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Why People Contribute Voluntarily to Innovation: Insights from South Africa's Siyabuswa Educational Improvement & Development Trust

Tom Siebeling en Henny Romijn

Eindhoven Centre for Innovation Studies, The Netherlands

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Department of Technology Management

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1. Introduction

The Siyabuswa Educational Improvement & Development Trust (SEIDET) is a community-based supplier of supplementary education to black secondary school students in rural South Africa. The project was initiated and set up by a local community itself, without involvement of aid organisations, and it has been expanding ever since the first classes started in 1992. It has earned a reputation in South Africa for its success in improving children's chances of enrolling at university or college.

In an earlier working paper (Siebeling and Romijn, 2005), we described in detail the manner in which SEIDET was initiated and developed. We noted a striking resemblance with the evolution of open source software projects like Linux and Apache, which rely on loosely coordinated ongoing incremental innovation and learning among interacting members of innovation groups. Many of these members are volunteers. The evolutionary learning process by which SEIDET was born and grew up was examined using conceptual insights from evolutionary innovation theory, notably Boru Douthwaite's "learning selection"[1] model, which is inspired by Raymond's "bazaar" model of open source innovation.[2]

With the help of that model we obtained many insights about how SEIDET's success was achieved. First of all, Douthwaite's model was useful for identifying a set of 'hard' conditions that needed to be satisfied for learning selection in the project to be possible in principle: SEIDET's participants were free to join and leave, they were able to make modifications to the innovation concept, and evaluate the results thereof. An unbiased and open selection mechanism was also in place. This ensured that only those modifications were adopted that truly enhanced the long-term functioning of the project. Similar preconditions are seen to hold in succesful open source software projects. Secondly, the model pointed towards a constellation of forces that nurtured and shaped SEIDET's learning selection process. Highly important among these were the high need for the project, a modular set up, and the presence of a strong innovation champion who worked with a group of innovation users in a highly participatory manner. In this respect, too, experiences in the open source movement show considerable similarity

At the same time, we noted that the learning processes in SEIDET were also influenced by important factors that did *not* form an integral part of Douthwaite's learning selection model. In particular, we saw that the project would never have come off the ground in the absence of the sustained dedication of SEIDET's volunteers, and the tremendous support extended by the local community as a whole. What drove these people to participate in such an enthousiastic manner, without being adequately compensated? Cursory mention was made in the paper of factors like "experiencing a sense of real achievement", "intrinsic happiness associated with personal learning", "our *Ubuntu* culture", "community-induced pressures that prevent free riding behaviour" and the like, but the question of motives was not examined comprehensively and systematically. Yet, there is no doubt that the motivation to contribute spare time, ideas, and hard work on a sustained basis constitutes, in a fundamental sense, the ultimate driving force for successful learning selection in SEIDET, just as it does in open source software projects. The study of SEIDET's success in the earlier working paper is therefore still a partial one.

The objective of the present working paper is to fill this gap, by delving into the different motivations that made SEITET's participants behave in the manner that Douthwaite observed in the empirical cases studied by him. We perform the analysis in two steps, by means of addressing the following questions:

1. What insights can be gained from extant innovation studies in respect of motivation-related determinants of successful learning selection? and,
2. Is there any evidence that these determinants – as found in the literature – have been at work in SEIDET, and if so, what can we conclude from this?

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[1] The concept of "learning selection" used by Douthwaite is the socio-economic equivalent of natural selection in biological evolution processes.
[2] See: Douthwaite (2002); Douthwaite *et al.* (2002); Douthwaite *et al.* (2001), and Raymond (1998).

The first question is addressed in section 2, where we examine recent innovation theory and empirical studies for relevant insights. Useful contributions are found to pertain to motivations of innovation users to freely contribute to the development of innovations; and the functioning of innovation communities consisting of networks of users. In section 3 we outline how the insights derived from the literature review were used for designing a questionnaire, with which motivation-related data were collected through a survey among various people associated with SEIDET. The results of that survey are discussed in section 4, where we also formulate an answer to the second research question. Section 5 contains conclusions, while a separate section 6 outlines a range of recommendations that arise from the research. We discuss practical issues for SEIDET's management and other development practitioners involved in project work, and make suggestions for further research.

2. Review of relevant literature

Douthwaite's learning selection model is useful for identifying the preconditions that must be met for learning selection to work; and also for studying how the process operates when it does work under the influence of various shaping and facilitating factors. One could also say that Douthwaite's model is primarily focused on *how* the actual user interactions in the innovation development process occur through various proximate determinants. However, it does not delve deeply into the underlying causes that are responsible for activating these proximate factors in specific circumstances while rendering them inoperative in other situations; that is, into *why* certain steps in the process actually happen.

For example, Douthwaite states that after a learning selection cycle, participants will learn from each other's experiences so that they build on the experiences gained by others. However, this is not something we can take for granted. In many large corporations, technological improvements that are developed as a result of incremental learning are often kept secret or even patented. The observed free revealing of new knowledge in Douthwaite's cases perhaps constitutes the exception rather than the rule. In any case, it is clear that free revealing does not always happen, and that it does not happen automatically.

The purpose of this review is to find a conceptual framework around the core of the process of learning selection that will explain *why* learning selection takes place when it does (Figure 1). This would enable us to explain the success of the SEIDET project in all its facets better.


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<-------Extension------->        <---------Focus of Douthwaite's model-------->
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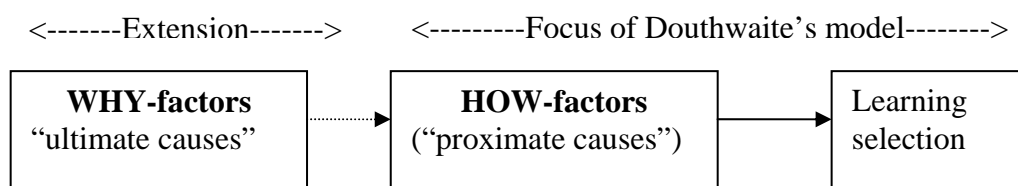| **WHY-factors** "ultimate causes" | ···▶ | **HOW-factors** ("proximate causes") | ──▶ | Learning selection |

Figure 1: Extending Douthwaite's model

As a starting point for the literature search, we looked at Von Hippel's recent writings about innovation, because (unlike Douthwaite) Von Hippel covers a wide variety of topics *around* the actual experimental innovation process (see: Von Hippel, 1986, 1994, 2001, 2002, 2005; Von Hippel and Von Krogh, 2003; Harhoff *et al.*, 2003). Firstly, using the concept of "sticky information", he explains why problem solving is more likely to succeed at the users' location. Secondly, he develops the notion that user *communities* or user *networks*, rather than users as such, are most important for the development of innovation modifications and improvements by users. Thirdly, he explains why users who are part of such innovation communities would be inclined to reveal their innovations (or new information) freely under certain circumstances, and why they would even engage in "mundane but necessary" tasks surrounding these innovations. Fourthly, he introduces the concept of "lead users": those who

experience new needs months or years before the bulk of the users encounter them, and who play an especially important role in innovation communities.

"The Cathedral and Bazaar" paper by Eric S. Raymond (1998) also offers some relevant insights for our purpose because it touches upon several motivational issues, such as the importance of user-innovators getting personal satisfaction from their debugging activities. However, as with Douthwaite's work, Raymond's paper falls short of providing an actual explanatory framework itself.

Some recent empirical papers building on psychological studies have attempted to fill this gap by more systematically exploring the motivations of hackers to contribute to open source software projects (for example, Hertel *et al.*, 2003; von Hippel and Lakhani, 2002; Lakhani and Wolf, 2005). They reveal a complex field *("a big tent"*, to quote Lakhani and Wolf) in which no specific type of motivation can account for users' observed innovation behaviour. Not surprisingly, these studies have inspired Von Hippel's recent work considerably.

Another relevant study, not specific to the software sector, explores why people give things to each other free. A diverse range of motivations for gift-giving are identified: expectations of reciprocity, feelings of altruism, notions of fairness, feeling good about having done "one's bit", desire for (increased) social approval, and signalling one's trustworthiness or status (Van de Ven, 2003).

Yet another useful input for our framework is the notion of *cumulativeness* in the innovation process – the tendency of innovations to build upon each other incrementally – as coined by evolutionary historians of technology Nathan Rosenberg and Joel Mokyr, and evolutionary economist Richard R. Nelson. Rosenberg's book, *Inside the Black Box* (1982), ties this notion to the concept of *learning-by-using*; a form of problem solving that involves application of a production process in a user environment, a process closely linked to learning selection. Rosenberg develops his framework with reference to Kenneth Arrow's ideas in "*The Economic Implications of Learning-by-doing*" (1962).

