Redefining learning networks through ICT capabilities: representations, behaviours and intermediation strategies

George Tsekouras, Despina Kanellou & Neha Rai

CENTRIM, University of Brighton, Brighton, UK
SPRU, University of Sussex, Brighton, UK

To cite this article: George Tsekouras, Despina Kanellou & Neha Rai (2013): Redefining learning networks through ICT capabilities: representations, behaviours and intermediation strategies, Technology Analysis & Strategic Management, 25:3, 257-279

To link to this article: http://dx.doi.org/10.1080/09537325.2013.764985

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.
Redefining learning networks through ICT capabilities: representations, behaviours and intermediation strategies

George Tsekouras\textsuperscript{a*,} Despina Kanellou\textsuperscript{a} and Neha Rai\textsuperscript{b}

\textsuperscript{a}CENTRIM, University of Brighton, Brighton, UK; \textsuperscript{b}SPRU, University of Sussex, Brighton, UK

This paper aims to shed light into the complex interaction instigated by the introduction and use of an information and communication technology (ICT) system in a learning network of small and medium-sized enterprises (SMEs) and the role of human agency in these interactions. It draws evidence from a research and technology development project where an ICT system was implemented in three established learning networks in Europe. The research looks into the representations of the system by various network actors, their behaviours and the degree to which the interaction between them results to the development of new routines in the network. The paper outlines three types of intermediation between network actors: (1) the liberal strategy, (2) the critical intervention strategy and (3) the heavyweight strategy. The strengths and weaknesses of each strategy are discussed based on the reviewed evidence.

Keywords: learning networks; SME; ICT systems; intermediation strategies

1. Introduction

One of the areas that small and medium-sized enterprises (SMEs) are clearly disadvantaged is the field of training in higher-order management skills required to compete in a knowledge economy (Edwards 2010; Cooper and Burke 2011). Examples of higher-order skills include exercising leadership, human resources management and project management. According to a Organisation for Economic Co-operation and Development (OECD) report, 68\% of SMEs need additional training in higher-order management skills (Green and Martinez-Solano 2011, 43). The SMEs’ training and skills development sector is going through a transformation:

Traditionally skills policy … was focused on improving supply. In part this reflected the ‘long tail of low skills’ … the general thrust of more recent developments in skills policy … has been towards raising … employers’ demand for skills … so that issues of supply, demand and usage of skills are looked at together. (Green and Martinez-Solano 2011, 21)

\textsuperscript{*}Corresponding author. Email: g.tsekouras@brighton.ac.uk

© 2013 Taylor & Francis
The emergence of information and communication technologies (ICT) represents a unique opportunity for integrating demand, supply and usage of higher order skills. Despite these opportunities, Europe has been slow to respond: ‘only about 27% of the EU workforce has received job-related computer training’. SMEs are even more disadvantaged since the majority of knowledge management and e-learning systems target the much more lucrative market of larger corporations.

A number of previous contributions have made clear that implementing technology to improve efficiency is a matter of complex interaction between technologies, organisational structures and people (Jasperson et al. 2002; Orlikowski 2000; Taylor 2004; D’Adderio 2003, 2004). In fact the role of human agency, i.e. the way people perceive, manage and respond to this complex interaction is proved to be a determinant factor of success or failure (Orlikowski and Barley 2001). However there is limited understanding of the concrete human agency strategies that can facilitate (or not) the constructive interplay between different factors, especially in the context of SME.

Through this perspective, the paper investigates the introduction of an ICT system into established learning networks of SME. The paper looks at the interaction between the different network actors, namely the network intermediary, the members and the experts supplying knowledge. Their representations and their behaviours are discussed to sketch out three models of intermediation: (1) the liberal strategy, a strategy driven by members with significant cost-efficiency advantages (2) the critical intervention strategy, where an intelligent moderator acts as a catalyst to provide unique results in terms of effectiveness and (3) the heavyweight strategy where content accumulation and the engagement of a wide range of users become the main targets.

The next section of the paper reviews the literature, the third and fourth sections describe the project and its methodology. The sixth, seventh and eighth sections present the collected evidence, the ninth section shows the results of the members’ survey after the implementation of the system before turning to the last two sections with the discussion of the three types of intermediation and the conclusions.

