The innovating self: exploring self among a group of technological innovators

Tomas Hellström
Chalmers University of Technology, Göteborg, Sweden
Christina Hellström
Department of Psychology, Göteborg University, Göteborg, Sweden, and
Henrik Berglund
Chalmers University of Technology, Göteborg, Sweden

Abstract *This paper explores the relevance of the concept of self in the process of independent technological innovation. In-depth interviews were conducted with technological innovators from start-up firms in IT, biotech and advanced services concerning the subjective and social forms of engagement in the innovation process. Emerging factors in the interview data revealed aspects pertaining to the innovator's reflexive self-conception, innovator ego-involvement in the venture, forms of commitment and control, personal and social stakes, and various self-oriented cognitive strategies. It is argued that the self-concept allows the innovator to come into view as a social and subjective being who is involved in reflexive activities such as dynamic role-taking, "is" vs "ought" reflections and social negotiations.*

Introduction

The question whether the capacity to innovate is an issue of right environment or right people has been a point of debate for a long time (Slappendel, 1996; Leavy, 1997). The stakes for managers are high, since the two perspectives issue into quite different ways of stimulating innovation in the organization, namely that of either emphasizing recruitment and channeling of human resources, or setting up the organizational structures, so that the innovation process is activated and runs smoothly. Some examples of this include stage-gate models and corporate venturing units. Again others maintain that, while the capacity to innovate requires the input of people, and even of specific modes of being, there is no such thing as an "entrepreneurial personality". Rather the organization has to be flexible, so that fruitful balances between structural restriction (focus) and personal freedom (choice) are maintained (Drucker, 1986; Adair, 1990).

At the same time the trend in innovation studies is towards a "personalization" and "individuation" of how we look at the innovation process (see Poolton and Ismail, 2000). For one, the role of improvisation in the innovation process has been emphasized, as opposed to rational, planned execution of a predetermined sequence of steps (Moorman and Miner, 1998). The evolution in the 1980s of concepts such as concurrent engineering, which emphasized innovation as "reading and reacting in parallel" (Bjurwill, 1993), "thinking in the midst of action" (Irby, 1992), and the well-known maxim of

Weick's (1993) closing of the gap between design and production all pointed in this direction.

In parallel with this development there is another trend in innovation studies towards recognizing the need to stimulate the organization's creative potential through its employees (Canfield and Miller, 1998). This trend has to do with recognizing that innovative climates rest on the existence of an environment which allows individuals to self-actualize within the work setting (Covey, 1990). In this vein, suggestions have been made to promote trust, and by extension innovation, by finding ways of letting employees put their personal signature on the products and services of the organization (Glanz, 1998). The overarching theme here has been to identify the needs of humans to emerge as individuals, and to differentiate themselves (Poolton and Ismail, 2000) as vehicles for innovation.

Still, the ongoing critique of an entrenched individual-oriented view of innovation obviously has many advantages. We argue that one of the more important of these is the need for a balanced infusion of a structural perspective on innovation which does not discard the individual dimension altogether. The challenge, it seems, is rather to provide a theoretical underpinning for a view on drivers of innovation that can account both for the individual and for the social (structural) without pitting the two against each other.

In this paper we propose that such a perspective may be found in the concept of self, seen not as a fixed trait-like aspect of the individual, but as a composite construct encompassing past, present and future experiences, needs and wants of the subject embedded in a social setting. The self in this conception is not exclusively an expression of the individual, but of a form of subjectivity that is constructed in the interface between the individual, his/her surrounding world and the activities that evolve there. The self-concept has received attention in a variety of fields of inquiry but has so far not been applied to the field of innovation. This paper will approach the phenomenon of independent technological innovation[1] from the perspective of individuals' conception of self. The independent technological innovator, or the inventor who is also an entrepreneur, and who conducts his/her venture outside the larger corporate structure, is especially amenable to the study of innovators' self, mainly because their activities are expressions of needs, capacities and future projection close to themselves, and not simply results of dormant and distant structures (Hellström and Hellström, 2001).

The present study builds on 15 in-depth interviews with technological innovators in the fields of IT, biotech and advanced services. The interviews addressed questions such as – How can the "innovating self" be conceived of, used and developed in the course of technological innovation? – What role can it play? – How is it reflected upon? By answering these questions we aim, first, to provide theoretical and empirical underpinnings for the self-concept to fill the gap between the individualism and structuralism that has long been hampering the balanced understanding of drivers of innovation and, second, to provide concepts that will help innovation management in facilitating actual

innovation processes. Even so, it is important to note that the aim of the study is not to speak generally about characteristics of "all" innovators. Rather we aim at "listening" to a group of technological innovators, to establish whether we can hear the innovating self reflected or echoed in their accounts, and finally to describe these particular accounts as adequately and systematically as possible. To achieve this, the paper is divided as follows: the section immediately preceding this will provide a theoretical outline of the concept of self as it pertains to aspects of innovation as action. The key categories that we will use are "self and action", "the changing, dynamic self" and "self and motivation". These categories are informed by the understanding that innovation is a dynamic, interactive process, and driven by motivation. A description of the method and results of the interview study will form the main thrust of the third section of the paper and effort will be made to shed light on the insights gleaned from this group about the role of the self in technological innovation. Finally the discussion section will draw out various conclusions from the material, and end with a number of comments on practical interpretations and implications of the results.

Elements of the problem
Self and action
In psychology and management research alike, the self-concept is used to emphasize the cognitive and motivational aspects of human action, e.g. the self as a generating force for motivation. Some traditions also tend to treat the self as a proactive component in the subjective management of impressions, and as a source of perceptual and cognitive organization (Goffman, 1984). At the bottom of it, the self builds on human reflexivity, or on self-awareness; what Mead (1934) has termed the individual's ability to be both a subject and an object on to him/herself. For our purposes, the self can be conceived of as an amalgam of reflected and unreflected identity, on the one hand, and, on the other, the interactive processes of social identification and intentional action upon which identity has a bearing, and through which it evolves (Mead, 1934).

