

Defining the characteristics of an expert in a social context through subjective evaluation

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### **Abstract**

Organizations are dealing with increasing demands for innovative and sustainable products and services at the same time as they have to maintain and improve quality and efficiency. This reality calls for a better understanding of the knowledge-worker. This paper seeks to highlight some of the personality or personal characteristics of an expert or knowledge worker, and to gain a deeper understanding of expert behavior in an organization or a project. The study is conducted as a survey directed to highly educated people engaged in product development on the global stage. This subjective self-assessment gives valuable results and brings about new knowledge in aligning characteristics of an expert to the traditional definition of craftsmen – emphasizing skills, commitment, and judgment. Such insight will have significant value for leaders when organizing and follow up work done and driven by experts.

**Keywords:** Expert, organization, characteristics, craftsmen

## Introduction

Peter Drucker said that knowledge worker productivity is one of the biggest management challenges of the twenty-first century (Drucker, 2008). This statement spurs a set of questions that both from an academic and a practitioner's point of view should bring interesting answers. First, we would like to pose the question; what is an expert? Second, what characterizes an expert? And third, are the identified characteristics sufficient to enable us to tell an expert from a non-expert? When introducing the term "expert," it is important to make a distinction between the relatively broad term "knowledge worker" and the more specific notion of an individual who holds exceptional knowledge within a domain. Ericsson defines an expert as someone widely recognized as a reliable source of knowledge, technique, or skill whose judgment is accorded authority and status by the public or his or her peers (Ericsson, 2006). Hence, an expert must be said to belong to the group of knowledge workers, but with the additional ability to consistently exhibit superior performance – as determined by other experts or knowledge workers.

Traditionally there are two main approaches to the study of the characteristics of experts (Chi, 2006). The absolute approach studies truly exceptional people and their performance within formal domains, often domains linked to academia and intellectual games, and informal domains such as sewing and cooking. In contrast, the relative approach tries to better understand how novices can achieve expert status through training and experience (Dreyfus, Dreyfus, & Athanasiou, 1986). In this paper we will not claim to strictly follow either of these two approaches. Rather we focus on how experts excel in their natural context, which in this case means an organizational setting aimed at developing new and innovative products for global value chains. In looking at organizations which have a proven track record of competitiveness in demanding global markets, we can safely assume that they attract and develop people who are able live up to certain performance standards. We can therefore infer

that the requirements of the absolute approach are met by the selection of potential respondents. The relative approach is primarily focused on how knowledge can be identified, exchanged, integrated and utilized in order to create experts. These are all important elements of the learning cycle, but are not the core of this study. Thus we will not delve into major philosophical debates such as the distinction between knowing how and knowing that (Ryle, 2009) and the denial of such a meaningful distinction in an epistemological sense (Stanley & Williamson, 2001; White, 1982). This study is not an effort to differentiate types of knowledge, but rather to determine the individual and subjective meaning of each person's apprehension of their own abilities and status. However, today's multitude of media for social interaction affects the exchange and integration of knowledge and how people receive feedback from others, gain social support and interact outside the organization (Grant, 2007). These broad changes in social interaction are claimed to impact the motivation, performance and well-being of professionals, with the result that social dimensions deserve greater attention than they have received before (Oldham & Hackman, 2010). This view, like this study, is rooted in the tradition of sociology that asserts that the lives of individuals cannot be understood independent of their social context (Evetts, Mieg, & Felt, 2006). There is an ongoing debate whether work designs that stress collaboration and team work are at odds with the person- and role-based identities often held by professionals (Johns, 2010). Although the hero status, sometimes linked to descriptors such as cool, independent, iconoclastic and non-conformist (Johns, 2010), is somewhat individual, product development in the organizations participating in this study is truly based on team effort.

In the following section the theory basis for developing a set of statements, aimed at identifying and characterizing experts, is outlined. Insight in the books "Leading Geeks" (Glen, 2003) and "Clever" (Goffee & Jones, 2009) provide the characteristics of the expert and give depth to the arguments. In an organization it is common to title people with expert of

this and that. The intent behind this could be to say that in this area the individual should seek to develop competence, as when a parent seeks to motivate a child to excel. Alternatively, the intent could be to praise the work of an individual or a team. So who are these experts in an organization? Goffee and Jones offer the following definition of expert (Goffee & Jones, 2009):

*“[Experts]... are highly talented individuals with the potential to create disproportionate amounts of value from the resources that the organization makes available to them.”*

So skills and talent are essential characteristics for an expert, who uses these assets to add significant value to the organization. Another definition of so-called exceptional people deals with “geeks” (Glen, 2003) which are defined as:

