it is argued simply that "firms tend to do what they have done before" (Kogut and Zander 1995: 425, also see Dosi 1988: 1130, Levitt and March 1988: 320, Nelson and Winter 1982: 134-135). While a historical, idiosyncratic, or experiential perspective on the origins of routines is interesting, it nevertheless does not allow for a theoretical basis for the origins of these experiences. What specifically is the source of the observed collective heterogeneity in capabilities? Is it simply history and experience ("accumulated experience" Zollo and Winter, 2002 or "past routines" Nelson and Winter, 1982), or is it possible to argue for more fundamental, individual-level antecedents?

Deep Structure and the Question of "Who"

Many fundamental questions of strategy are dealt with at the individual level – including questions about the origin of structure, decision-making power, motivation, appropriation, etc. –, all (it seems) outside the purview of current capabilities-based work. Overall, we believe that capabilities-based work has focused on the wrong "central" elements of extra-individual routines, while starting with individuals and individual action and interaction provide a better starting point, particularly given that the field of strategic management strives to offer useful theoretical insights, even for the practicing manager. What deserves reiteration with regard to routines in terms of practice, again, is that while routines quite feasible provide *an* element of organizational behavior, sole focus on the construct however has come at the expense of critical individual-level considerations.

The deep structure providing the antecedent to collective surface structure is what we label the "who" question. That is, *who* starts the firm, *who* is attracted into it, *who* turns over, *who* the organization is composed of, etc. is absolutely fundamental for overall

organizational outcomes and advantage.[14] Similar to much of organization behavior and theory (Davis-Blake, 1989), however, the underlying assumption in strategy has been that organizations are "strong situations", and that individuals are malleable, homogeneous, or at least randomly distributed into organizations. This assumption effectively suppresses the "who" question(s). However, even casual observation of for example R&D environments, suggests that the mechanism of self-selection plays a fundamental role in overall outcomes (e.g., Stern, 2004; also see Zenger, 1994). That is, highly talented individuals self-select and are attracted into (and create) certain environments, thus being largely responsible for overall outcomes (cf. Schneider, 1987). The parallels to the "school effects" literature are striking here – that is, while early sociological work pointed to the primacy of schools in determining individual learning outcomes, later and more recent studies showed that *a priori* individual effects (e.g., abilities to learn) dwarf environmental or collective effects in learning outcomes (Jencks, 1972; Felin and Hesterly, 2004).

We should note again that extant arguments in the organizational capabilities literature specifically argue that 1) organizational routines are independent of individuals (Levitt and March, 1988: 320; Nelson and Winter, 1982), and given the primacy of routines that 2) organizations can withstand significant turnover without material effects on the organization (Kogut and Zander, 1992). We address each point in turn, as it relates to our overall framework focusing on individualist foundations.

First, the independence of organizational routines from individuals. From the perspective of methodological individualism, collective structures are dependent or supervenient to the individuals who make up the organization. How things are done in organizational settings, both in terms of structure and overall efficiency or creativeness, is a function of *who* is doing. Even in highly "routinized" environments, the origins of heterogeneous routines are fundamentally individual-level (Foss and Foss 2000). While capabilities-based work focuses on exogenous sources of advantage –

[14] Our argument here builds on Schneider's (1987) insightful attraction-selection-attrition (ASA) framework, which gives strong *a priori* emphasis to the individuals who make up an organization. Quite surprisingly, Schneider's landmark article has not been referenced in (much less theoretically extended into) strategic management, despite its clear repercussions for capabilities-based work.

environment, situation etc. determining experience –, nevertheless the key *differential input* is the services or capabilities of the people who make up the organization (cf. Schneider, 1987). That is, the fundamental difference in how environments and situations are reacted to – is nested within the individual-level.

Second, the implications of turnover on organizational capabilities and performance. Given the primacy given to collective routines and capabilities, extant work argues that individual turnover logically does not affect overall organizational routines or outcomes (e.g., Kogut and Zander, 1992; Levitt and March, 1988). However, this conceptualization is fundamentally flawed from an individualistic perspective. That is, *who* turns over is absolutely fundamental to overall organizational outcomes. Recent work in fact has begun to wrestle with the problem of individual-level measurement and collective-level theory. That is, work for example by Song et al. (2003; also see Lacetera et al., 2004) suggests that capabilities can simply be brought in as a function of certain, key individuals, which implies that capabilities in the first place may reside in individuals versus in the organization.