2. Literature review

SMEs experience shortages of resources and they need extensive networks (Nooteboom 2004; Tidd and Bessant 2009; Thorpe et al. 2005). Gibb (1997) called government support for ‘learning partnerships’ to accommodate SMEs, pointing out that ‘this will be a function not only of the competency of the business itself but also of the competency of the relationship networks’.

Several authors have highlighted the challenges involved in building networks and learning from them (Lane and Lubatkin 1998; Larsson et al. 1998; Tsekouras 2005; Lewin, Massini, and Peeters 2011). As put by Harris, Coles and Dickson (2000), networking requires a range of internal resources in terms of time and personal effort … devoted to building trust and actively managing various inter firm relationships over time. (229)

This highlights the fact that learning from a network requires relevant management expertise such as ‘a competence in the process of network building’ (ibid.). Especially for SMEs, the lack of such expertise and competence may represent risks that threaten the very existence of the company (Prashantham and Birkinshaw 2008). This is why the smaller the company, the less likely it is to engage into open innovation practices (Van de Vrande et al. 2009).

Learning networks are special networks established to alleviate the cost and the burden of these ‘learning transactions’. A learning network: (i) is formally established and defined, (ii) has
Redefining learning networks through ICT capabilities

a primary learning target, (iii) has a structure for operation, with boundaries defining membership and (iv) has developed processes which can be mapped on to the learning cycle (Bessant and Tsekouras 2001). Learning networks have been researched in the context of manufacturing (Bessant and Francis 1999), supply chains (Dyer and Nobeoka 2000; Bessant and Kaplinsky 2003; Bessant, Kaplinsky, and Morris 2003a), dissemination of sustainability practices (Bessant, Kaplinsky, and Morris 2003b), university third stream activities (Marshall and Tsekouras 2010), sectoral innovation (McGovern 2006; Sgourev and Zuckerman 2006) and economic development (Morris, Bessant, and Barnes 2006).

A learning network is managed by a third party which is not necessarily the same organisation as the sponsor. This party undertakes the responsibility to facilitate the interaction between knowledge sources and knowledge recipients. It also takes the responsibility to develop a sustainable business model (Solvell 2009). To paraphrase the term of innovation intermediary (Chesbrough 2006; Galbraith and McAdam 2011), this party is a kind of ‘learning intermediary’ which becomes the main engine of the learning network. Morris, Bessant, and Barnes (2006) refer to intermediaries which act ‘as neutral brokers, mediating cooperation and drawing together disparate interests’. Holti and Whittle (1998) argued that these intermediaries should be able to manage and overcome internal conflicts, jealousies and mistrust. Intermediaries have to ‘regulate’ the knowledge sharing process by identifying partners with the right degree of overlap between their knowledge bases (Schoenmakers and Duysters 2006).

Over time these intermediaries develop an ‘organisational capability’ (Bessant and Rush 1995, 100) including the responsibility of evaluating the network structures, upgrading its processes and enhancing the learning outcomes. These circumstances are inviting support from the ICT capabilities. For instance previous studies (Saxenian 1994; Dahl and Pedersen 2004) have proved that informal contacts and sharing of knowledge benefits crucially industrial networks. Furthermore Lazaric, Mangolte, and Massué (2003) have proved that the articulation and codification of collective know-how have helped communities of practice.

Nevertheless the evidence from small firms networks using ICT capabilities is rather disappointing (Anghern, Gibbert, and Nikolopoulou 2003; Bessant 1999; Chiarev, Di Maria, and Micelli 2004; Gottardi 2003). According to Orlikowski and Barley (2001, 147) ‘the role of human agency in shaping either the design or the use of technology’ is largely ignored by most organisational theories. Although acknowledging the role of human agency in the diffusion of ICT in learning networks is valuable, it is far from sufficient. For instance, Majchrzak et al. (2000), investigating computer-aided inter-organisational virtual teams, suggest that

a key function of team leaders should be to make thoughtful choices about which structures should be malleable and which should be adapted.