*“... the enablers of technology who develop, deploy, and support the systems and products that deliver value to customers and help companies remain competitive. They are the indispensable enablers of innovation.”*

In this definition technology is a key element, in combination with people creating/developing, deploying and supporting technology and thereby delivering a competitive advantage. Innovation arises from the synthesis of people’s effort to make technology work and the uniqueness of the technology. Some of the resources that the organization makes available to the experts can be technology, and it is technology that can then form the basis of some of the disproportionate amounts of value they produce. In this case, the experts are motivated by concrete results in the form of a product or a process. Their expertise must be recognized by others, and in that sense is bounded. Technology-driven innovations will also give very specific areas in which the person is an expert; this results in compartmentalization.

### **Framework for identifying an expert**

Goffee & Jones identify nine characteristics of experts in the organizational setting (Goffee & Jones, 2009). These nine characteristics pertain to both the expert's identity and the social factors that provide a foundation for their function in the organization. This paper focuses primarily on the individual subjective opinion of persons. Such subjective opinions will play a part in the larger picture of how experts behave in organizations and especially in R&D projects.

#### **Identity**

Every person has an identity or a way of perceiving himself or herself. An expert's identity is often centered on his or her competence, knowledge or function, together with how these characteristics are put to use. It is essential for an expert to know details which are irrelevant to others, while from the expert's point of view, the company's overall "big picture" is not particularly interesting. This perfectionist attitude makes experts reluctant to rely on others, except for collegial expertise (Evetts, et al., 2006), because others are not clever enough to understand the complexity and the nuances of knowledge that form expert identity. Goffee and Jones (Goffee & Jones, 2009) summarize it this way: "cleverness is central to their identity". Another element in the characteristic identity is found in Glen's writing (Glen, 2003). He claims that experts revere the rational, but points out that this reverence is ironic because their boundless faith in the rational is "fired by passion," and passion is inherently irrational. Glen (Glen, 2003) claims that playfulness and the childlike view of the technological world remain with experts throughout their lives. While identity is important, the trait-approach tells us that education, experience and autonomy are not enough to define an expert (Evetts, et al., 2006; Sonnentag, Niessen, & Volmer, 2006).

## **Skills**

Employee skills are often emphasized as a company's most valuable resource (Liker & Hoseus, 2008) and the backbone of its competitive advantage. What kinds of skills set an expert apart from the rest of the employees? First, their skills are primarily tacit, or as observed by Glen, they include a joy of puzzle-solving whereby knowledge, creativity and logic are the ingredients for a lifelong pursuit of puzzles (Glen, 2003). This mode of thought is segmented into the problem-solution mind set of the expert (Glen, 2003). Experts are on top of their trade and are well connected, so that for instance, they often have a greater reputation among experts outside the company than they have inside the company. Goffee and Jones summarize it this way: "a great deal of their cleverness resides not *what* they know but *who* they know and *how* they know it" (Goffee & Jones, 2009). At the same time, an expert is regarded as an individual player (Glen, 2003). This view is supported by Locke et al. who claim that some tasks, such as those that require sophisticated use of highly specialized individual knowledge or expertise, are better suited for individual rather than collective performance (Locke et al., 2001).

## **Worth**

As mentioned above, the skills of an expert are tacit, meaning that knowledge is personal and difficult to articulate and codify (Nonaka & Takeuchi, 1995). This factor implies that company performance relies heavily upon skilled people – something an expert is well aware of. Some knowledge can be codified and written down, but to attempt to record all the knowledge in a company would be a monumental task or near impossible. As soon as something is written down it can become obsolete, leading to inertia, since organizations tend to conserve what exists (Weber & Antal, 2001). Goffee and Jones (Goffee & Jones, 2009) observe that experts with specialized knowledge can be very blunt in their assessment of their

leaders. Those who have deep knowledge of their field and use it in real world projects, and, last but not least, are willing to share their knowledge and abilities, are considered technological leaders (Glen, 2003) or experts.

### **Difficult questions**

Questioning the leaders follows naturally from experts knowing their worth, putting a lot of pressure on leaders and their role. Questions may be asked in a manner that reveals that experts believe they are always right. This belief is the key to "selling" ideas to the rest of the organization. They instantly challenge what is laid before them, which may serve as a prerequisite to a new way of thinking that can lead to breakthrough innovations (Goffee & Jones, 2009). Some of these tendencies are also reported by Glen (Glen, 2003), who notes that experts tend not to get along with those they consider fools. In this light, a difficult question can be seen as a way of testing the abilities of others. But it can also be a sign of recognition and acknowledgment of other people, if the expert holds the belief that asking difficult questions shows signs of caring and giving the other or leader the opportunity to answer in a way that shows his or her own excellence.