Moreover, we should note that much of what happens within organizations can scarcely be labeled as routine (Williamson, 2002: 426; also see Barnard, 1968: 240; Garicano, 2000: 898). That is, individuals within organizations, particularly managers, deal with exceptions rather than the routine. Therefore, within a given organizational setting, perhaps depending on various task or industry-specific contingencies, certain individuals provide the parameters or constraints within which action is taken (cf. Brennan and Buchanan, 1985; Elster, 2000). This gives way to a two-stage process where (for example) standard operating procedures and rules of interaction are first created and specified by organizational founders or managers, and then individuals interact given these collective structures or constraints, perhaps gradually changing those procedures and rules (Foss and Foss 2000).[15]

[15] Furthermore, given the inevitable "degeneracy" in closed systems of interaction, the key role that external individuals provide in breaking up myopic structures should be recognized. That is, "degeneracy is avoided if there is turnover" (March, 1991: 80), and insight which capabilities-based work implicitly denies given its collectivist focus (Kogut and Zander, 1992: 382).

We have argued that capabilities work in general rules out *a priori* the possibility that heterogeneity is located at the individual level. In contrast, we do not wish to rule out the possibility that heterogeneity *may* conceivably be located at the collective level. Game theory shows that many games are characterized by a multiplicity of equilibria, particularly in repeated settings. Thus, different equilibria can emerge, even if agents are relatively homogeneous. Similarly, we do not wish to argue that routines and capabilities should necessarily be understood as rationally designed. As game theory has clarified — formalizing the traditional intuition of classical liberalism that many of society's most valuable institutions (language, money, norms and conventions, etc.) are the result of "human action, but not of human design" (Hayek 1952; Ullman-Margalitt 1977) —, collective entities may conceivably arise in a wholly unplanned manner (e.g., Schotter 1981; Sugden 1986). Still, the same kind of research also shows that processes of emergence of such entities are strongly conditioned by historical specificities, such as the characteristics of the initial individuals among which the convention began (Sugden 1986). And although it stresses the unplanned emergence of social entities, this approach is squarely within methodological individualism.

Conclusions

While references abound to notions of organizational routines and capabilities, at present in evolutionary economics and strategy we have 1) no theory of their origin, 2) no agreed upon, clear definition, 3) no measurement and 4) no clear understanding of how exactly they relate to competitive advantage. In sum, the routines and organizational capabilities-based approach needs significant theoretical and empirical development prior to be able to attain theoretical status. Fundamentally, we have argued that the problem is to a considerable extent with the collectivist roots of routines and capabilities-based work, which sideline the individual, and scarcely allow for individual-level explanation. Ironically, it turns out that much of the routines and capabilities approach is vulnerable to the same critique that Winter (1991) forcefully (and justifiably) launched against the neoclassical theory of the firm. Specifically, and

borrowing directly from Winter, it is in potential "conflict with methodological individualism" (p.181) (because of the emphasis on routines and organizational capabilities), "… provides no basis for explaining economic organization" (p.183) (because collective concepts such as routines and capabilities cannot do the job), lacks "realism" (because of the "unrealistic" treatment of decision-making as entirely guided by routines), and provides a "simplistic treatment of its focal concern."

We think that the absence of attention to the level of the individual in recent evolutionary economic and strategic management research is fundamentally problematic. Individuals after all provide the nested antecedent to numerous collective phenomena and thus deserve careful theoretical and empirical consideration in our theorizing (cf. Elster, 1989). As noted by Simon (1985: 303), our underlying assumptions about the humans we are studying are absolutely fundamental to theorizing.

Our hope is that this chapter will serve as a clarion call of sorts for evolutionary and capabilities-based scholars to pay more careful attention to their underlying assumptions, and to develop theoretical arguments, which give primacy to individuals and micro-foundations. Overall we thus challenge the completely behavioral, organic, and structurally-oriented approaches to carefully revisit their underlying assumptions about individuals, and the individual-collective relationship. Moreover, significantly more work is needed on explicating the individualist micro-foundations of routines and capabilities. While we have no ontological problems with the existence and potential influence of collective structures on individual behavior as such (contrary to "strong" forms of methodological individualism, e.g., Watkins, 1952), nevertheless we argue that it is inadmissible to *begin* analysis with structures and routines, because *their origin* should be of interest and the primary focus.[16]

[16] While there most certainly are (for example) exogenous institutions, which partially determine firm level outcomes (cf. Oliver, 1997), they nevertheless influence firms more or less equally and thus are not a source of heterogeneity, while an internal focus proves more fruitful (Barney and Hesterly, 1996).

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