On the basis of this preliminary round of exploration, we roughly identify two strands of literature that appear to be able to shed (complementary) light on the ultimate driving forces of learning selection:
1. Studies about free revealing of innovations and gift-giving. This could help to explain why people voluntarily contribute their time, money and energy to a cause such as SEIDET. Private benefits, psychological incentives and socio-cultural values may play a role here.
2. Studies using the notion of "user-innovation communities" or -"networks", including associated notions of lead users, champions and cumulativeness. This could help explain why critical mass in learning selection could be achieved in particular circumstances, giving rise to a sustained process of step-by-step improvement. We elaborate the main points from the two bodies of literature in turn.

Concerning the *reasons for people voluntarily investing time, money and energy into a project,* we first consider Harhoff et al.'s (2003) approach to explain the contributions of individuals to innovation groups such as the open source software movement. They contend that the issue can be considered essentially in economic terms: people will only contribute to these kinds of initiatives – by revealing their innovations –if the expected benefits outweigh the costs. They argue that, in the case of innovation communities, costs to reveal are generally low when:

- the costs of diffusing the innovation are low, which can be the case when communication takes place though the Internet or when people talk face to face during meetings;
- the perceived costs associated with the loss of intellectual property rights are low, which happens when rivalry between the users is low, as is generally the case in innovation communities;
- moreover, even if users want to keep their innovations secret they might not do so, because, if many people have the same information, it will be impossible to keep the innovation secret for a long time.

Therefore, even low benefits can be adequate to induce free revealing.
The following benefits for people to innovate and reveal their innovation are distilled from various literature sources by Harhoff *et al.* (2003), Von Hippel and Lakhani (2002) and Lakhani and Wolf (2005):

- the user has a direct need for the innovation;
- the user improves his personal skills;
- the user enjoys and learns from the work of innovation, which is rewarding in itself;
- the user's reputation in the eyes of others is enhanced;
- the user's reputation in his own eyes is enhanced (ego boost);
- the user expects generalized reciprocity, or is giving back because of generalized reciprocity;
- the user wants to help the community to which he/she belongs;
- the user feels that his/her particular skill is important to the project;
- the user wants to be a good citizen;
- the user wants to gain respect;
- the user feels he/she has some effect on his/her environment.

Even the presence of users who don't contribute anything to the innovative process can induce innovating users to reveal their improvements freely. They would do so in order to induce widespread adoption of the improved features, leading to favourable network effects, and to elicit valuable user feedback. Remarkably, these gains may outweigh the negative effects on innovation associated with free riding, which tend to be emphasized by neo-classical economists.

These factors, together with some of the more conventional stimulants that are commonly found in the business sector, such as increased opportunities for promotion, a salary raise, increased prestige or power, will comprise the conceptual basis of the first part of the research instrument with which we investigate the causes behind successful learning selection in SEIDET.

The second group of studies that we want to include in our framework is concerned with the notions of *user-innovation communities* (von Hippel 2001) or *horizontal innovation networks* (von Hippel 2002). These notions concern the innovation, development, production, distribution and consumption activities in which many users participate, and which link them together. Von Hippel defines user communities as *"...networks of interpersonal ties that provide: sociability, support, information, a sense of belonging, and social identity"* (von Hippel, 2001, p?)

Von Hippel points out that user communities are most likely to flourish when (i) at least some users have sufficient incentive to innovate; and (ii) at least some users have an incentive to reveal their innovations and the means to do so voluntarily. On the basis of evidence about the functioning of open source software development networks such as Linux and Apache, Von Hippel and Von Krogh (2003) explain how user-innovation communities work by means of a so-called *private-collective innovation model*. The model combines the advantages of the conventional private investment model of innovation and the subsidized collective action model of the production of a public good. *"In this model, participants ... use their own resources to privately invest in creating novel software code. In principle, these innovators could then claim proprietary rights over their code, but instead they choose to freely reveal it as a public good. Clearly the net result of this behaviour appears to offer society the best of both worlds"* (p. 213).

Of course, there is no reason why users outside a user community could not also go through the same learning selection cycles as users within the community. However, those within a user community can benefit from – and build on – each other's results, whereas the lone user outside a user community has to develop everything for him/herself. These possibilities for realizing cumulativeness give the user community such a great advantage that Von Hippel (2001) sees the community, rather than users as such, as the centre of learning selection. An important reason for the occurrence of cumulativeness is that communities have direct and cheap access to otherwise "sticky information": information that is costly to

transfer from the user to the manufacturer. Because the users do not have to transfer the information, or can easily show the information to each other, they can use it directly in their experimental learning. This feature is clearly visible in Lee and Cole (2003), who depict the Linux product development process as an evolutionary learning process driven by constant peer review, criticism and error correction among members of the innovation community, who communicate well due to their common language and understanding of the process.

According to Von Hippel, a particularly important role in the functioning of innovation communities is played by lead users. Lead users are not the same as early adopters; they are typically ahead of the entire adoption curve and have needs that are not found in any commercial product. Von Hippel found evidence from empirical studies that innovation by users tends to be concentrated within this user category.

A final relevant observation from Von Hippel's work concerns the outcomes of the functioning of user-communities. He and von Krogh note the importance of a sense of ownership and control, and a feeling of solidarity (von Hippel and von Krogh, 2003). Expectations of achieving these outcomes could thus also be ex-ante stimulants for users in communities to contribute actively to the innovation process.

Raymond's (1998) bazaar model, in which learning cycles are carried out by innovative users in a *"great babbling bazaar of differing agendas and approaches"*, likewise suggests that the Linux innovation community was an important success factor in its development. Raymond notes that *"Linus was keeping his hacker/users constantly stimulated and rewarded - stimulated by the prospect of having an ego-satisfying piece of the action, rewarded by the sight of constant (even daily) improvement in their work."* And further on in the paper, he lists two additional important stimulants: treat your users as if they are your most valuable resource, and create an efficient market in "egoboo" [sic!]. His analysis provides six functions needed by the user community: stimulation, reward, encouragement of people, their involvement in decision-making, praise, and the creation of an efficient market in "egoboo". (Raymond, 1998). All the community-related stimulant factors listed by Raymond and Von Hippel will be used to design the second part of our research instrument for investigating the motivational causes of SEIDET's successful learning selection.

Summing up, the studies reviewed above point towards the notion that voluntary contributions made by users to an open innovation process akin to Douthwaite's learning selection are driven by a combination of individual motives and participation in a larger innovation network. This leads us to hypothesize that learning selection in SEIDET, too, is likely to have been driven by the same factors.

3. Research methodology

For both sets of causal determinants of learning selection – individual motivations and community-related aspects – we compiled a list of factors and transformed them into a questionnaire that was administered to various SEIDET participants. The questionnaire was in two parts. The first was designed to investigate the motivations of people to participate in and contribute to SEIDET. The relevant factors deriving from the theory in Section 2 were reasonably straightforward and did not require substantial adaptation for use in the context of SEIDET. The motivations were also contrasted with the reasons for people doing paid work instead.

The second part of the questionnaire covered the functioning of the user community, both in the sense of the "SEIDET family" of directly involved participants and the local community at large. In this respect, the theory discussed in Section 2 yielded a list of features that emphasized the importance of the user community, using terms such as sociability, social identity, a sense of belonging, a sense of ownership and control, and a feeling of solidarity. We assumed that most of these concepts would be too abstract for the SEIDET participants. Therefore, the terms were translated into words that would be meaningful in their specific context. To this end, we used three concepts that were frequently cited by the participants themselves as being important to the SEIDET project: "the work method of SEIDET", "the community at large", and "the culture of the people".

The questionnaire as a whole was grouped into eight main categories, of which the first five categories tried to establish the reasons for people contributing voluntarily to an innovation project (Part 1, summarized in Table 1), while the remaining three tried to establish how the user-innovation community is organized and how important it is to the volunteers (Part 2, summarized in Table 2).