### **Organizationally savvy**

Experts understand very well the dynamics of organizations and related politics. Some demonstrate an ability to play political games to their advantage in the organization, in which typically, funding of their interests or projects is the ultimate goal. Goffee and Jones write, "they are expert gamers" (Goffee & Jones, 2009). This game playing may, despite the fact that experts generally are very clear in their opinions, lead to fuzziness when it comes to separating facts from assumption, opinions, inferences, and implications (Glen, 2003). This notion of "my facts are your facts" comes into play when experts are dealing with the

dynamics of an organization in order to get their way. From this perspective it is interesting to introduce the theory of self-management. This theory claims that strong personalities need to have specific and challenging goals that ultimately go along with company strategy (Renn, Allen, & Huning, 2011).

### **Corporate hierarchy or do not want to be led**

Corporate hierarchy and managerial control do not impress the experts (Evetts, et al., 2006). This implies that a leader is “only as good as your last idea” (Goffee & Jones, 2009). Knowledge and skills are what count, not a title or a position. In other words, leading experts is all about gentle guidance in the desired direction, much like nurturing knowledge creation (Ichijo, 2007). Interestingly, it seems that the organizational chart is not what motivates experts, but on the other hand there is an “invisible wall chart” (Goffee & Jones, 2009). The invisible wall chart is an informal organizational chart of experts. Here we also find so-called “heroes”, experts who claim to both define problems and provide solutions. This concept brings to mind the Chief Engineers at Toyota (Morgan & Liker, 2006) and the discourse of fat design (Fujimoto, 1999). Heroic actors are also described by Schön as product champions who use every means of informal pressure, persistence and courage of heroic quality in promoting innovations (Schön, 1963). Motivational factors are other things than money and formal power (Gagne & Deci, 2005). For example, acceptance and recognition inside and outside the company, together with values such as individualism, freedom, independence, self-determination, integrity, and creativity, are recognized as important for experts.

### **Instant access**

When playing with ideas, experts tend to be overwhelmingly enthusiastic about their own ideas. In this state of mind experts find it difficult to understand why others do not share

the same enthusiasm (Goffee & Jones, 2009). This is similar to the presumption that inability to delay gratification may be negatively related to operating and willpower (Renn, et al., 2011). They believe that the idea is so revolutionary to the company that all systems and everything should stop immediately. For a leader this kind of behavior can be thought of as interference or acts of genius. Howell and Boies found support for this enthusiasm, asserting that champions provide enthusiastic support for new ideas more often than non-champions (Howell & Boies, 2004). Burgelman also reported that champions often lay a convincing master strategy for their ideas that includes mobilizing resources and establishing and maintaining intense contact with top management to keep them informed and enthusiastic about the project (Burgelman, 1983).

### **Connected to others**

Experts need to be connected to other experts outside the organization in order to be effective. This is a paradox. Resources that will bring or create new knowledge for an expert are usually found outside the organization itself. And it is the intellectual process among the experts that is the foundation for this new knowledge. Earlier, in the discussion of replication of knowledge, the point was made that the most important thing about experts was whom they know rather than what they know. This implies that being an expert involves being part of a network in which your expertise is recognized in a social interaction. Networks of this kind are where experts get bright ideas and a source of perpetual improvement. Questioning assumptions and making unacknowledged links are some of the main driving forces in the network. According to Tsoukas (Tsoukas, 1996), social learning is a network of collective behavior based on distributed knowledge, implicitly assuming the existence of a group mind within professions. Studies of communities of practice, by for instance Wenger and Brown and Duguid (J. Brown & Duguid, 1998; Wenger, 1998), typically lie within this tradition. A

community of practice does not separate the activities of working, learning and innovating. Brown and Duguid (J. S. Brown & Duguid, 1991) argued that such communities constantly improvise and adapt their behaviors to cross the limitations of formal organization. Experts will not follow a past dogma blindly; to satisfy their true and natural curiosity they must question past reasoning. “It is born of the need for a free inner life of thought and reason” (Glen, 2003). This idea points back to key concepts such as identity, knowing their worth, and asking difficult questions.

### **Won't thank you**

In keeping with the notion that an expert does not want to be led, he or she will not recognize any value of your leadership. “Even when you're leading them well, ... may be unwilling to recognize your leadership” (Goffee & Jones, 2009). This does not mean that experts are unthankful, but leadership is not in their focus and interest. Goffee and Jones summarize it this way; “You know you're a success when you hear them say you're not getting in the way too much”. It is believed that this characteristic follows from an expert's strong sense of identity as described earlier.