The self will in such case also be constitutive of the evolution of attitudes and interaction, which puts it at the heart of the social creativity, constraint and enablement that constitute social action (Giddens, 1984). This is the reason why the concept of self is so central in the intentional and adaptive processes of innovation. In other words the concept of self is central to understanding how intentions are formed, and thus how goal-directed action is carried through. While cognitive psychology has held that attitudes to predict or generate intention with some degree of consistency, and also suggested intentions to be good predictors of behavior (Hogarth, 1987), the self goes to the heart of interrogating that common thread of meaning which runs through attitudes, intentions and behavior. Ajzen and Madden (1986) have made a strong connection between individuals' intentions and specific situational role-beliefs, for instance role-beliefs that stimulate the act of starting a new venture. Even though it may seem mundane to single out intention (i.e. that which one

proposes or plans to do) as a cause for entrepreneurial action, one has to keep in mind that intention is a multifaceted correlate to the much more intricate concepts of self and identity. The fact that variables such as social class, age group and personality measures have been of limited value in explaining entrepreneurial activity (i.e. Bagozzi and Baumgartner, 1989) may be due to an omission of entrepreneurial intention and self as mediating concepts.

The assertion that the intention to innovate would explain innovative behavior (e.g. Krueger *et al.*, 2000) can be qualified by recourse to Bem's (1972) "self-perception theory", which holds that individuals determine what they are feeling and thinking by making inferences based on observing their own behavior. From this point of view self does not ultimately generate action, rather the two are intertwined in a dialectic of mutual generation and re-generation. One example of this dialectic may be found in the act of role-playing, where the individual or the group develops its self(ves) by "trying out" various forms of overt behavior (Ibarra, 1999). The proactive structuring of the generative relation between self and action is what underlies the process of tying the entrepreneurial self to educational forms, for instance, in problem-based entrepreneurial education (Fiet, 2001).

A similar dialectic exists between the individual self and the various forms of organizational action involved in innovation. Coopey *et al.* (1998), for example, point out how openness of the organizational action domain allows the actors to voice and make use of conflicting interpretations, as these pertain to innovation. These actors' capacity to reconcile identity and self therefore has a bearing on their ability to deploy organizational resources and negotiate appropriate socio-political meanings to certain actions. Self, organizational socio-politics and innovation are thereby intertwined in a reciprocal exchange reminiscent of Giddens' (1991) structuration model of self-identity.

The changing, dynamic self
As mentioned above, the self can be viewed as both an amalgam of identities and the interactive processes through which the self develops. This departs from traditional psychological theories of self as well as much of the innovation and entrepreneurship discourse (see Slappendel, 1996), both of which have traditionally tended to focus on relatively permanent personality dispositions and patterns of behavior. In contrast, the sociological conception of self is more interactive, social and processual, which implies a sensitivity to self as a subject to change. Zurcher (1977) represents this latter approach by describing the self-concept within a social-cognitive framework, not as a unitary, monolithic entity but as a manifold, dynamic system of constructs with situated, responsive and malleable features. Identity theory (Stryker, 1991) further emphasizes the role of the milieu and asserts that the self is produced in concrete networks of social interaction, where different identities are developed as internalized role designations, carrying the shared meanings and behavioral expectations associated with different roles and group memberships. The self is then viewed as the hierarchical ordering of these identities.

Innovation and creative acts put special demands on the responsiveness and mutability of the self, as well as on meaningful future orientations or visions of the future (Nightingale, 1998; Hellström and Hellström, 2001). Markus and Nurius (1986) propose a multifaceted model of the self, which contains a series of "possible selves" or schemata representing potential or hypothetical conditions of the self that may be imagined, hoped for, or feared. They argue that possible selves are cognitive representations of more or less enduring goals, motives, aspirations, fears and threats that give specific cognitive organization, direction and meaning to these motivational dynamics. A similar development in sociology defines the self in terms of multiple identities (cf. Bazerman *et al.*, 1998).

Possible selves derive from representations of the self in the past but also include accounts of a person in future states and circumstances (Nurius, 1991). This allows the individual to put him/herself into a given role or situation, affording the opportunity for vivid simulations of an envisioned event or role, something which lies at the very heart of innovative acts. On a similar note, Ibarra (1999) describes how people purposely seek out and experiment with different "provisional selves", which serve as probationary identities in a trial and error process of refining and improving professional skills and behaviors.

Focusing on self-development and retention, Yost *et al.* (1992) describe the construction of the self from an evolutionary perspective, where individuals continuously seek manifestations of "truth" in their possible selves. Greenwald and Breckler (1985) describe a similar selection process through the metaphor of an inner audience that passes judgment on the behavior of the self, and thereby affects reflexive role-taking emotions. Complementing these models of self-evolution, McCombs and Marzano (1990) contend that the self arises not only through cognitive rehearsals of behavior, but also through actual problem-solving activities, implying an inter-constitutive dialectic between the innovating self and the meta-cognitive skills involved in the actual innovation process.

Self and motivation

Similar to the way the self is developed through a discursive relationship between creation and retention of possible selves, the development of self serves as both a proactive and a more reactive motivational source of innovative action. Many theories point to the fundamental motivational power of human agency and suggest that the agentive self is an essential part of the experience of self (Greenwald and Pratkanis, 1984; Gecas, 1982). Whereas symbolic interactionists (e.g. Mead, 1934) traditionally have taken the idea of human agency to be without direction, psychological research has developed a number of theories relating intrinsic proactive motivation to concepts such as need for achievement and power (McClelland, 1961, 1975), and internal *locus* of control (Rotter, 1966). One of the more influential theories of intrinsic motivation is Bandura's (1991) notion of self-efficacy, which focuses on assessment of ability and competence as motivating action and performance.