Main categories	Subdivision (statements)
1. Personal benefits (including financial)	- satisfy a direct need for the service - improve career prospects - get promotion - earn money -be in power and have control
2. Personal gains (non-financial)	- gain enjoyment - it is my hobby - do something different - rewarding in itself - feel I have an influence on the future
3. Psychological incentives	- be known as the expert - get an ego boost - gain respect - improve reputation - improve standing in the community
4. Reciprocity	- feel obliged because I have benefited before - it is more likely that I will benefit in the future - expect others to help me when they can, so it is only fair to help others when I can
5. Learning	- learn new things - learn for private life - learn for normal day job - improve as a human being - meet interesting people - have a lot of relevant expertise

Table 1: Questionnaire Part 1 – Possible personal motivations to work for SEIDET

Main categories	Subdivision (statements)
1. Work methods	- I feel "ownership" of the project - I have control over the work I do or how I do it - I am able to improve (things within) SEIDET
2. Community issues	- promote community development - improve "the SEIDET family" - commitment towards SEIDET or the community - out of solidarity - it is important to the community
3. Culture / obligation	- to be a good community member - "it is something one should do" - it is part of my culture

Table 2: Questionnaire Part 2 – Importance of the user-innovation community

All the factors in the questionnaire were listed in the form of statements. The respondents were asked to rank each statement in terms of a seven-point Likert scale.[3] The set-up of the survey was adapted from Lakhani and Von Hippel (2002)'s survey of open source software contributors. Our survey had three additional general questions: we asked the respondents for their position in the SEIDET project (teacher, manager, administrator, executive member or board member), the branch to which they belonged, and the length of involvement (years) with SEIDET. Space was also provided for any additional remarks the respondents might have.[4]

An initial draft of the questionnaire was tested on six respondents, after which it was redesigned, retested on a few more respondents and finally distributed to all 25 teachers and managers of SEIDET through the branch managers. The branch managers distributed the questionnaires on a Saturday, when the teachers came to SEIDET. A few extra questions were asked of the manager of every campus, to provide some basic standard information about its teacher corps. The completed questionnaires were collected by the managers and passed on to the University of Pretoria.

4. Survey results

The total number of respondents (27) exceeded the number of distributed questionnaires because of additional participation in the survey by six SEISPRO members.[5] Of the original 25 questionnaires meant for the SEIDET managers and teachers, 21 valid forms were returned, including 11 from Siyabuswa, 3 from Vaalbank, and 7 from KwaMhlanga (a response rate of 84%). The number of responses from the three centres is representative of the respective sizes of the centres in terms of student numbers. Of the 21 respondents, 16 were teachers, 3 managers and the remaining 2 administrators.[6] In terms of years of experience with SEIDET, the respondents ranged from first-year participants to participants who had been with SEIDET from the very start (11 years' experience). The overall sample average was just under five years' experience.

With the codes on the Likert scale ranging from a maximum of 7 ("strongly agree") to a minimum of 1 ("strongly disagree"), an average of 4 across all respondents would signal an equal number agreeing and disagreeing. The overall average score on all the statements across all respondents is 2.51, indicating a more than average presence of factors that respondents could agree with. This is only to be expected, as most of the factors presented to the respondents were drawn from the literature by authors who had found some evidence that these factors had been important in other situations. However, some bias in scoring towards those in agreement could also have been at play, leading to some skewness in our score distribution.[7] In order to diminish the effect of such possible bias, we decided to regroup the

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[3] The codes on the Likert scale were: 1=I strongly agree, 2=I agree, 3=I somewhat agree, 4=Neutral, 5=I somewhat disagree, 6=I disagree and 7=I strongly disagree.

[4] The respondents were also asked to indicate which of the five statements in the questionnaire they felt most positive about. However, the responses were haphazard. Some respondents indicated fewer than five statements, while others ticked every statement in the questionnaire! It was therefore decided to exclude the results of this from the discussion about the findings.

[5] SEISPRO is a SEIDETsub-project managed by its alumni, in which fresh SEIDET graduates and other students from disadvantaged backgrounds are coached at the start of their university studies. See Chapter 4 for more details.

[6] The members of the SEIDET board were purposely not included in the survey, since the main purpose was to elicit the views of those directly involved in the educational work at SEIDET. Moreover, most of the board members had already been interviewed at great length for the purpose of establishing the details of the learning selection processes and obtaining their views on the functioning of SEIDET. The results of these interviews were reported in Chapter 4.

[7] In order to avoid possible biases in scoring, about one half of the statements were selected randomly and reformulated as negative statements in the final questionnaire. This seems to have been understood well by the respondents, since after conversion of the raw scores on these negatively worded statements the resulting distribution of answers was roughly in line with that of the positively worded statements.

scores into a broad classification comprising four broad categories, ranging from "highly agreed" to "disagreed" (Table 3).
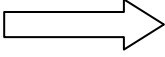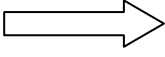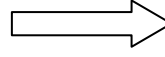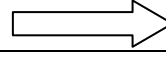
Original scores	Converted into ...	Interpretation adopted for analysis
$x \leq 2$ (strongly agreed / agreed)	⟹	highly agreed
$2 < x \leq 3$ (agreed / somewhat agreed)	⟹	agreed
$3 < x \leq 4$ (somewhat agreed / neutral)	⟹	not so much agreed
$x > 4$ (neutral / disagreed)	⟹	disagreed

Table 3: Interpretation of survey scores

Personal motivations

We first examine the statements associated with individual motivations. Starting with the averages for the main categories as a whole (Table 4), non-financial personal gains receives top marks with an average of "highly agreed" (score 2.0). Three other categories, including motivations associated with learning, psychological incentives, and reciprocity, also elicit broad agreement, with average overall scores between 2.1 and 2.6. The remaining category, which covers personal financial incentives, rates a mere 3.8, which is "not so much agreed", leaning towards "neutral". The average overall score across the five categories is 2.6, with a standard deviation of 2.

These results are broadly in line with what we would expect to see in a project involving volunteers. The highest degree of agreement is seen in the category that gives personal enjoyment, closely followed by other non-tangible forms of satisfaction. The respondents obviously consider the learning that occurs during SEIDET activity to be a good reason for volunteering or working for the project. The importance of psychological incentives for people to contribute, as emphasized by Von Hippel and Raymond, is also agreed upon. The reciprocity factor is broadly agreed upon as well, although it ranks a bit lower than personal factors. The agreement about this factor is also in line with expectations, since SEIDET is based in a community where traditional institutions involving commitments of mutual help are still strong. In contrast, motivations associated with hard gains such as control, financial reward or satisfying a direct need for the service clearly take a back seat.

Main categories (from Table 1)	Average overall score per category	Interpretation according to classification in Table 3
Personal gains (non-financial)	2.0 *)	highly agreed
Learning	2.1	agreed
Psychological incentives	2.3	agreed
Reciprocity	2.6	agreed
Personal benefits (incl. financial)	3.8	not so much agreed

Table 4: Personal motivation scores, averages for main categories (n=27)
*) Excludes the results for one statement in the category that turned out to be non-applicable.
Source: Survey by Siebeling.

The overall average score on the *raw* data (which includes the scores on the negatively worded statements) was 3.65, close to the expected 4.

	Rank	Avg score (n=27)	St dev.	Category
"Highly agreed" reasons to volunteer or work for SEIDET (avg score ≤ 2)				
I feel that I have an influence on the future	1	1.30	0.70	Personal gains
I really enjoy the work I do for SEIDET	2	1.40	0.65	Personal gains
Working for SEIDET boosts my ego	3	1.52	0.87	Psychological
I expect others to help me when they can, so it is only fair to help when I can	4	1.56	1.00	Reciprocity
It improves me as a human being	5	1.58	1.25	Learning
It improves my reputation	6	1.72	1.28	Psychological
One meets many different and interesting people	7	1.75	1.48	Learning
It improves my future career prospects	8	1.84	1.11	Personal benefits
It is rewarding in itself	9	1.96	1.55	Personal gains
"Agreed" reasons to volunteer or work for SEIDET (2 < avg score ≤ 3)				
I like to learn new things	10	2.20	1.96	Learning
It makes me better at my normal day job	11	2.22	1.31	Learning
It improves my standing in the community	12	2.28	1.88	Psychological
I have a lot of expertise in this field of work	13	2.33	1.66	Learning
I learn a lot of things that I can use in my private life	14	2.74	1.66	Learning
Gaining respect at SEIDET is important to me	15	2.76	1.64	Psychological
It is then more likely that I will benefit from SEIDET in the future	16	2.88	2.13	Reciprocity
"Less agreed" reasons to volunteer or work for SEIDET (3 < avg score ≤ 4)				
Want to do something different from my normal day work	17	3.13	2.29	Personal gains
It is my hobby	18	3.24	2.07	Personal gains
Want to be known as the expert among the others	19	3.28	1.90	Psychological
Feel obliged because I (or close family) have benefited from SEIDET earlier	20	3.32	2.17	Reciprocity
The money I earn with the work I do for SEIDET is important	21	3.40	2.33	Personal benefits
I (or my close family) have a direct need for SEIDET	22	3.42	2.55	Personal benefits
"Disagreed" reasons to work or volunteer for SEIDET. (Avg score > 4)				
Work hard to get a promotion in SEIDET	23	5.12	1.62	Personal benefits
Want to be in power and have control over SEIDET	24	5.20	2.29	Personal benefits

Table 5: Personal motivation scores, averages of individual statements (n = 27)
Source: Survey by Siebeling.