## **Dimensions**

Given the characteristics of experts, it can be fruitful to group these into dimensions for analytical purposes. Richard Sennett discusses the idea craftsmanship or the skill of making things well. This notion has to do with the cultural issue of technique, in which a central point is the desire to do a job well for its own sake. But there are many things that stand in the way of doing the job well: lack of good tools, excessive bureaucratization, lack of training, inadequate education, etc. Putting the notion of craftsman in perspective, Sennett comes up with three dimensions: skill, commitment, and judgment (Sennett, 2008).

When someone is good at something, he or she conducts a dialogue between concrete practices and thinking; a good example of this would be the behavior of a carpenter. In business practice more abstract **skills**, such as product development, marketing, etc., involve a duality in their work. A technical understanding is only possible when skills are developed through the power of imagination. Language is the very tool for imagining; it enables a person to tell another what works best. “The use of imperfect or incomplete tools draws on the imagination in developing the skills to repair and to improvise” (Sennett, 2008). These two faculties, practice and imagination, are intuitively grasped, but developing such skills is arduous. The role of imagination is a particularly interesting issue.

**Commitment** deals with motivation and talent. A talented person will not do well if he or she is not motivated, but a motivated person can do well without being a great talent. The danger is when motivation transforms into obsession. “The obsession with getting things perfectly right may deform the work itself” (Sennett, 2008). Developing the ability to manage obsession eases the process of developing expertise.

**Judgment** deals with the ethical side of craftsmanship. The example Sennett gives pertains to Oppenheimer, father of the nuclear bomb (Sennett, 2008). Oppenheimer was a brilliant physicist and researcher, but the result of his work was not good for mankind. “The good craftsman ... uses solutions to uncover new territory; problem solving and problem finding are intimately related in his or her mind” (Sennett, 2008). A craftsman has the ability to ask both why and how, and at the same time stand back and evaluate the ethics of the work. The last point is more of an individual choice.

## Method

Results and conclusions from this study are derived from a survey directed at people working with product development in and in close proximity to a Norwegian industrial cluster. This

cluster consists of between 70-80 manufacturing companies, many of them competing on the global stage supplying products to industries such as automotive, defense and aerospace industries, natural gas and liquid natural gas distribution, special machineries, etc. Hence, these actors and their employees are seen as highly competitive in their respective markets and value chains, consistently performing at a level assumed to require some sort of expertise within certain domains. The survey included 50 questions, some fact-based and some designed to capture the subjective opinions of individuals; the latter were constructed in terms of a five-point Likert scale. The survey was sent by e-mail to 400 potential respondents. The list of respondents was provided by local departments of relevant Norwegian work organizations for professionals, limiting the selection to people with at least a bachelor's degree in either engineering or economics. Results from the 115 who answered the questionnaire, from 37 different companies, show that over 46% have a master's degree as their highest education, whereas over 9% have a PhD. In addition, the population consists of very experienced people; over 84% have a professional experience of more than 11 years.

### **Survey design**

The first step to identify the respondents' subjective impression of themselves as experts was to ask them the following three questions:

1. In what degree do you think you are an expert?
2. In what degree are the innovative ideas inside the company coming from you?
3. In what degree are the innovative ideas inside the company coming from your team?

The first question addresses how people see themselves as experts within one or several domains important to the company, whereas the two latter questions cover how deep and specific this expertise is and how it relates to the company's success as measured by creative ideas that solve problems and nurture innovation. The reasoning behind these three questions

is rooted in the discourse of professionalism, which claims that experts need to feel exclusive ownership of an area of knowledge in addition to the power to define both the nature of problems and to control access to potential solutions (Evetts, et al., 2006). Being an expert also includes an image of collegial work relations of mutual support; for instance, Lave and Wenger (Lave & Wenger, 1991) defined a community of practice as “*a set of relations among persons, activity and world, over time and in relation with other tangential and overlapping communities of practice.*” They thereby view learning and practice as socially, culturally, and historically situated (Handley, Sturdy, Fincham, & Clark, 2006), based on common interests to engage in sharing, learning and solving problems. Introducing a community of practice may expand the boundaries of a traditional team (Amin & Roberts, 2008), a term used in the third question, but we believe that people working with product development see their team as an extended group encompassing contributors from academia, customers, suppliers, competitors etc. Results from these questions, creating a construct, were run through a factor analysis in order to make up a single dependent variable.