Strong belief in one's ability not only influences choices and courses of action but also affects the effort, perseverance and resilience with which these actions are carried out. Therefore it has been said that self-efficacy beliefs can sometimes generalize to inform performance of novel tasks (Pajares, 1997).

The self also motivates action on a more subtle level, through individuals' aspirations to maintain and enhance internalized or ideal (possible) views of self. According to cognitive dissonance theories (cf. Festinger, 1957), individuals, when experiencing a misfit between feedback and world-view, apply a number of strategies to resolve the perceived dissonance and to preserve self-esteem (Greenwald and Ronis, 1978; Rokeach, 1960). Similarly, incongruities between ideal selves and perceived self-image, or "want" and "should" selves (Bazerman *et al.*, 1998), can motivate individuals to improve behavior. A more reactive motivating factor is the striving after self-maintenance or self-consistency. Here coherence and stability of self are viewed as a prerequisite for effective action (Epstein, 1973), and therefore perceived self-consistency is seen to motivate behavior.

It has been suggested that people with low self-esteem generally depend more on reactive and self-preserving motives than on proactive self-enhancement (Gecas, 1982). However, many authors claim that stability and stubbornness are the marks of a successful entrepreneur (Bhidé, 2000; March and Shapira, 1987) and, though regarded as essentially positive, high self-efficacy and self-esteem may also inhibit perception of negative information, thereby making individuals less open to change and new experiences (Katz and Zigler, 1967).

Previous research on self and self-related topics presents a complex and multifaceted account of human action in its subjective and social context. Still, most accounts of innovating and entrepreneurial actors present descriptions that isolate and reify the individual as a set of traits, thus missing the form of subjectivity that develops in the boundary between the individual, his/her surrounding world and the activities that evolve there, e.g. in the process of innovation. In what follows we will explore empirically how the dynamic and reflexive self is expressed in independent technological innovation. To this effect a qualitative interview study has been conducted, where some of the topics above were explored and extended in the light of practical and experiential insights drawn from a number of technical entrepreneurs.

Method
Participants
The study utilized a purposive sampling method, i.e. inclusion criteria were set up as to the attributes of the group of interest, and these were used to choose the sample (Berg, 2001). These criteria were that the participants to be selected should have initiated, and still work in, innovative (new) technology-based ventures. They should also have been involved in these activities for at least two years, and be developing their innovations within the ventures, not being subsumed under a larger company. The participants were fairly well distributed among biotechnology, information technology and technology-based services.

Procedure
The participants were interviewed in their companies for one-and a half to two hours by two to three interviewers at a time. The interviews were semi-structured and questions concerned general aspects of the innovation, with a special emphasis on processes relating to self-conceptions and social activity. The interviews proceeded in an informal manner, starting with general questions about the educational and professional background of the participant, and moving on to the development of the innovation (from invention of the concept/technology to the building of the company in all its aspects). During the interview, questions relating to the individual and social dimensions of the venture were brought up and continuously revisited. Typical questions involved "How do you perceive your role in the innovation process?" "How has it changed?" "What has it meant to you?" etc. Following Lofland and Lofland (1984) the interviews were documented in detail through notetaking, with particular attention to key quotations with a bearing on different aspects of the self in the innovation process. Notes were immediately transcribed into protocols for maximum comparability.

Analysis and synthesis
The interview protocols were read by all the interviewers with an attitude of openness, in order to grasp the full nature of the participants' accounts. An agreement on substantive content and validity of the resulting protocols was thereby established. The individual protocols were then merged into a master document, reread and analyzed line by line. In this process the text was broken down into discrete parts, not according to syntactic rules (e.g. sentences) but with respect to visible change of meaning in the text. As a result meaning units (MUs) were identified (Giorgi, 1985). Such MUs consisted of larger units – sentences, monothematic "chunks" of sentences, or paragraphs in the written-up protocols. Each MU represented a concept and was indicated in the margin using codes, which captured the essential quality of what was said by the participant. The MUs or concepts were then broken out of the text together with their corresponding statements. MUs were then compared and iterated in the research group until basic similarities could be discerned among them. These similarities formed the basis for grouping MUs into emerging themes. Themes and their interrelationships were focused on in more detail and similar themes were clustered into descriptive categories. This reductive abstracting process was intended to result in a more integrated, meaningful conceptual pattern overlying the empirical material. In this way categories were further reduced into fewer higher-order factors through an iterative communication and adaptation process among the researchers (Miles and Huberman, 1994). The protocols were reread and co-judged by all the interviewers against these factors and categories. Thereafter points of disagreement were discussed in great detail until full intersubjective concordance was accomplished. These categories and higher-order factors are presented in the conceptual matrix below, which describes the hypothesized typological (categorical and hierarchical) relationship between categories and factors[2].

Results of the interviews – categories and higher-order factors

The synthesis generated five higher-order factors with 17 subsumed categories, which related to aspects of self and innovation (Table I).

These factors and categories will now be described in greater detail and also exemplified with a number of quotations from the interviews. All citations are from the interviewed innovators.

Factor 1: innovator's reflexive self-conception

The factor "innovator self-conception" concerns how participants reflexively view themselves as innovators, and how this in turn affects innovation. The interview material yielded four categories relating to this phenomenon.

Innovator self-efficacy (1a) has to do with how perceived ability affects performance. This pertains to strategic activities, as illustrated by the following quote:

> I take more risks now; with my experience I know that I can handle the ups and downs. I was more careful in the old days.

This category also pertains to more action-oriented concerns, like risk taking:

> I take more risks now. My experience allows me to adapt to fluctuations more readily.

The *innovator self-esteem (1b)* category illustrates the optimistic self-conception, which was typical of many of the innovators in this study. One quote exemplifies this:

> We feel very, very sure of ourselves. Only minor variations can occur.