The overall picture is confirmed by an examination of the detailed scores for the individual statements within the main categories (listed in Table 5). The two most agreed-upon motivational aspects fall in the personal gains category, namely the feeling that the respondent has an influence on the future (ranked 1) and the enjoyment the respondent gets out of the work for SEIDET (ranked 2). Together with the fact that the respondents also find the work rewarding in itself (ranked 9), this is in line with what would be expected from the theory reviewed in section 2. The two other factors in the "personal gains" category score far lower than expected on the basis of the theoretical expectations (ranked 17 and 18). However, the explanation for one of these, "doing something different", is evident when further analysis shows that most respondents in the survey consisted of SEIDET teachers, who are also regular school-teachers during the week. These people are not doing something fundamentally different in SEIDET as compared with their weekday job. It was therefore decided to exclude the score on this particular factor from the category's average.

The remaining reason in the personal gains category that fell below expectations is "it is my hobby". This is interesting, as we would have expected that the enjoyment people clearly get out of working for SEIDET would lead to their regarding the time invested in SEIDET as similar to time spent on a personal hobby. However, the term "hobby" probably has the wrong connotation for the SEIDET respondents. It does not do justice to the seriousness of the work in which they are involved. There is more at stake in the work for SEIDET than in a hobby activity. Therefore, we conclude that *personal (non-financial) gains* are the most important force motivating people to work for SEIDET.

Going on to the second category, it is clear that 'self-learning' is also seen as a major factor influencing the decision to volunteer or work for SEIDET. Two of the six factors in the learning category are strongly agreed upon by the respondents. Notably, they feel that working for SEIDET improves them as human beings (ranked 5), and that they meet interesting people there (ranked 7). The remaining four learning-associated factors: "learn new things" (ranked 10), "learn for normal day job" (ranked 11), "have a lot of relevant expertise" (ranked 13), and "learn for private life" (ranked 14), all fall in the interval 'agreed / somewhat agreed'. No single factor associated with learning scores less than 'agreed / somewhat agreed'. This shows not only that one of SEIDET's pillars is learning, but also that people are directly motivated by being in a learning environment. The conclusion is that *learning* through and in SEIDET is a major motivator for people to volunteer or work for SEIDET.

The psychological incentives category is concerned with the factors Raymond defined by the "establishment of a market in egoboo" – the possibilities for the participants to get satisfaction from their work through a boost in their morale, gain in respect and enhancement of their reputation (Raymond, 1998). The ego-boost factor (ranked 3) and possibilities for enhancing individual reputation (ranked 6) are agreed upon by the respondents as being important motivating factors. Two other factors are seen as somewhat less important but still significant. These are: "improving my standing in the community" (ranked 12), and "gaining respect" (ranked 15). Only one factor, "to be known as the expert", is of rather less importance to the respondents (ranked 19), probably because it is too much like bragging.

Some of the differences between the scores obtained by the four psychological factors that matter could arise from the fact that some benefits are more easily attained than others. For example, an ego boost can be obtained without interaction with other people, but gaining respect is only possible if other people (the community) concur that the respect is owed to you; it is not something that the individual in question can decide. We think that the forms that can be gained more easily ("it boosts my ego") score higher than forms that are less easy to obtain ("gaining respect") for this reason. We conclude that the market in "egoboo" probably can be divided into individual and more communal forms of "egoboo", and that our respondents feel more comfortable with individual forms of "egoboo" than with forms that depend on others to supply it.

Reciprocity is frequently identified in the literature as one of the reasons for people helping others, especially among economists (see, for example, van de Ven, 2003). Three basic variants of reciprocity can be distinguished. The first form is a response to assistance that was received from somebody at some point in the past. The second is the help extended to someone now, with the anticipation that this person is then more likely to provide help at some point in the future when the benefactor is in need. These two are similar in that they refer to personal reciprocity. The third form is known as generalized reciprocity, and can be seen, for example, when a motorist helps a complete stranger to change a flat tire when his car is stranded in the middle of nowhere. Most likely these motorists have never seen each other before and will never see each other again, so the first two forms of reciprocity do not apply. The motivation that gives rise to this behaviour can best be described by, "I expect others to help me when they can, so it is only fair to help others when I can." The helpful motorist is contributing to maintenance of good behaviour among the motoring community as a whole.

All three forms of reciprocity were covered in our survey. It is interesting to see that only the generalized form of reciprocity(ranked 4) is considered important by the respondents, while the other two, which are associated with more individualistic tit-for-tat strategies, rank only 16 and 20 (out of a total of 24). The difference between the generalized and non-generalized forms of reciprocity indicates that few of the people who participate in SEIDET directly need (for themselves or for their family) the service provided by SEIDET, or would wish to receive direct compensation for their work (in kind or cash) from those members in the community who benefit directly from the programme. Rather, they feel motivated by the contribution they can make towards the well-being of their community as a whole, in the knowledge and expectation that their behaviour will also help to keep alive the tradition of mutual help that exists in the community. The high score for this more generalized form of reciprocity probably ties in with the observation in our earlier working paper that participation in SEIDET is "something you do" as part of the people's *Ubuntu* culture (Siebeling and Romijn, 2005).

In view of the foregoing, the low scores given to personal benefits (direct or indirect financial or cash-equivalent gains from the project to the participants) are not surprising. Four out of five factors in this category obtain a rank exceeding 20 (out of a total of 24). These include: "Money" (ranked 21), "direct need for the product" (22), "to get a promotion" (23) and, "to be in power and have control" (24). Moreover, the only two statements in the survey that participants clearly disagreed with ("to get a promotion" and "to be in power and have control") are to be found in this category.

These results are according to expectations. Voluntary work is not about money, promotion or power, unlike paid work. The results in this category also confirm the conclusion about the reciprocity factors discussed above, that the participants do not have an overwhelming direct personal need for the service provided by SEIDET.

There is, however, one factor in the personal benefits category that scores well: the statement that the work at SEIDET improves the future career prospects of the participants (ranked 8). We expected this factor to do as badly as the others in this category, but it is among the top ten motivations to work for SEIDET. On closer inspection, this might be due to the fact that this motivator is more closely linked with learning – which was shown to be a top motivation– than with monetary gains. For example, teachers improve their teaching methods through the learning cycles that they go through, and these improved methods are also applied during their weekday job. During the research, participants also said they had developed new capabilities, such as negotiation, management and computer skills. It is logical that the opportunity afforded by SEIDET to master such valuable skills would motivate people to volunteer or work for the project.

Summing up the evidence, according to the respondents the ten most important personal motivations to contribute to SEIDET are:
1. feeling that one can influence the future
2. experiencing a sense of real enjoyment in the work
3. receiving an ego boost

4. feeling that it is only fair to help others when one can, as part of the culture of mutual help that is part of *Ubuntu*

5. getting opportunities to improve oneself as a human being

6. enhancing one's reputation

7. meeting many different and interesting people

8. improving one's career prospects, through acquisition of new skills

9. experiencing a feeling of reward that is intrinsic to the work itself

10. liking the work because of the new things that one learns through it

These factors represent a mix of personal non-financial gains, psychological incentives, generalized reciprocity, and learning. Financial gains, personalized reciprocity and a personal need for the service provided by SEIDET are considered to be unimportant or (at best) neutral as motivators.

The functioning of the user-innovation community

Table 6 shows broad agreement on the importance of all three main categories of user-community factors, especially the issues to do with the SEIDET community and the local community as a whole. No main category has an average score of 3 or higher. The overall average across the three categories is 2.34, which is even lower than the 2.60 overall average score for the individual motivation answers. Assuming that both parts of the survey capture people's attitudes adequately, it would appear that being part of a larger user-innovation community is perceived to be an even more important reason to work for SEIDET than personal motivational factors.

Main categories (from Table 2)	Average overall score per category	Interpretation according to classification in Table 3
1. Community issues	2.0	highly agreed
2. Work methods	2.5	agreed
3. Culture / obligation	2.7	agreed

Table 6: Scores on user-innovation community issues, averages for main categories (n=27)
Source: Survey by Siebeling.