The next step was to outline a set of questions as exploratory variables, based on the nine characteristics offered by Goffee & Jones (Goffee & Jones, 2009). However, because of perceived redundancy in this framework we chose to reduce it to the following seven characteristics: Identity, Skills, Connection to others, Difficult questions, Instant access, and Organizational savvy. On average six questions were related to each characteristic, making up in total 42 exploratory variables to be correlated against the dependent variable (computed from the three initial questions). A multiple regression analysis was conducted to determine which explanatory variables/single questions fit the new construct representing experts in their own view. In this procedure a complete regression equation is determined, containing all the variables -  $X_1, X_2, \dots, X_p$ . Then variables are checked one at a time and the least significant is dropped from the model at each stage. The procedure is terminated when all of

the variables remaining in the equation provide a significant contribution to the prediction of the dependent variable. The objective in trying to find the “best equation” will be to find the simplest model that adequately fits the data. This will not necessarily be the model that explains the most variance in the dependent variable Y (the equation with the highest value of  $R^2$ ). This equation will be the equation with all of the independent variables in the equation. The objective is therefore to identify an equation with significant variables that still explains a percentage of variance in the dependent variable that is comparable to the percentage explained with all the variables in the equation.

## Results

### Creating a dependent variable

In order to verify that the three questions above indeed can be used as a single indicator for measuring the subjective meaning of the term “expert,” the data had to be checked for relatedness, consistency and multicollinearity. First, the correlation matrix in Table 1 shows that the results are correlated at a significance level  $p < 0.05$ , demonstrating that there exist relations at the same time as the data provide some different insight into the respondents’ subjective apprehension of own abilities.

Table 1: Correlation matrix (Spearman) of personal opinion of expert. (Values in bold and represented by \*\* mean significant at  $p < 0.05$ ).

Second, internal consistency is measured by Cronbach’s alpha, which should be in the range of 0.7 and 0.9, in order to express uniformity while each question still has some individual explanatory value (Bagozzi & Yi, 1988). Factor analysis of the three questions shows a Cronbach’s alpha of 0.701. This analysis also generates a combined factor score for

each observation which will serve as the dependent variable in a multiple linear regression with the exploratory variables. Third, by performing a VIF (Variance Inflation Factor) analysis of the dependent variables, which means that an ordinary least square regression analysis is run for each  $X_i$  as a function of the other variables in the first equation, one can quantify the severity of multicollinearity. The equation is as follows:

$$VIF = \frac{1}{1 - R_i^2}$$

An accepted rule of thumb is that a VIF value below 5 indicates a low probability of collinearity (Kutner, Nachtsheim, & Neter, 2004). The results show values in the range 1.3-1.6, indicating that the three questions do not overlap each other.

### Regression analysis

A multiple regression analysis was carried out to tell which explanatory variables/single questions fit the single indicator created from the three dependent variables representing experts in their own view. In total nine exploratory variables were found significant at  $p < 0.05$ , as shown in Table 2.

Table 2: Standardized coefficients

The remaining regression equation, which provides a significant contribution to the prediction of the dependent variable, is shown in simplified form below:

$$F\text{-expert} = -4.7 + 0.3*Q19 + 0.3*Q23 \text{ reverse} + 0.2*Q14 + 0.2*Q15 \text{ reverse} - 0.3*Q41 \text{ reverse} + 0.2*Q34 + 0.2*Q36 + 0.2*Q48 + 0.2*Q50$$

This model has a  $R^2 = 0.503$  and an adjusted  $R^2 = 0.460$ . The reverse notion on question 15, 23, and 41 means just that the Likert scale is reversed to make the answers

comparable and consistent to the theoretical background. The exploratory variables are also checked for collinearity by calculating VIF values, where none of the values, ranging from 1.04-1.44, are in proximity to the proposed cut-off value of 5, stating that the variability ( $R^2$ ) calculated from the multiple regression analysis is not inflated by collinearity.

### **Discussion**

The subjective dimension to thinking of oneself as an expert is shown by three statements. The most obvious statement is for an individual to say that he or she is an expert. Second, an individual can claim that ideas for innovation in the organization originate from himself or herself. Third, the team of which the individual is a part may be seen as the source of innovative ideas that are used in the organization. Going deeper into the material, the explanation of an expert has several clearly explanatory variables with respect to the characterization of experts in an organizational setting. The following findings, represented as statements, will now be discussed:

#### **My knowledge is very well acknowledged in my organization**

Such a statement deals with the judgment dimension and more precisely the worth characteristic. It says very distinctly that the expert feels that his or her identity as an expert is acknowledged, but it is unclear whether the organization is important for defining the identity of the expert. Perhaps the organization consists of many other experts in a particular field, in which case it can be argued that acknowledgement within one's own organization is important. But the opposite can also be true, if experts are primarily outside the organization.