Higher-order factors	Categories
1. Innovator's reflexive self-conception	1a. Innovator self-efficacy
	1b. Innovator self-esteem
	1c. Awareness of capabilities and limitations
	1d. Innovators' self-characteristics
2. Innovator ego-involvement	2a. Identification with the venture
	2b. Ego and self-reflexive action
	2c. Instrumental view of self
3. Commitment control	3a. Controlling the firm
	3b. Managing uncertainty
	3c. Realistic judgments
4. Personal stakes	4a. Economic stakes
	4b. Emotional and social stakes
	4c. Existential stakes
5. Cognitive strategies of the self	5a. Rationalization
	5b. Dual role identification
	5c. Long-term planning
	5d. Autotelic personality

Table I.
Self and innovation –
higher-order factors
and categories

Another quote shows how self-esteem can be specifically related to a general striving after success:

> We were without any salary the first four months after graduating from [university]. The only real goal we had was to start a company – we did not know what about. We believed in ourselves.

The innovators in the study, however, do not seem blindly optimistic about themselves and their prospects. This fact emerged in the category of awareness of capabilities and limitations (1c), which represents a departure from the heroic view of the entrepreneur and a step toward a more sensible and planned actor, who knows his/her strengths and weaknesses and adapts accordingly. The following quote illustrates this nicely:

> The philosophy has been to tread lightly at first, i.e. not take in a large amount of money without having a clear idea. One should not press the gas without knowing where to steer.

The *innovators' self-characteristics (1d)* seemed to be shaped and retained on the basis of professional backgrounds and previous experiences. This process was reflected in their self-conceptions, for example:

> There lies a challenge in the technical difficulties, and to produce a product according to specifications is the most important thing. It is possible that only a group of researchers can run a project like this.

And also:

> The risk is that you do not reach the specifications. As an engineer you are an optimist in this sense. You do not underestimate the difficulties, but still you want the challenge of trying.

Factor 2: innovator ego-involvement
The interviewed innovators were all highly dedicated to their ideas and ventures. We were able to discern a number of indications from the interviews, which suggested that this may lead to high levels of ego-involvement in the venture, i.e. where the innovator develops an emotional interchange and "identity overlap" with the innovation to the extent that the self becomes constructed as part of the venture. The intimacy of this relation is clearly manifest in the category *identification with the venture (2a)*, where a group of interviewees stated:

> [Name of company] is our personality.

Another innovator affirmed:

> It is difficult to separate the company from myself as an individual.

A similar but more operational category is *ego and self-reflexive action (2b)*, which is concerned with the innovators' mindful efforts to manage the intersection between the self and the venture:

> One has to continuously monitor the trade-offs one makes between company and ego; just as well as between the different actors involved in the project.

Some respondents stressed the risks implied by ego-driven behavior, e.g.:

> Perhaps I discard an economically successful alternative. I may focus on myself and thereby short-change the company as a whole.

And also:

> It's important not to want to own the ideas yourself. Obsessive needs for control can be damaging; I have seen mistakes made.

Acknowledging this, some innovators in the study attempted to emotionally detach from their ventures by assuming a more *instrumental view of self (2c)*. One interviewee stated:

> I look at the company as an owner; I will be part of it as long as I contribute. In later phases others are probably more suitable.

In another instance this had already led to changes in the firm:

> We are probably not the ones best suited to be running the company. NN (Member of the founding team), for example, is not head of marketing anymore and a CEO with industry experience has been recruited.

Factor 3: commitment and control
An important concern in the innovations included in this study was the way in which innovators' personal involvement and deep commitment often conflicted with their need to retain control over the venture, i.e. there was a kind of sense and sensibility trade-off. This wish for control and oversight may entail direct operational influence, but may also express itself in more subtle ways, such as negotiating the limits of one's own capabilities and powers.

One of the categories in this regard is *controlling the firm (3a)*, which depicts innovators' attempts to create some degree of autonomy in relation to external actors and financiers:

> I relied on bank loans. Not because external financiers were not available, but because I wanted to maintain control of the company. I do not want to take the company to the stock exchange; at least not as long as I'm working actively.

This factor also entails the negotiation of uncertain boundaries of various kinds. The category *managing uncertainty (3b)* deals with the inherently uncertain situations in which some innovators often tended to find themselves. Uncertainty must be dealt with both on a personal level and with respect to the future of the venture, as this respondent indicated:

> I have not had a salary for three years. I live on my grants. Chances are of course that it will never be profitable.

This is also expressed in more professional situations, where the need for direction and management often is crucial:

> The most dangerous thing that can happen is decision anxiety. We would rather be wrong four times out of five than make the right decision too late.

In order to maintain a practical perspective on the venture and its future development, it seemed important to make *realistic judgments (3c)*. This is indicated by the following quote:

> Many entrepreneurs suffer from wishful thinking, which is very damaging most of the time. Here I see a parallel to doing research; I know many scientists who try to do too much ending up doing nothing.

This point was further emphasized by an interviewee who stated:

> Wishful thinking is as damaging as being overly cautious when it comes to entrepreneurship.

Factor 4: personal stakes
Not unexpectedly, the individuals in the study tended to shy away from some security and routine in favor of a more uncertain situation and possible personal rewards. The character of this personal wagering was to some extent economic but also largely emotional and existential. In fact, the limited *economic stakes (4a)* were often viewed by the innovators as real but secondary:

> I am a widower since a couple of years. My child is grown up and I haven't invested much money myself.

Some point to the fact that the financial risks are essentially assumed by others, e.g.:

> I would personally never have invested this much money in our firm – if I had it, I mean.

Some of the innovators went so far as to say that their ventures involved essentially no personal economic stakes at all, e.g.:

> The money I take out of the company is the equivalent of a good salary, but the experiences I make are worth much more, and if the company fails I will have learned still more! The opportunity cost therefore is zero. There are only upsides, as I see it.