The scores for the individual statements about the role of the user-innovation community in the survey are given in Table 7. From this table it also emerges that issues related to the people's local community (main category 1) are by far the most important contributors to the motivation of the SEIDET user-innovation community. Of all the possible reasons to work for SEIDET (including personal motivation factors) the one that is most solidly agreed upon is "to promote community development projects" (score 1.26). This innovation-community factor seems to be at least on a par with, or even slightly weightier than, any personal motivation people might have, since the highest personal motivation ("having an influence on the future") ranks 1.30. In addition, the notion that the problem addressed by SEIDET is important to the community (ranked 2 in Table 7); that people feel commitment towards SEIDET and/or the local community as a whole (ranked 4) and that they want to improve the SEIDET family (ranked 5) score very highly in the community category. Four of the five highest-ranking statements in Table 7 are community related. The respondents evidently feel committed to their community, work to foster the atmosphere of a user-innovation community, and actively aim to promote community development projects. We can conclude that community issues are a major motivational force for people to volunteer or work for SEIDET.

The response to all the statements under the main category of SEIDET working methods is "agreed", meaning that the respondents generally consider SEIDET's working methods a motivation to volunteer or work for the organization. The respondents feel that they are able to make improvements in SEIDET and that they have control over the work they

do or how they do it. Moreover, they have a sense of "ownership" of the project. We conclude that the SEIDET working methods are factors that motivate participants, but that they are clearly less important than community issues. This is an important conclusion for the SEIDET management because it is one of the few factors that the management can influence directly.

In the category of "culture/obligation", we tried to measure the influence of culture on the motivation of the participants. Notions such as "wanting to be a good community member" (ranked 7 in Table 7); opining that working for SEIDET is "something one should do" (ranked 11); and saying that the respondent works for SEIDET because it is "a part of my culture" (ranked 3) were expected to result in mutually comparable outcomes, since it was assumed that all these statements would address more or less the same issue. However, there does not seem to be any overall agreement in this category as to whether or not it is an important motivational factor. The respondents certainly do agree that contributing to community development projects is part of their culture (ranked 3 in Table 7), but "being a good community member" obtained just a middle rank, while "it is something one should do" ranked last (11). The latter is evidently not a motivating factor. It is hard to make sense of these varied results. When we further include the statement "I work for SEIDET out of solidarity" (ranked 10) from the first category of community issues, which can also be seen as a cultural trait, the confusion merely increases.

	Rank	Avg score (n = 27)	St dev.	Category
"Highly agreed" reasons to volunteer or work for SEIDET (avg score ≤ 2)				
I want to promote community development projects	1	1.26	0.54	Community issues
The problem addressed by SEIDET is important to the community	2	1.44	1.26	Community issues
Contributing to community projects is part of my culture	3	1.75	1.26	Culture / obligation
I feel committed towards SEIDET or the community	4	1.92	1.35	Community issues
"Agreed" reasons to volunteer or work for SEIDET (2 < avg score ≤ 3)				
Improving "the SEIDET family" is important to me	5	2.08	1.95	Community issues
I think I am able to improve things within SEIDET	6	2.13	1.74	Work methods
I want to be a good community member	7	2.50	1.96	Culture / obligation
I feel that I have control over the work that I do at SEIDET, or how I do it	8	2.72	1.79	Work methods
I feel a sense of "ownership" of the project	9	2.78	1.81	Work methods
"Less agreed" reasons to volunteer or work for SEIDET (3 < avg score ≤ 4)				
Solidarity	10	3.29	2.10	Community issues
Working for SEIDET "is something one should do"	11	3.76	2.22	Culture / obligation

Table 7: Scores on user-innovation community issues, averages of individual statements (n = 27)
Source: Survey by Siebeling.

In view of the importance attached by the respondents to generalized reciprocity in the first part of the survey (see Table 5), the most likely explanation for our puzzling results is that people's local culture is indeed considered to be an important factor among the SEIDET participants, but that we did not quite succeed in adequately capturing all the specific cultural aspects that would motivate people to volunteer or work for the organization. In other words, the set of statements relating to this issue may not be internally consistent. Although the questionnaire was tested, the number of test interviews (6) was probably too limited to observe internal inconsistencies in this respect.

Discussion

We consolidate the results relating to the respondents' personal motivations and their opinions relating to the importance of the innovation community of which they are a part. First, we combine all the statements from Tables 15 and 17 that elicited a "highly agreed" response ($x \leq 2$). This results in a final list of 14 motivations (out of a total of 33) that most closely capture why people have volunteered or worked for SEIDET. These statements are listed in the left-hand block of Figure 2 (statements of highest agreement ranked first). We contrast this with the short-list of statements from Tables 15 and 17 that our respondents disagreed with, and that they felt more or less neutral about ($x > 3$). These statements can be found in the right-hand block of Figure 2 (statements eliciting highest degree of disagreement first)
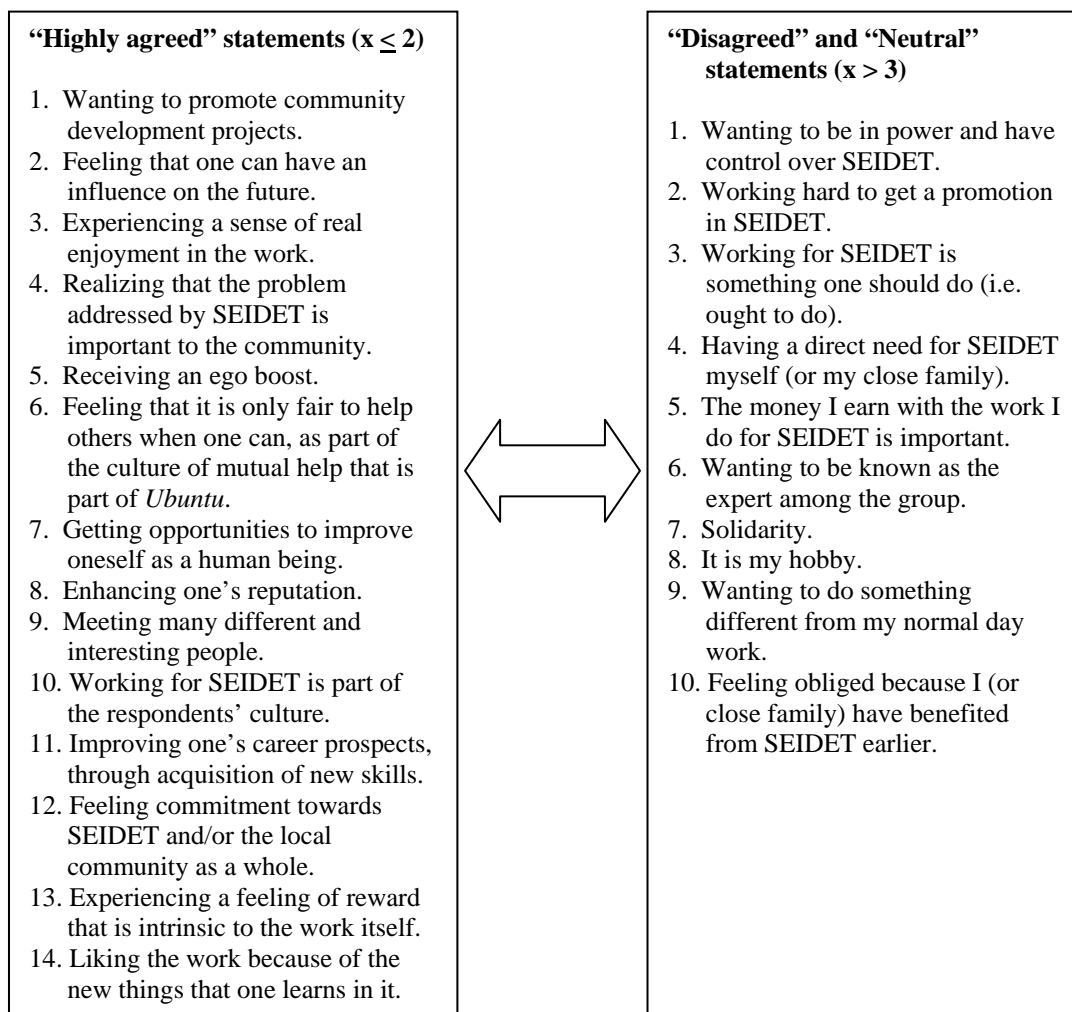
"Highly agreed" statements ($x \leq 2$)

1. Wanting to promote community development projects.
2. Feeling that one can have an influence on the future.
3. Experiencing a sense of real enjoyment in the work.
4. Realizing that the problem addressed by SEIDET is important to the community.
5. Receiving an ego boost.
6. Feeling that it is only fair to help others when one can, as part of the culture of mutual help that is part of *Ubuntu*.
7. Getting opportunities to improve oneself as a human being.
8. Enhancing one's reputation.
9. Meeting many different and interesting people.
10. Working for SEIDET is part of the respondents' culture.
11. Improving one's career prospects, through acquisition of new skills.
12. Feeling commitment towards SEIDET and/or the local community as a whole.
13. Experiencing a feeling of reward that is intrinsic to the work itself.
14. Liking the work because of the new things that one learns in it.