**I do not like to be told what to do by my leader**

This is a statement that supports the independent mind of the expert (in the skills dimension). The reason for disliking being told what to do is that the expert knows best what must be done, much better than his / her leader does.

**I find it easy to sell my ideas to the rest of the organization**

This statement brings us back to the characteristic of organizational savvy. The expert is saying that he or she knows the organization very well and therefore finds it easy to have an impact, and at the same time is saying that he or she is familiar with the rules of the organization. An organization can be seen as a puzzle for an engineer who is primarily interested in technology and not people.

**Nobody in the organization has any in-depth knowledge of my area of expertise**

The statement reminds one of children saying, “nobody understands me”. It is a statement that seems like a confusion of facts and opinions. Nobody understands how deep my knowledge really is, but at the same time my knowledge is very well acknowledged in the organization. This confusion can also be interpreted as a reflection of a person who is overwhelmed by his or her own ideas. “I have these wonderful ideas but they (the leadership in the organization) do not fully understand the beauty of them.”

**I have close contact with people working for the customer who are doing the same thing I do, and I have close contact with researchers and professors who are interested in my field of expertise**

These two statements are put together because they say more or less the same thing. They relate to networks among equals or a community of practice. One self-identified expert

relates to other experts whether they are located inside or outside the organization. But here it is important to say that the expert is central and has so much valuable knowledge and insight that the external customers demand it. His or her knowledge is valuable and therefore he or she is an important person. The other message conveyed by these statements is that they stay in touch with the frontier of research. This aspect is an important part of the “quality” of the knowledge the individual expert believes he or she has. Lastly, those two statements indicate what kinds of persons are important to know (in the judgment dimension). It may also be an indication that who you know is part of the professional identity of the expert.

### **I feel that the management is interested in and supportive of what I do**

By saying this, he or she indicates that resources are made available for his or her usage. In an organization there are always limited resources which must be used intelligently to gain competitive advantages. Again is the self-identified expert emphasizes the centrality of his or her skills to the organization. Having resources available tells everyone else that the leadership in the organization recognizes the expert’s value. But at the same time we have seen that the expert is said to identify himself or herself to persons outside the company. Lastly, one can argue or think that a person possessing valuable resources believe that managers should listen to him or her instantly when a new thought or revelation in thinking or a technological “breakthrough” is achieved.

Table 3 below shows the eight characteristics of an expert and their breakdown into survey questions, together with the refinement and classification of these characteristics into three dimensions by Sennett.

Table 3: Dimensions and characteristics of expert

## **Skills**

The dimension skills can, however, be said to represent the two characteristics “identity” and “skills”, including explicit characteristics such as 1) formal education in terms of type of education, which college or university one is educated at and linkages to others in the organization or near proximity with the same background and 2) work experience within a domain, degree of professionalism and how dependent the organization is on that specific knowledge. Curiosity is divided into two parts. First, curiosity is a trait that is natural in most humans. In this setting I am not interested in every kind of curiosity, only the curiosity for technology and basically the capacity to wonder how things work. Most children have this ability, but it seems to be lost, in many, on the way to adulthood. Experts have this childish ability to wonder how things work. They sustain it throughout formal education and/or practical learning. In many cases the training and learning enhance this curiosity, and some other related abilities emerge. A problem solving mind can be argued to emerge from curiosity, especially when it comes to technology. To solve a technological problem you need some skill acquired through learning in practice and/or education, and I believe a strong sense of satisfaction when solving such problems. To gain a deeper insight into the technological wonders you need to have the ability to share knowledge with others. In this way they can tell you about new things or correct mistakes and so on. We see this in all areas of science when groups of researchers work together on projects. At the same time getting the right resources available at the right time is often described as a skill. Lastly, I have listed company knowledge base and independent thought as skills. The knowledge base is open to everyone in the department or company, but some are able to use the knowledge better than others. One explanation for this offered by Glen and Goffee and Jones is the independent mind (Glen, 2003; Goffee & Jones, 2009). This means the ability to think outside the “box,” where

organizational knowledge written down to an explicit knowledge base is a representation of the “box”.