The category emotional and social stakes (4b) is related to social issues such as the possibility of losing face in different social contexts and the impact this may have on the self, or on self-image as viewed by others. One respondent reported:

> I am waging my reputation in the academic sphere.

Another one stated:

> There is a social risk involved: I promise the moon and the stars left and right. If it fails, then I will lose a great deal socially.

This also entails a sense of personal let-down:

> If we don't succeed, I will lose a couple of thousand [USD], but it is not the loss of invested money or future profits that would hurt the most. The personal failure would be the worst.

The *existential stakes (4c)* in innovation activities of this sort seemed to include feelings of independence and personal freedom, as testified by the following:

[If this venture did not work out] I would lose the freedom to do what I want, money and the opportunity to move on.

And:

The reason I do it is the sense of freedom which being my own boss gives me. There are of course also monetary aspects.

This existential autonomy does, however, have a price. One innovator described it in the following fashion:

The downside is that it never ends, you never get closure and you have almost no time to catch your breath.

Factor 5: Cognitive strategies of the self
This factor describes how innovators in the study used various "self-adapting" cognitive strategies to serve as a means for coping with and relating to stressful aspects of the innovation process. The first of these strategies, self-oriented *rationalization (5a)*, shows how threatening situations and experiences are reconstructed as less daunting than they might really be by dint of referring to a constructed self-image, e.g.:

However tough things were, the thought of quitting never crossed our minds. We are so young and stupid that we don't realize how difficult this is. Sometimes you wonder about the business-model but, what the heck, things always go up and down.

In this vein, one innovator's comments suggested an even more straightforward rationalization strategy:

A good way of reducing risks is to not minimize real risks, but rather to be extremely optimistic, and say that whatever one chooses is "best by definition". There should be a strong feeling that this is a right way forward.

A number of innovators employed *dual role identification (5b)* as a means of rationalizing uncertainty in their innovation activities. This was especially evident for the scientists/innovators, as shown by the following:

As a scientist you are used to not reaching all the way. This attitude might be a disaster in a consultancy but for a scientist it is business as usual.

Uncertain day-to-day situations were sometimes handled by adopting a more *long-term planning (5c) perspective*. This is exemplified by the following quote:

We will go on to start other ventures. This is just the first one. We will be running things only as long as we can contribute.

Another respondent stated this more directly:

I use this venture in order to raise capital, so that in the future I can pursue more interesting business projects without high demands on pay-off.

Some innovators were found to display an *autotelic personality (5d)*, which means partaking in and enjoying activities for their own sake. This mentality can put its imprint on the whole team, as is indicated by the following citation:

What inspired the members in the group was the actual idea of the system and the idea of improved health care. At the same time there was a feeling that we needed to start a firm in order to keep the ideas alive.

Or put even more concisely:

I live for the venture!

Discussion

This section will draw on the interview categories in combination with the literature overview in order to present some tentative theoretical comments and extensions on the role of self in independent technological innovation. Even though the ambition of the present study has been to listen closely to a smaller set of innovators, we will, in the course of synthesizing our finding against the backdrop of the general literature, adopt a more "essentialist" language, and talk about the implications of our findings for "innovators in general". This is not to imply an empirical generalization to all or even most innovators; rather we discuss and debate the innovator *qua* ideal type. The discussion will proceed by analyzing the significance of each higher factor (including categories) in this regard.

The innovator's reflexive self-conception
This factor refers to a number of ways in which the innovator constitutes his/her self as part of driving the innovation. The factor may be said to refer to a reflexive process in that the "malleability of the self" becomes a tool for achieving certain ends. In this sense it expands on the propositions of Bem (1972) and Ibarra (1999), who see self partly as a result of trying out various forms of action. The reflexive self-conception elaborated by these authors should, in our view, also take into account the self-efficacy and self-esteem of the innovator, particularly since the present study shows how these categories affect perceived innovating ability and performance in a re-enforcing feedback. It also seems as if role-taking activities, or the role-beliefs, may be related to what Markus and Nurius (1986) referred to as "possible selves".

The innovator's reflexive self-conception is mediated both by reflexive role-taking, as seen in category 1d, by self-efficacy and self-esteem, as seen in 1a and 1b, and finally by the self-reflexive awareness of capabilities and limitations, as seen in category 1c. This suggests a view where the innovator implicitly "uses" role-beliefs as balancing factors for conducting the venture, where goals are enacted through a conception of who he/she is. Such a process would be social in the sense that the innovating self is being formulated *vis-à-vis* an inner (socially mediated or learned) audience, to which self emerges as "agentive" (Gecas, 1982), rather than just as a behavioral response to certain personal impulses or needs.

The innovator's ego-involvement
The innovator's ego-involvement *vis-à-vis* the venture ranges from emotional ties with the concept or idea to a form of identity overlap between innovation

and innovator. Similar to the previous category this factor is mediated both by self-reflection (2b) by practical considerations, e.g. using self in an instrumental fashion to achieve certain ends (2c). On the more "un-reflexive" side of ego-involvement we saw the identification with the venture (2a), which expressed itself in a perception that the venture or the company was essentially the same as the identity of its members. Practically this could take the form of stubbornness on the part of the innovators as to what the venture was about. Such processes have been argued by, among others, Katz and Zigler (1967) and also by Bhidé (2000) to be of great positive import in venture creation, but they may also be a possible source of failure such as when stubbornness hampers opportunistic adaptation and thereby goal achievement.