Critical questions remain unanswered:

- What strategies are available to intermediate between the dispersed interests, representations and behaviours of various actors in a learning network of SMEs?
- What are the strengths and weaknesses of different models of intermediation?
- What are the implications of these models in terms of network routines, network resources and learning efficacy?

This paper draws evidence from a two-year research and technology development project funded by the Information Society Technologies (IST) programme of the EU to respond to these questions.
3. The project

The IST programme was set up in order to ‘improve the functionality, usability and acceptability of future information products and services’. This project was funded under the Action Line ‘Self learning for work’. Two priorities, namely soft skills and informal learning and the communities of learning, were addressed by the project. The consortium involved two universities, one consultancy company, one ICT developer and three learning networks. Pseudonyms are used for the three learning networks to protect the anonymity of respondents; the learning networks are called ACS, EdP and PLT.

4. The project methodology

The first round of the methodology aimed to identify the routines deployed by a learning network. This research has addressed the whole network, i.e. extending beyond the core business of knowledge sharing among its members, including routines such as decision-making and conflict resolution. Eight semi-structured interviews were conducted with people working for the network intermediaries. In addition ethnographic research, described as being ‘ideally placed’ to capture the ‘actual contents of routines’ (D’Adderio 2003, 323) was carried out within the three learning networks, attending a number of networks operations (learning sessions, session preparation activities, communication with members, etc.). At the end of this phase, research has identified four sets of network routines (Becker 2004; Zollo, Reur, and Singh 2002) that would benefit from ICT support:

- Planning and management of learning activities (PMLA);
- Communication, information and knowledge sharing (CIKS);
- Organisation and access to learning resources and contacts (OALRC);
- Learning dissemination (LD) either within or outside the network.

The system was given to the networks with all functionalities but without content. The intermediaries were responsible for all preparatory work (e.g. registering members) and the initial content. A localised version of the portal was introduced to each of the networks and some pilot groups were asked to use the portal as part of their on-going activities.

After six months, a number of measurements were conducted. First, the number of active users were measured – active being those who had accessed the system at least once. Two groups of active users were identified:

1. Nine users working for the intermediary namely network managers, administration people, group facilitators and experts
2. One hundred and twenty-four users that were network members, i.e. representing their companies which were in the network primarily for learning.

Second, the knowledge embeddedness (Purvis, Sambamurthy, and Zmud 2001) of the three learning networks was measured through the following variables:

- the number of ‘items’ uploaded (e.g. uploaded documents, casted votes in a voting forum, pieces of news, messages in discussion forums);
- the level at which items were uploaded (i.e. the network area or a group area);
the kind of user behind the uploading of these ‘items’ (i.e. whether a user associated with the intermediary or a network member).

Third, the members’ reading activity was measured by recording the number of times the network members had visited a specific part of the system. This measurement was normalised by dividing the measured hits by the number of active users.

The final round of research addressed the members’ perceptions regarding the value of the ICT system. A questionnaire tool was developed in line with the four clusters of routines identified earlier in the project. The questionnaire included 52 questions in seven scales: a demographic section, a section about the system interface, four scales on the system contribution to each of the four sets of identified routines and one scale on the overall improvement of the network. An anonymous survey was sent to 60 network members (20 in each network), getting a response from 53 of them (88% response rate). The reliability of individual scales was found very satisfactory (Cronbach $\alpha = 0.88$ for system interface; $\alpha = 0.79$ for PMLA; $\alpha = 0.88$ for CIKS; and $\alpha = 0.82$ for OALRC) while the reliability of the whole questionnaire was also found quite high (Cronbach $\alpha = 0.94$).

5. The system

The system included the following functionalities:

- **Calendar**, showing details of past or forthcoming network events such as session title, venue, time, etc.;
- **Members’ directory** including members’ contact details, their companies’ services and products, group membership, etc.;
- **News** which included ‘news categories’ and ‘news folders’, posting ‘news items’ and the ability to comment/reply to these news (‘news replies’);
- **Voting forums**, which included the ability to initiate a vote on a subject, post messages, comments and replies as well as cast a vote in these forums;
- **The Public articles**, through which network groups could ‘broadcast’ news, messages or documents to the rest of the network;
- **Documents** and other learning resources (e.g. presentations files);
- **Discussion forums** allowing to initiate a topic (‘forum folder’), maintain a discussion thread (‘forum messages’) and post comments/replies (‘forum replies’);
- **Synchronous and asynchronous chatting** for one-to-one or group communication.