### **Commitment**

The commitment dimension is about motivation and drive. Passion and obsession fit naturally in here. Curiosity has also a strong motivational side to it. When a person looks at technological wonders and sees them as puzzles, a strong motivation to look deeper into the puzzle is established. Creativity commits the person to look more deeply. As a result of this closer look, one seeks problems or begins to see how things could be done more easily or more elegantly. Looking at the data, we can see that problem seeking is more a matter of motivation and personal drive than it is a skill. Many persons can see problems but only a few have the ability to do something about them, i.e. problem solving. In this process ideas form and take on a shape that can lead to strengthening the passion or in some cases become an obsession. The beauty of the idea in the head of the expert can be described as free will of thought and reason. When we think of technology, it is developed under a rational frame of mind. An engineer will present himself as a rational person, but at the same time, as Glen presented, talking about technology puts fire in his eyes. The rational mind is fired or motivated by a strong passion for seeing the beauty of the technological wonder or solution. This commitment and passion spur the individual to seek a network among equals, most often outside the company. The network then is the reference point for the expert; it is here that the deep tacit knowledge is valued and expanded. It begins to look like more of a community of practice of experts in which highly advanced knowledge and insight are valued (Amin and Roberts, 2007). As many people talk about their work and passion, the distinction between facts, assumptions, opinions, inferences, and implications get confusing.

## **Judgment**

Judgment is most certainly an important element to consider. In a network of equals or a community of practice, an internal logic emerges which implicates some ethical guidelines for the conduct of the individual and the network. These guidelines are informally set and developed by the persons in the network and play an important role when the individual thinks of how much he or she is worth to the organization. The guidelines are also an expression of what is seen as fair in the eyes of members of the network. A notion of fairness can be quite different from what is commonly thought of as fair in the organization. Asking difficult questions is a way of establishing indirectly the guidelines and notions of fairness in the organization or more specifically in the department or team the individual is working in. Quickness of mind as a value that experts cherish can be interpreted as a way of getting just enough information on things than do not interest them. The rest is theirs to fill out and this represents a challenge for the established organization. Think of the organizational goals that are most often a result of a huge process, a fact which the experts do not want to accept. Goals are interpreted with guidelines and notions of fairness from the network, and in this sense the experts seem to have a rebellion mind and are organizationally savvy. But their behavior can be viewed instead as their way of aligning the “wisdom” of the network with the organization, and getting to grips with the rules of the puzzle (being the internal life of the organization). These new – for the experts -- insights are so valuable for the organization that they feel that a leader should hear them instantly, perhaps because they are afraid of losing control of the discussion.

The skills, commitment, and judgment dimension makes sense only when one believes that the intention of an expert is to do a good job. Although we have not investigated how well the experts do their jobs, we find it reasonable to think that they aim to do a good or great job. But to successfully lead these experts represents a different challenge than leading the

rest of the organization. Development of skills requires that the organization let the experts have resources to work with and an organizational climate that allows independent thoughts to grow. This can be more or less the starting point, but the leader needs also to understand the “fuel that fire” commitment of the experts. Guidance in bringing in facts in a situation in which assumptions or opinions rule can be helpful, and listening to the “brilliant” ideas that overwhelm them is also a critical aspect of leadership. Letting them ask difficult questions without taking offense is important, as is remembering that challenging questions can be their way of acknowledging another’s expertise as a leader and at the same time testing their own worth in the organization. Lastly, it seems that experts need to have time to figure out the organization as a puzzle and the rules behind it. This requires passion from the leader and some teaching skills, letting them figure things out for themselves with guidance.

### **Summary**

We have tried to identify the subjective definition of expert through a survey designed to capture the subjective meaning of the individual in a social context such as an organization, product development department or team. A set of characteristics, based on theories describing people identified as “Clever”, “Geeks”, “Expert”, and “Champion”, was developed in terms of questions/indicators in order to investigate exploratory factors. Among the 50 questions asked in the survey, distributed according to nine categories defined by theory, eight were found to be statistically significant, covering all elements of all three dimensions related to an expert (Table 4).

On the other hand, we expected to find a stronger connection between judging oneself as an expert and education, experience and formal knowledge sharing. In addition, the category “difficult questions”, characterized by constantly challenging and provoking others in order to manifest expert status, was given little support in this study – not as surprising as

the discovered mismatch between profound expert status and the indifference to formal background.

#### Table 4: Supported expert abilities

This result, however, does not mean that other characteristics or abilities are not present in experts. These characteristics or abilities are perhaps difficult to capture in a survey, due to the fact that the experts are not aware of these themselves. And there might be other characteristics or abilities that we have not captured here at all. Finally, we have very briefly discussed the implications these findings have for leading an organization with experts. Hopefully this paper can enlighten leaders in their work.