As we saw in the interviews, ego-involvement may also be consciously managed by the innovator (2b). It is this form of self-management that qualifies earlier theories, which have viewed self as having "maintaining" or "preserving" qualities with regard to processes that the individual creates (e.g. Gecas, 1982). Rather we should view category 2b as referring to a mindful effort on the part of the innovator to balance the need for stubbornness with that of flexibility. This conception is clearly connected to the issue of role-taking and the use of provisional selves as part of being an innovator (Ibarra, 1999), although here we can qualify the taking of roles as being a conscious process where the self receives an instrumental significance (2c). By managing one's ego-involvement as an innovator, one indirectly manages the divide pointed out by, among others, Bazerman *et al.* (1998) between "want" and "should" selves in the innovation process. Again there seems to be an ego-involvement spectrum ranging from the more "self-indulging" ego-involvement in which the innovator is largely unable to evaluate the nature of his/her own actions. This sentence is missing something, you say; there is a spectrum, but the sentence only indicates one point in this spectrum. Perhaps you have to find a way to merge it with the next sentence. At the other end we have a situation where innovator-managers try to instrumentalize themselves and their engagement, i.e. where the innovator sees him/herself as a resource; manageable just like everything else.

Commitment and control

Self-reflexive ego-involvement is closely connected to maintaining commitment and control in the innovation process; only here commitment and personal involvement are balanced against the possibility of maintaining control of the development of the venture. From a social point of view, the tension between control and commitment comes from the relation between the internal innovation process and external actors, and the ability of the innovator to maintain boundaries between these two spheres. The category of "controlling the firm" (3a) relates to what Stryker (1991) refers to as the role of milieu and networks in developing self, that is to say that the innovator seems to create autonomy to develop by negotiating boundaries, which in turn create internal role designations of various kinds.

In the same sense uncertainty is managed (3b) by putting an emphasis on action, i.e. the innovator "acts his/her way out of uncertainty" (see also Bhidé, 2000). Uncertainty reduction seems to be an integral part of the innovator's motivation and problem-solving strategies in general, which adds to our understanding of the innovator as someone who is not just cognitively rehearsing behaviors but acts through solving novel problems pertaining to the innovation process (McCombs and Marzano, 1990). A similar characteristic is found in the category of "realistic judgments" (3c), where the innovator is engaging in reflexive self-observation as part of the venture. Building further on the "want" and "should" selves of Bazerman *et al.* (1998), this category suggests that, by reflecting on the possible side-effects of wishful thinking, the relation between ideal self and perceived self-image can be used as a creative and constructive guide to future action.

Innovator's personal stakes
This factor points to a dimension of the innovation in which the innovator can be seen to wager, economically as well as emotionally. The category of economic stakes (4a) basically supports the Schumpeterian view that the entrepreneur is not an economic risk-taker (Schumpeter, 1934), since most often it is the resources of others that are wagered in the process of innovation (Berglund and Hellström, 2002). However, the categories of emotional and social stakes (4b) and of existential stakes (4c) complicate the picture considerably compared with that of Schumpeter's. In the instance of emotional and social stakes we can see that the innovator's wagering is related to role, and that it is often role-designations that are being wagered in a venture. Extending Ajzen and Madden's (1986) concept of how role-beliefs underlie the act of starting a venture, we can reflect that the enduring identities connected to the goals of the venture (goals which may fail to materialize) represent a more fruitful ground for considering innovator's stakes. The category of existential stakes (4c) extends this reasoning to imply that what is wagered is actually nothing less than self, or at least a very viable possible future self (Markus and Nurius, 1986).

Cognitive strategies of the self
The results showed how some innovators employed particular cognitive strategies in order to cope with certain stressful aspects of the innovation process. One way of doing this was to reconstruct threatening situations as being less so by referring to a particular self-image. This could be interpreted in the spirit of Bandura (1991) as an expression of self-efficacy that is moderated by a dynamic concept of self. Rather than to assume that high self-efficacy is necessary for coping with novel situations, we see how self and consequently self-efficacy are reconstructed, when important choices are made and obstacles confronted. This is obviously a stronger statement than that of Pajares (1997), who assumed that it is simply a belief in oneself that makes one do new things.

The category of "dual role identification" (5b) is also significant in this regard, although here we can see how the innovator makes use of conflicting interpretations of self and role (that between researcher and innovator) in order to affect mind sets (cognitive resources) and ultimately physical resources. Long-term planning (5c), as it is represented in this study, suggests a similar cognitive strategy on the level of time. Here the innovator separates the "now" from the "then" in order to legitimate and emotionally authorize certain activities. In this category the innovator uses vivid future representations in order to create an emotional and social space for an opportunity-seeking in the present (Nurius, 1991). A qualifying instance to these categories is found in the autotelic personality concept (5d), where we see an innovator who is less goal-driven, and more enjoying the innovation process for its own sake. Maybe goal-driven is not the best opposing description here. This feeling of "living for the venture" is one where "is" and "ought" merge, and the innovator or group seems to experience a kind of "flow" (Csíkszentmihályi, 1990).

General conclusions

A general aim of this study has been to provide a theoretical underpinning for the innovation concept *qua* social and cognitive process; one which combines individual and social levels of description and explanation without pitting the two against each other. One rationale for such an aim would be that organizational interventions are usually construed on a social (structural) level, while their impacts are often, at least at the outset, on a subjective, individual level. Pure subjectivist/individualist insights rarely work well on a social level, and vice versa (cf. the critique of methodological individualism by, among others, Winch, 1958). Instead we have tried to develop a number of conceptions of the innovation process that take the social and subjective self as the point of departure.

With respect to the role of self in innovation, we have been able to show how the self acts as a form of balancing mechanism between proactive drivers of the individual and the social/external forces that act upon the venture. This result represents a counterbalance to the traditional view, which holds the role of personality in innovation to be a "blind force", which pushes the innovator or entrepreneur into certain forms of stereotypical behavior patterns. By studying the innovation process from the point of view of self we have further been able to describe how the innovator engages in the innovation as a reflexive actor. In other words, the innovator forms his/her self and at the same time he/she forms the goals and the processes of the innovation through role-taking, reflexive negotiation of "is" and "ought", as well as projecting formative visions on to the future. These processes are all embedded in social practices, and shape the context in which the innovator's dynamic self-conception is evolving.