"Disagreed" and "Neutral" statements ($x > 3$)

1. Wanting to be in power and have control over SEIDET.
2. Working hard to get a promotion in SEIDET.
3. Working for SEIDET is something one should do (i.e. ought to do).
4. Having a direct need for SEIDET myself (or my close family).
5. The money I earn with the work I do for SEIDET is important.
6. Wanting to be known as the expert among the group.
7. Solidarity.
8. It is my hobby.
9. Wanting to do something different from my normal day work.
10. Feeling obliged because I (or close family) have benefited from SEIDET earlier.

Figure 2: Summary of the most important and least important motivations to work for SEIDET (n = 27)
Source: Survey by Siebeling.

The difference in content between the two lists is striking. In the left-hand list, we find intrinsic enjoyment and other positive psychological factors, community spirit, generalized reciprocity considerations and a culture oriented towards mutual help; as well as personal stimulation by means of self-development and learning through exposure to new things and through interaction with others. In contrast, the list of least-favourite statements is dominated by hard ego-rewarding factors: power, status, personal material need and gain, wanting to pursue one's own hobby, and repaying a personal debt as part of a personal reciprocity strategy. The only motive that does not fit well in that list is "solidarity", probably because our measurement of the cultural aspect left something to be desired, as noted earlier.

Our results are very much in line with the results of earlier studies about motivations of participants in open source innovation networks. For example, the survey of 684 software developers by Lakhani and Wolf (2005) found the following personal motivations to be the top reasons for project participation: intrinsic enjoyment associated with being involved in something creative, user need, intellectual stimulation, and improving one's (programming) skills. Highly similar results were reported in Hertel *et al.* (2003). All these aspects are also to be found in our list of "highly agreed" statements (see statements 3, 4, 9, 13, 14, and to some extent 11). Raymond's concept of "egoboo", another intrinsic personal motivator, is also present in our list (see statements 5, 7 and 8).

Community-related factors also feature prominently in the open source software studies. Building on earlier work by Lindenberg (2001), Lakhani and Wolf (2005) observe a strong sense of collective identity among the participants in free / open source software projects, which motivates them to behave in accordance with group norms. For example, hackers may be motivated to contribute new code because they feel proud of being members of a code-writing community that upholds the principle of free sharing in which they believe. Interestingly, Lindenberg argues that the pursuit of such obligation/community-related goals is strongest when personal gain-seeking by individual members at the expense of others in the group is minimized (Lindenberg, 2001). Clearly, a similar pattern is visible in SEIDET. The respondents in our survey report a strong commitment to "the SEIDET family" and the local community at large, and the values for which it stands (statement 12). They also feel very strongly about being involved in uplifting that community through a collaborative initiative (statement 1). The importance attached to generalized – as opposed to personal – reciprocity (statement 6) also points in the same direction. Participants who are in a position to contribute are evidently driven by a desire to use their position to achieve something good for their community as a whole, in keeping with the prevailing values of community spirit (statement 10), not because they expect personal repayment by the beneficiaries. Personal gains are important motivators alongside the community-related ones in SEIDET, but all the important personal drivers lie in the non-financial sphere and tend to be of the win-win type. None of the personal gains in our high-motivation list is obtained at the expense of other participants in the project, supporting Lindenberg's observation and other earlier studies (Lakhani and Wolf, 2005; Von Hippel and Krogh, 2003). The only extrinsic motivation with some personal financial implications in that list is statement 11, that participants are motivated to work in SEIDET because they expect it to improve their career options. The modest employment conditions of school teachers in the region in which SEIDET operates, and the very limited opportunities that exist for personal advancement in that context, explain why this point is considered important.

One difference between the findings of existing studies and the SEIDET case is noteworthy. Contributors to open software projects have reported that they value the sense of ownership and control over the results of their work (see, for example, the studies reported in Von Hippel and Von Krogh, 2003, p. 216). In the SEIDET project, as we saw, these working-method aspects are valued as well, but clearly not as much as the motivating effect of actually being able to influence the quality of future community life (statement 2). The vast contextual differences within which the open source projects and SEIDET unfolded are surely at play here. The membership of the open source communities is geographically highly dispersed; many of its members might never even have come face to face. Social bonding in these

communities is undoubtedly strongly work-related, and it is built around a common work ethic. In contrast, SEIDET grew out of a local community with strong social and cultural bonds that have been forged over generations of shared day-to-day life, including experience of deep-rooted poverty, stagnation, frustration and neglect. In that setting, any personal satisfaction derived from being in control of one's own work in the project would pale in comparison with the collective sensation of upliftment and newly found confidence experienced as a result of witnessing the project's steady successful expansion, and the knowledge that it had been achieved through the community's own joint efforts.

5. Conclusions

Recent innovation studies, especially those that have probed the working of open source / free software innovation networks, have yielded a number of valuable insights related to personal motivation and the functioning of user innovation communities. These insights could be applied fruitfully for an exploration of the causal forces underlying the learning selection process in SEIDET. Although the software studies are focused on innovation processes of a very different nature and in a radically different context, the evolutionary manner in which these innovation processes have unfolded over time and the way in which its users have contributed to those processes appear to be highly similar to the process of learning selection that has made SEIDET so successful.

Applying the analytical tools generated by these studies in a small survey of our own, we obtained results that clearly support the importance of these personal motivational and community-related issues in the context of SEIDET. We saw that SEIDET's participants feel motivated by the experience of personal gains of a non-financial nature, such as intrinsic enjoyment of the work, getting an ego boost, and improving their reputation. They also value psychological incentives such as a feeling that they can exert an influence on the future. Furthermore, they are motivated to participate in SEIDET because the work stimulates them intellectually; it is a place for mastering new knowledge and skills, and a place where one can meet a variety of other interesting people. Moreover, the participants appreciate the flexible and democratic work methods adopted by SEIDET, which allow them to pursue their own interests and to do things in their own way to the maximum possible extent.

Furthermore, we are able to conclude that a user-innovation community exists in SEIDET, which plays similar roles to those of the user networks operating in the free software movement. It stimulates people through its participative work methods, which make people feel in charge of their own agendas and that they can influence decision-making in the project. It also motivates them by facilitating and promoting interactive learning-by-doing in the project, by serving as a forum for communicating and exchanging what they have learnt and want to share, and for receiving feedback on each other's experiments. And above all, it has served as an effective mechanism for undertaking co-ordinated joint action that benefits their local community as a whole, something which they would never have been able to achieve had they been operating as a set of separate individuals. The effect on SEIDET's participants of the joint experience of this phenomenon of critical mass has obviously been very uplifting.

Since the extensions to Douthwaite's model were only explored with reference to our one case of SEIDET, this is not the place to draw generalized conclusions about the applicability of the research concepts, instruments and results. However, the set of "ultimate causes" that we added to Douthwaite's model do not have any SEIDET-specific characteristics that could not also be achieved in other innovation projects where learning selection is at work. We therefore believe that the extensions to the model could be applicable to a range of other projects. We thus suggest that they could prove useful starting points for further research on learning selection in a variety of contexts.

By combining the insights about the underlying driving forces of learning selection identified in this paper with the findings about the preconditions and proximate success factors in our earlier working paper (Siebeling and Romijn, 2005), we are now in a position to offer the following comprehensive view of the basis of SEIDET's success:

- Douthwaite's "prerequisites" are the necessary conditions. They enable us to analyze *whether or not learning selection was possible* in the project.
- Our "ultimate causes" are the motivational driving forces of the process. They provide insights into *why people contributed to the process of learning selection* in the project.
- And thirdly, a range of facilitating "success factors" collectively explain *the nature of the process itself, how it worked, and how that in turn gave rise to successful innovations and improved project performance* over time.