#### **Further research**

This study is built upon theories and characteristics describing “Clever”, “Geeks”, and “Craftsmen” and defining a method to empirically test this set of characteristics on a population consisting of well-educated and highly experienced people. As mentioned previously, there can of course be other characteristics and abilities that are not covered by this approach; it should be recalled that this study aimed at getting individuals to conduct a self-assessment of their level of expertise within an organizational setting – and that level of performance was taken for granted due to the organization’s ability to renew itself and stay competitive in a global setting. Other studies have taken approaches such as describing and recognizing experts from the outside by peer reviews, pattern recognition and by comparing the performance of so-called experts in contrast to novices (Ericsson, 2006). Combining different methodologies and approaches may be beneficial in order to define the threshold, based on findings in this study, at which an individual goes from educated, well experienced

and a true contributor to the organization, to the level of an expert who creates extraordinary results for the organization. Thus, one can investigate whether expertise comes into view from inherent individual motivation and precondition or whether it is possible to shape an expert to build layer on layer of different knowledge types. The ability to create innovations probably involves much more than being good at pattern recognition and repetitive tasks.

### **Compliance with Ethical Standards**

The workers unions for engineers provided the email addresses of their members and approved the research. The survey program secured the anonymity of the respondents, and the mail addresses were deleted afterwards. The research project, called AluPart, financed the research. The project board read the paper before approving.

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<b>Variables</b>	<b>Q 1</b>	<b>Q 2</b>	<b>Q 3</b>
<b>Q1</b>	1	<b>0.320**</b>	<b>0.469**</b>
<b>Q2</b>		1	<b>0.528**</b>
<b>Q3</b>			1

Table 1: Correlation matrix (Spearman) of personal opinion of expert. (Values in bold and represented by \*\* mean significant at  $p < 0.05$ ).

Questions	Question number	Pr>[t]
How well is your knowledge acknowledged in the organization that you are working in?	Q14	0.000
How do you feel about being told exactly what to do by your leader?	Q15 (reverse)	0.009
How easy is it to sell your ideas inside the organization?	Q19	0.003
How deep is the knowledge that others in the organization have about your discipline?	Q23 (reverse)	0.000
To what degree do you have contact with persons working for customer(s) who are working with the same field as you?	Q34	0.008
To what degree have you contact with persons working in research institutes or academies who are interested in your field of work?	Q36	0.004
To what degree does management "get in your way" and make you do uninteresting work?	Q41 (reverse)	0.000
To what degree is it the case that the experts come up with ideas for innovations?	Q48	0.028
To what degree is it the case that your department comes up with ideas for innovations?	Q50	0.001

Table 2: Standardized coefficients

Theory	Exploratory variables	Code /questions	Key words	Dimensions (Sennett)	Significant variables
Identity	Identity	3, 7, 13, 19 and 23 neg	-Replicated -Knowledge	Skills	-Resources (get hands on) -Independent thought
Skills	Skills	8, 9 neg, 10 and 14	<ul style="list-style-type: none"> <li>• Education</li> <li>• Practical</li> </ul> -Curiosity of technology – natural ability -Problem solving mind -Knowledge sharing -Resources (get hands on) -Company knowledge base -Independent thought		
Connected to others	Connected to others	5, 33, 34, 35, 36, 37 and 38	-Passion -Obsession -Curiosity as motivation -Creativity -Problem seeking -Network among equals -Tacit knowledge (worth) -Community of practice -Confuse facts, assumptions, opinions, inferences, and implications -Overwhelmed by own ideas -Social interaction -Free inner life of thought and reason -Puzzle	Commitment	-Network among equals -Community of practice -Confuse facts, assumptions, opinions, inferences, and implications -Overwhelmed by own ideas -Puzzle
Difficult questions	Difficult questions	16, 17 neg, 18 neg, 20, 21 and 22	-Logic = ethical foundation -Who you know -Worth	Judgment	-Who you know -Worth -Organizational savvy -Instant access -Rules of the puzzles
Instant access	Instant access	30 neg, 31, 32 neg, 39 neg, 40 neg and 41 neg	-Difficult questions -Quickness of the mind -Organizational savvy -Corporate hierarchy		
Organizational savvy	Organizational savvy	15 neg, 24 neg, 25, 26, 27 neg, 28 and 29 neg	-Rebellious mind -Instant access		
Corporate hierarchy or do not want to be led			-Fairness -Rules of the puzzles		
Won't thank you					

Table 3: Dimensions and characteristics of expert

<b>Skills</b>	<b>Commitment</b>	<b>Judgment</b>
Resources (get hands on)	Network among equals	Who you know
Independent thought	Community of practice	Worth
	Confuse facts, assumptions, opinions, inferences, and implications	Organizational savvy
	Overwhelmed by own ideas	Instant access
	Puzzle	Rules of the puzzles

Table 4: Supported expert abilities