The research conducted in this study and the conclusions drawn suggest that innovation research may benefit from further exploring the socio-cognitive foundations for innovation as a form of reflexive action. Specifically, it would be of great interest to pin-point the mechanisms working on the level of the

socialized and socializing subjects to further understand what drives innovative action, i.e. how entrepreneurial intentions and goals are formulated, communicated, maintained and revised in a social context. This would imply an expansion of the notions of individual and structural conditions for innovation, and ultimately involve a collapse of these levels to account for the forms of action that drive the innovation process. Because goals and previous experiences are central to the notion of innovation as self-reflexive action, the concept of time may also be a viable extension to this type of research. The view of self developed here could then be used to study reflexive action as a vehicle for enactment of past, present and future states of innovation.

Some practical implications

By viewing innovation as a form of action that involves the dynamic utilization of self, we are able to give new relevance to issues such as stakeholder involvement in the innovation/venture process, e.g. by owners, sponsors, venture capitalists, market representatives, etc. In more formalized settings, for instance, in incubators and in entrepreneurship education, these stakeholders may differ, but the implications are the same. The insight that self and action are mutually constitutive and changing over time influences issues of planning, staffing, evaluation of processes and interaction. Intellectual curiosity and experimentation involving many perspectives (stakeholders) should be encouraged by owners and leaders, as these activities are not merely mental exercises but tools for achieving specific ends. Innovator insights about self have real implications pertaining to the innovation process and the actual innovation: they create flexibility, malleability and further the achievement of goals, as well as helping in focusing-in on new goals in times of crisis. This strategy of "self-based management" would require innovators to open up their action domain and allow for new and possibly disrupting perspectives. Seeing self, not as a fixed identity, but as a constructive experimenting with future conditions and interpretations thus makes the innovating self a pertinent tool for enacting conflict and uncertainty. This processual view of self in a sense replaces mechanistic strategies and formalized planning, and instead puts the fluctuating amalgam that is the innovating self at the helm of the innovation process.

Notes

1. The concept of innovation has been broadly defined by the European Commission as "the successful production, assimilation and exploitation of novelty in the economic and social spheres" (European Commission, 1995, p. 9). We will adopt the above definition and limit it to similar commercial processes that take place in small, technologically-based start-up firms and result in a discernible product or service (i.e. independent technological innovation as opposed to corporate innovation of the larger company).

2. The spectrum of factors and categories found should not be taken to refer to a simple set of "individual styles" or to individual statements in the interviews. In the final reading of the protocols against the conceptual matrix, many of the categories and factors were found within the same actor in different situations, contexts or times in the innovation process.

References

Adair, J. (1990), *The Challenge of Innovation*, The Talbot Adair Press, Surrey.

Ajzen, I. and Madden, T.J. (1986), "Prediction of goal-directed behavior: attitudes, intentions and perceived behavior-control", *Journal of Experimental Social Psychology*, Vol. 22 No. 5, pp. 453-74.

Bagozzi, R.P. and Baumgartner, J. (1989), "An investigation into the role of intentions as mediators of the attitude behavior relationship", *Journal of Economic Psychology*, Vol. 10 No. 1, pp. 35-62.

Bandura, A. (1991), "Social cognitive theory of self-regulation", *Organizational Behavior and Human Decision Processes*, Vol. 50, pp. 248-87.

Bazerman, M.H., Tenbrunsel, A.E. and Wade-Benzoni, K. (1998), "Negotiating with yourself and losing: making decisions with competing internal preferences", *Academy of Management Review*, Vol. 23, pp. 225-41.

Bem, D.J. (1972), "Self-perception theory", in Berkowitz, L. (Ed.), *Advances in Experimental Social Psychology*, No. 6, Academic Press, New York, NY.

Berg, B.L. (2001), *Qualitative Research Methods for the Social Sciences*, Allyn & Bacon, Boston, MA.

Berglund, H. and Hellström, T. (2002), "Enacting risk in independent technological innovation", *International Journal of Risk Assessment and Management*, Vol. 3 No. 2.

Bhidé, A. (2000), *The Origin and Evolution of New Businesses*, Oxford University Press, Oxford.

Bjurwill, C. (1993), "Read and react: the football formula", *Perceptual and Motor Skills*, Vol. 76, pp. 1383-6.

Canfield, J. and Miller, J. (Eds) (1998), *Heart at Work: Stories and Strategies for Building Self-Esteem and Re-awakening the Soul at Work*, McGraw-Hill, Crawfordsville, IN.

Coopey, J., Keegan, O. and Emler, N. (1998), "Managers' innovations and the structuration of organizations", *Journal of Management Studies*, Vol. 35 No. 3, pp. 263-84.

Covey, S.R. (1990), *The 7 Habits of Highly Effective People*, Franklin Covey Co., New York, NY.

Csíkszentmihályi, M. (1990), *Flow: The Psychology of Optimal Experience*, Harper & Row, New York, NY.

Drucker, P.F. (1986), *Innovation and Entrepreneurship*, Pan, London.

Epstein, F. (1973), "The self-concept revisited, or a theory of a theory", *American Psychologist*, Vol. 28, pp. 404-16.

European Commission (1995), *Green Paper on Innovation*, Brussels.

Festinger, L. (1957), *A Theory of Cognitive Dissonance*, Stanford University Press, Stanford, CA.

Fiet, J.O. (2001), "The pedagogical side of entrepreneurship theory", *Journal of Business Venturing*, Vol. 16 No. 2, pp. 101-17.

Gecas, V. (1982), "The self concept", *Annual Review of Sociology*, Vol. 8, pp. 1-33.

Giddens, A. (1984), *The Constitution of Society*, Polity Press, Cambridge.

Giddens, A. (1991), *Modernity and Self-Identity*, Polity Press, Cambridge.