These three sets of factors taken together yield the following picture: The success of SEIDET had its origins on the work floor, in the volunteers and people working for the project. The volunteers and teachers remained *motivated* to work for SEIDET because of the *personal (non-financial) gains* that they obtain from the work, such as intrinsic enjoyment of the work and the feeling that they have an influence on the future. After the start-up of the project, a *user-innovation community* developed in SEIDET because the participants viewed the problem addressed by SEIDET as important to the community. SEIDET succeeded in establishing this *"SEIDET family feeling"* because the participants felt committed to the community and contributing to community projects is a part of their *culture*. The user-innovation community also made it possible for people to obtain enjoyment as a result of *personal learning* factors, such as the feeling that the work improved them as human beings and the fact that they met many different and interesting people. These factors were in turn the basis for *learning selection* to take place. The user-innovation community also provided the participants with a *communication channel* which was necessary for sharing ideas and for the outcomes of their personal learning. In addition, the user-innovation community provided the participants with a *"market in egoboo"*, through which they were motivated by several *psychological incentives*, such as a boost in their ego and the enhancement of their reputation. All preconditions for learning selection were met; the participants were *free to join and they selected themselves*, it was possible for them to *modify the innovation* and *evaluate the results* of their modifications, and an *unbiased selection mechanism* for the modifications was available.

The *initial idea* was developed by a small team of individuals, who generated a *'best bet'* prototype of what the stakeholders wanted. They demonstrated this 'best bet' prototype, and the stakeholders were convinced that it made a *'plausible promise'* of bringing benefits to them. Because the 'plausible promise' was *simple, flexible and robust,* the early adopters understood the concept and the 'plausible promise' could overcome the problems associated with the first introduction. Because the pilot project was in an area where the *need for it was high* and nothing of value was given away free, the early adopters among the stakeholders were sufficiently motivated to modify and carry out sensible *learning selection* on the basis of the 'plausible promise'.

A *product champion*, who was highly motivated, knowledgeable, communicative and 'low on the ego side', filled in the knowledge gaps of the early adopters and functioned as a selector of learning selection outcomes. The innovation *was not released too soon* to too many learning selection participants, so the few early adopters had ready access to the product champion. The innovation was *not patented or protected* in any way that hindered learning selection. The *stakeholders gradually took over the ownership* from the initiators and the *product champion let go in time* before the expansion and market took over.

Because the local *community challenged the product champion* to start the project, the product champion felt obliged to accept the challenge. He then transformed his personal challenge into a *community project*, through *ongoing consultations with the community*. These consultations helped to shape the project into the kind of initiative that was truly needed, and ensured the building of a *broad support base in the community*. The strengths of the *local culture* supported the project.

Crucial *external linkages* were established. Through forward linkages with universities and polytechnics, the outputs generated by the project (that is, well-trained students) were able to find places in tertiary education institutions. Through backward

linkages with professionals, the project had direct access to knowledge and expertise. This helped the project to develop and motivated the participants to *take matters into their own hands*. The experts involved in the learning selection process *guided* and *helped* the other participants instead of presenting a preconceived solution, thereby stimulating learning selection instead of by-passing it. Backward linkages also *generated pressures on the participants to deliver* quality outputs on time.

The *research* carried out as a result of the linkages acted as a catalyst for change and an *overlap in personnel* between similar sub-projects helped to transfer appropriate ideas from one branch of the project to another. The different branches of the project were *allowed to experiment* and generate diversity, while being kept close enough to prevent forking. The importance of *celebrating successes* was recognized. It provided a morale boost to the participants and established a common feeling between the participants.

The product champion kept in mind that he was working with volunteers. A *'no hard feelings' approach* to volunteers, by making no attempt to keep people in the organization that were not interested in it anymore and by avoiding a blame culture, helped to maintain enthusiasm in the project. Instead of creating pessimism, failures were used as sources of further learning.

6. Recommendations

We have recommendations for SEIDET on how to proceed with the project in the future. We also think that the case-study holds useful lessons for other development practitioners interested in setting up a project "the SEIDET way". Finally, we offer suggestions to the research community, since further research in this area would seem to be fruitful.

Recommendations for SEIDET

An interesting question that surfaced from the analysis performed on SEIDET in Siebeling and Romijn (2005) was that SEIDET has not (yet) moved into the expansion phase of the learning selection process. We are now in a position to suggest three alternative explanations for this state of affairs:

1) The project is not ready for expansion yet, but sooner or later it will be. In this scenario, the innovation has not yet developed into a package that is perceived by mainstream adopters as "fit" enough for implementation by them, and for this reason no widespread adoption of SEIDET has occurred. This explanation is supported by the fact that the project still depends on outside funding and works mostly with volunteers. These factors prevent the market from taking over; quite simply, there are still not enough market gains to be made.

2) The nature of the project, that is, the offering of an innovative service, might prevent the project from ever moving (deeply) into the expansion phase. It seems that even the "finished" product that is now on offer at SEIDET after more than a decade of development and fine-tuning, can still only be provided through the continued use of learning selection. This has to do with the highly tacit nature of the knowledge and skills that are being deployed in the project. The knowledge accumulated through learning selection in SEIDET is hard to transfer from person to person in any way other than through a process of learning-by-doing; and moreover, every new volunteer is bound to tinker with the concept in order to arrive at a formula that fits his/her own personality, skills and interests. Teaching is a highly personalized activity, and practices that work well for one person may not suit another equally well. It might help if the essential elements of the service could be transformed into a more or less standardized process management package, where a process manager would act as a change agent for new adopters (as was attempted, for example, in the sub-project for primary school teachers). The project could then possibly progress more easily and/or more deeply into the expansion phase.

3) A third explanation for the absence of an expansion phase could be that there is perhaps no perceived need for expansion within SEIDET. Some are hesitant about, or even set against, the establishment of new branches. This could be a reason why the project is not set in the

direction of (quantitative) expansion. If there are sufficient people who feel this way, the fact that the expansion phase has not begun is no real problem for SEIDET since the lack of expansion does not influence its functioning as such. The project is quite happy with its three current branches.

The first recommendation to SEIDET's management would thus be: probe the reasons SEIDET has not moved into the expansion phase and decide whether a move into the expansion phase would be desirable. From the problem analysis that SEIDET's executive committee conducted at the start of its project (see Siebeling and Romijn, 2005) we established that the initiators were concerned about the state of the educational system in the whole of South Africa. It would therefore be reasonable to assume that the establishment of SEIDET-like initiatives throughout the country would be seen as desirable, and that upscaling of the activities of the project would be considered beneficial. According to Douthwaite's model, if expansion were to happen, many SEIDET-like projects would emerge throughout the region, country and maybe even the continent, *without* there being a need for direct intervention by SEIDET itself. These projects would start to emerge when SEIDET reached a point in its development that would make the project so "easy" and attractive to implement that the early majority of adopters would be tempted to try out "the SEIDET way". The only thing that SEIDET would have to do, is work towards increasing the "fitness" of its product, perhaps in the form of standardization and codification of key service elements, as suggested above. There might be support for this within the project.

On the other hand, Douthwaite's model also predicts that such a move would also entail *market* selection becoming more and more predominant in the project in order to ensure widespread long-term economic viability. This would mean that the dependence on external financiers would need to be replaced by a more commercial market mechanism. The volunteering nature of the project could then well be lost. These side-effects of bringing the project to a level of sufficient "fitness" for the market to take over might be deemed undesirable by SEIDET participants. In any case, from a strategic point of view it would be important for SEIDET to discuss and carefully consider the pros and cons of expansion at this stage of the project's life.

A second recommendation for SEIDET is the systematic identification and collection of data about the key factors responsible for past success and failure, so that lessons from the past can be applied in the future. As we saw in Siebeling and Romijn (2005), a whole range of factors have proved to be highly important in the development trajectory of SEIDET during the past decade. However, conscious awareness about all of these factors is not widespread. While some of them would be taken into account automatically in future expansions of the project, others might be inadvertently left out. As the example of the establishment of the CDC centres by Professor Roode showed, lessons about success are not always learned, or shared, automatically and systematically. It is therefore of great importance for SEIDET to move one step closer to a full-fledged "learning organization", by checking all the key factors whenever decisions are made to add new sub-projects or establish new branches.

A third recommendation to SEIDET is: carefully study the implications of the findings concerning the motivational extensions made to the model. The results of the survey provide a list of the factors that motivate the people who are currently with SEIDET. Some of these factors are already present in the project, but there could be other factors that are now less prominent, or not present at all, that could attract a new group of volunteers to SEIDET. Also, the importance of a functioning user-innovation community was highlighted strongly by the respondents to the survey. It is important to understand that the "building blocks" of this user-innovation community (the culture of learning in SEIDET, the working methods, the social bonding that occurs) are controlled by SEIDET itself. Through in-depth analysis of these "building blocks" by the participants in the user-innovation community themselves, it might be possible to further improve upon the functioning of these building blocks, resulting in a strengthened user-innovation community, which would produce even better learning selection results and which would be an even more inspiring example for people in other localities wishing to embark on community development projects of their own.

Recommendations for other development practitioners

For development project managers who want to set up a project "the SEIDET way", we would recommend starting by thinking from the perspective of the project participants – the co-developers in learning selection. The participants are the most valuable resource in a project. This point has been made strongly by both Raymond (1998) and Jackie P., the product champion in SEIDET. Although the seed of the idea for a new project will often come from an external source, the project can only be successful when there are enough adventurous minds willing to experiment with the new idea and a clear plausible promise is perceived in it.

Therefore, it is of the greatest importance that a user-innovation community develop as soon as possible. This does not have to involve anything formal (preferably not, in fact), but what is needed is a bonding of the participants so that they feel they are working on an important common problem together. The user-innovation community will then act as a forum for the participants to communicate easily with one another, to exchange information on what works and what does not, to spark ideas off each other, and to shoot down each other's ideas in a non-competitive atmosphere in which "failure" does not have a negative connotation. In addition, it will provide a place for participants to receive ego-satisfaction and other psychological incentives, such as esteem from peers. Thus, managers should try to nurture a culture of learning in the project and develop a set of working methods that stimulate participants to become active, engage in experimentation and contribute to the cause.

It is absolutely crucial for managers to keep in mind that they are working with volunteers; that the managers are not bosses and the participants are not employees. Participants should be treated as people who are doing the project management a favour (which they are!); they are bound to repay the project by doing favours. It is also important to celebrate successes and engage everyone who (even remotely) contributes to the project. Celebrations are also a time to inspire enthusiasm in others to participate in the project and for the larger community to accept the project as its own.

Being a "learning organization" also means that the organization has to figure out which specific factors are responsible for its successes. Not all the factors we identified in SEIDET may be directly applicable, but many will be. Other factors, which were not visible in SEIDET, might yet be discovered in other projects. It is important not to write off the effects of certain factors if they do not seem to fit one hundred per cent. They might be relevant in some roundabout way, or in a somewhat different interpretation from that discussed by us. These key factors must be kept in mind when building up the project, and it should be a natural activity at every milestone to check whether the project is still on the right path. We recommend paying special attention to the "extra" key factors that were found in the SEIDET case and were not listed by Douthwaite in his work, especially those that emphasize the importance of the involvement of the local community and the establishment of forward and backward linkages. It is through the forward linkages that a "market" is to be found for the outputs produced by the project, while the backward linkages are useful for obtaining access to specialized expertise. If a relationship can be forged with experts, they can become a valuable asset to the project through direct advisory involvement or through research that can be carried out in collaboration with them. As the SEIDET case shows, both sides can benefit from such partnership.

Recommendations for further research

Researchers wishing to delve further into this field may fruitfully concentrate on the factors that motivate people to participate voluntarily in learning selection processes in different sectors and across different contexts. We now have some good studies from the open source domain, but there is still a scarcity of research focused on projects in other sectors. More studies of this are a must in order to determine the extent to which von Hippel's and von Krogh's (2003) private-collective innovation model can serve as a more general basis for a

strategy that would be an alternative to conventional privately driven and publicly driven innovation strategies.

Future research could also further broaden the scope beyond the domain of innovation studies, delving more deeply into the discipline of psychology and drawing lessons from the field of community development, where the importance of motivating diverse (volunteer) stakeholders to work together has been recognized for decades. Both these areas appear to offer many relevant insights. Moreover, the definitions and operationalization of certain difficult concepts (such as "local culture") need to be tightened more than we were able to do in this research.

Thirdly, to the best of our knowledge the notion of the "user-innovation community" is currently neither clearly defined nor well documented. Eric von Hippel, who coined the term, defines it primarily through examples (von Hippel, 2001; and von Hippel, 2002). In-depth research into the user-innovation community's structures, variants, and do's & don'ts would help researchers to assess the generalizability of the extensions to Douthwaite's learning selection model that we developed in this research. Because the ideas for the extensions to the model were applied in only one case, SEIDET, we are not in a position to draw conclusions on their possible applicability to other projects. More case-studies by other researchers, combined with the possible broadening of the study of motivational factors and a more rigorous definition of the user-innovation community, are needed to further flesh out the valuable conceptual work done by Von Hippel, Douthwaite and their colleagues.

As in SEIDET's process of learning selection, this research constitutes only a step towards a 'best bet' of what we think could be of use to others. The next step would be to find enough researchers who feel that this approach holds a 'plausible promise' and who are sufficiently motivated to tinker with it. Then, and *only* then, will we see the emergence of a new user-innovation community involving itself in countless learning selection cycles, resulting in improved innovation theory that can offer sound lessons for better project practice.

References

Arrow, K. (1962) 'The economic implications of learning by doing', *Review of Economic Studies*, 29 June, pp. 155-173.

Douthwaite, B. (2002) *Enabling Innovation: A Practical Guide to Understanding and Fostering Technological Change*, London, Zed Books.

Douthwaite, B., J.D.H. Keatinge, and J.R. Park (2002) 'Learning selection: an evolutionary model for understanding, implementing and evaluating participatory technology development', *Agricultural Systems*, 72, pp. 109–131.

Douthwaite, B., J.D.H. Keatinge and J.P. Park (2001) 'Why promising technologies fail: the neglected role of user innovation during adoption', *Research Policy* 30(5), pp. 819–836.

Harhoff, D., J. Henkel and E. von Hippel (2003) 'Profiting from voluntary information spillovers - How users benefit by freely revealing their innovations', *Research Policy*, 32 (10), pp. 1753-1769.

Hertel, G., S. Niedner and S. Herrmann (2003) 'Motivation of software developers in Open Source projects: An Internet-based survey of contributors to the Linux kernel', *Research Policy*, 32 (7), pp. 1159-1177.

Lakhani, K.L. and R.G. Wolf (2005) 'Why hackers do what they do: Understanding motivation and effort in free/open source software projects', in: J. Feller, B. Fitzgerald, S. Hissam and K.R. Lakhani (Eds) *Perspectives on Free and Open Source Software*, MIT Press, Cambridge, M.A., Chapter 1, pp. 3-22.

Lee, K.L. and R.E. Cole (2003) 'From a firm-based to a community-based model of knowledge creation: The case of the Linux kernel development', *Organization Science*, 14 (6), pp. 633-649.

Lindenberg, S. (2001) 'Intrinsic motivation in a new light', *Kyklos*, 54 (2/3), pp. 317-342.

Raymond, E.S. (1998) 'The cathedral and the bazaar', *First Monday*, 3 (3) [online] URL: http://www.firstmonday.org/issues/issue3_3/raymond/

Siebeling, T. and H.A. Romijn (2005) 'Remedial education for black children in rural South Africa: An exploration of success using evolutionary innovation theory', Eindhoven Centre of Innovation Studies Working Paper 05-10, Eindhoven University of Technology, Eindhoven, [online] URL: http://www.tm.tue.nl/ecis

Rosenberg, N. (1982) 'Learning by using', in: N. Rosenberg, *Inside the Black Box*, Cambridge University Press, Cambridge, Chapter 6, pp. 120-140.

Ven, J. van de (2003) *Psychological Sentiments and Economic Behaviour*, PhD thesis, Department of Economics, University of Tilburg. [Online] URL: http://arno.uvt.nl/show.cgi?fid=4740

von Hippel, E. (2005) *Democratizing Innovation*, MIT Press, Cambridge, MA. [online] URL: http://web.mit.edu/evhippel/www/democ.htm

von Hippel, E. (2002), 'Horizontal innovation networks – by and for users', MIT Sloan School of Management Working Paper 4366-02 (June 2002) [online] URL: http://web.mit.edu/evhippel/www/UserNetworksWP.pdf

von Hippel, E. (2001) 'Innovation by user communities: Learning from open source software', *Sloan Management Review,* 42 (4), pp. 82-86.

von Hippel, E. (1994) '"Sticky information" and the locus of problem solving: Implications for innovation', *Management Science,* 40 (4), pp. 429-439.

von Hippel, E. (1986) 'Lead users: A source of novel product concepts', *Management Science,* 32 (7), pp. 791-805.

von Hippel, E. and G. von Krogh (2003),'Open source software and the private-collective innovation model: Issues for organization science', *Organization Science*, 14 (2), pp. 209-223.

NOTE:
p.4, line 25: von Hippel, 2001, p?

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