Giorgi, A. (1985), *Phenomenology and Psychological Research*, Duquesne University Press, Pittsburgh, PA.

Glanz, B. (1998), "Developing your personal signature", in Canfield, J. and Miller, J. (Eds), *Heart at Work: Stories and Strategies for Building Self-Esteem and Re-Awakening the Soul at Work*, McGraw-Hill, Crawfordsville, IN.

Goffman, E. (1984), *The Presentation of Self in Everyday Life*, originally published in 1959, Penguin, Harmondsworth.

Greenwald, A.G. and Breckler, S.J. (1985), "To whom is the self presented?", in Schlenker, B.R. (Ed.), *The Self and Social Life*, McGraw-Hill, New York, NY, pp. 125-6.

Greenwald, A.G. and Pratkanis, A.R. (1984), "The self", in Wier, R.S. and Srull, T.K. (Eds), *Handbook of Social Cognition*, Vol. 3, Erlbaum, Hillsdale, NJ, pp. 129-78.

Greenwald, A.G. and Ronis, D.L. (1978), "Twenty years of cognitive dissonance: case study of the evolution of a theory", *Psychological Review*, Vol. 85, pp. 53-7.

Hellström, T. and Hellström, C. (2001), *Time and Innovation: Micro-Sociological Aspects of Technological Entrepreneurship*, Chalmers University of Technology, Sweden.

Hogarth, R.M. (1987), *Judgement and Choice*, 2nd ed., Wiley, Chichester.

Ibarra, H. (1999), "Provisional selves: experimenting with image and identity in professional adaptation", *Administrative Science Quarterly*, Vol. 44, pp. 764-91.

Irby, D.M. (1992), "How attending physicians make instructional decisions when conducting teaching rounds", *Academic Medicine*, Vol. 67 No. 10, pp. 630-8.

Katz, P. and Zigler, E. (1967), "Self-image disparity: a developmental approach", *Journal of Personality and Social Psychology*, Vol. 5, pp. 186-95.

Krueger, N.F., Reilly, M.D. and Carsrud, A.L. (2000), "Competing models of entrepreneurial intentions", *Journal of Business Venturing*, Vol. 15 No. 5-6, pp. 411-32.

Leavy, B. (1997), "Innovation and the established organization", *Journal of General Management*, Vol. 3, pp. 38-52.

Lofland, J. and Lofland, L.H. (1984), *Analyzing Social Settings: A Guide to Qualitative Observation and Analysis*, 2nd ed., Wadsworth, Belmont, CA.

McClelland, D.C. (1961), *The Achieving Society*, Van Nostrand Reinhold, New York, NY.

McClelland, D.C. (1975), *Power: The Inner Experience*, Irvington, New York, NY.

McCombs, B.L. and Marzano, R.J. (1990), "Putting the self in self-regulated learning: the self as agent in integrating will and skill", *Educational Psychologist*, Vol. 25, pp. 51-70.

March, J.G. and Shapira, Z. (1987), "Managerial perspectives on risk and risk-taking", *Management Science*, Vol. 33 No. 11, pp. 1404-18.

Markus, H. and Nurius, P.S. (1986), "Possible selves", *American Psychologist*, Vol. 41, pp. 954-69.

Mead, G.H. (1934), *Mind, Self and Society*, Chicago University Press, Chicago, IL.

Miles, M.B. and Huberman, A.M. (1994), *Qualitative Data Analysis*, 2nd ed., Sage Publications, Thousand Oaks, CA.

Moorman, C. and Miner, A.S. (1998), "The convergence of planning and execution: improvisation in new product development", *Journal of Marketing*, Vol. 62, pp. 1-20.

Nightingale, P. (1998), "A cognitive model of innovation", *Research Policy*, Vol. 27 No. 7, pp. 689-709.

Nurius, P. (1991), "Possible selves and social support: social cognitive resources for coping and striving", in Howard, J.A. and Callero, P.L. (Eds), *The Self-Society Dynamic*, Cambridge University Press, Cambridge, MA, pp. 239-58.

Pajares, F. (1997), "Current directions in self-efficacy research", in Pintrich, P.R. and Maehr, M. (Eds), *Advances in Motivation and Achievement*, No. 10, JAI Press, Greenwich, CT, pp. 1-49.

Poolton, J. and Ismail, H. (2000), "New developments in innovation", *Journal of Managerial Psychology*, Vol. 15 No. 8, pp. 795-811.

Rokeach, M. (1960), *The Open and Closed Mind*, Basic Books, New York, NY.

Rotter, J.B. (1966), "Generalized expectancies for the internal versus external control of reinforcements", *Psychological Monographs*, Vol. 90, pp. 1-28.

Schumpeter, J.A. (1934), *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, Cambridge University Press, Cambridge, MA.

Slappendel, C. (1996), "Perspectives on innovation in organizations", *Organization Studies*, Vol. 17 No. 1, pp. 107-29.

Stryker, S. (1991), "Exploring the relevance of social cognition for the relationship of self and society: linking the cognitive perspective and identity theory", in Howard, J.A. and Callero, P.L. (Eds), *The Self-Society Dynamic: Cognition, Emotion and Action*, Cambridge University Press, Cambridge, MA, pp. 19-42.

Weick, K.E. (1993), "The collapse of sensemaking in organizations: the Mann Gulch disaster", *Administrative Science Quarterly*, Vol. 38, pp. 628-52.

Winch, P. (1958), *The Idea of a Social Science*, Routledge, London.

Yost, J.H., Strube, M.J. and Bailey, J.R. (1992), "The construction of the self: an evolutionary view", *Current Psychology: Research and Reviews*, Vol. 11 No. 2, pp. 110-21.

Zurcher, L.A. (1977), *The Mutable Self: A Self-Concept for Social Change*, Sage Publications, Beverly Hills, CA.