The system and all its functionalities were offered at two levels. The network area for everyone associated with the network and the group areas (one for each group).

6. The liberal strategy: the case of ACS

6.1. The ACS learning network

ACS is a network of automotive companies in Austria, established in 1996 by the local government, the regional Federation of Austrian Industry and four main vehicle manufacturers. The network had 200 member-firms at the time of implementation, the majority of them SMEs. In ACS learning takes place primarily through face-to-face sessions. Other learning mechanisms include factory visits, seminars and workshops. The platform was introduced in two pilots groups.
Table 1. Initial representation of the ICT system by the ACS intermediary\textsuperscript{a}.

| Planning and management of learning activities | 4.07 |
| Communication, information and knowledge sharing | 3.17 |
| Organisation and access to learning resources and contacts | 3.75 |
| Learning dissemination | 4.00 |

\textsuperscript{a}Average score of several items on a questionnaire with Likert scale (1, negligible; 2, low; 3, medium; 4, high; 5, very high).

6.2. Initial representations in ACS

In ACS, the groups have never tried a knowledge management or an e-learning software before to support its operations. The pilot group facilitator referred to knowledge management and e-learning applications as systems that are not very user-friendly.

It comes as no surprise that the network intermediary gave strong signs of subdued expectations from the developing platform. For instance, in the initial phase of the project, the facilitator of the pilot group admitted that he did not expect any new form of learning to spring out of the system.

Regarding the focus of the developing platform, the network intermediary expected the routines underpinning learning dissemination and the planning and management of learning activities to benefit (Table 1).

6.3. Introduction of the system to ACS

The project champion took some initiatives to introduce members into the system such as the presentation of usage possibilities and using the system to e-mail members for forthcoming events. The reaction of members was mixed. Although few people pointed out to the value of the platform for getting information, most were sceptical about the procedure: some found it too time-consuming, some were not happy to use a password.

6.4. System embeddedness and authoring activity in ACS

The network intermediary has uploaded a small amount of initial content and information in the network area, primarily documents and news (Figure 1). The strategy followed by the ACS intermediary was clear:

A sector that is to be improved and promoted is that the members not only have a look at information on the platform but increasingly put information on the platform themselves.\textsuperscript{3}

The strategy to encourage members to upload their own content has created an interesting response. The members responded by uploading content in the areas of News and Public Articles, raising the amount of content in these areas far above the other networks (Figure 2).

6.5. Members reading activity in ACS

The ACS members exhibited the lowest number of average visits per active user: 95 in contrast to 138 for EdP and 228 for PLT. In terms of the platform areas visited, the mem-
bers seem to neglect the areas with most of the embedded content (i.e. Public Articles and News) concentrating more on documents and other files mostly uploaded by the intermediary (Figure 3).
6.6. Emergence of new routines in ACS

The group facilitator invited members to an online session (synchronous chatting) to discuss work-relevant topics and problems. After the session, the participants claimed that an online session ‘is not a useful tool in a field of work where … people just don’t find the time to log in a chatroom’. This experience was discussed at the next meeting of the group and members conclusion was that an online session ‘would be fine for teenagers but not for managers and employees in the automotive business’. A few weeks later, a second online session was organised but this time very few participants joined in. As a result it was decided to stop piloting this service.

7. The critical interventions strategy: the case of EdP

7.1. The EdP learning network

The EdP started with 15 members in 1993, and increased to 500 members and 40 major sponsors. The network included a diverse range of individual participants – business executives, academics, students. EdP is ‘an unorthodox club of reflection’ where learning takes place through a process of listening, reflecting and debating. The intermediary employs four full-time staff. The EdP monthly seminars are 2–3 hours long with around 20 participants. The system was first introduced to the
Business Life group which included 40 members and it was then expanded to include other members.

7.2. Initial representations in EdP

EdP had its own website, used solely for warehousing information which was visited by 20,000 people each week. The popularity of the site made the managing director (MD) think about ways that technology might help the network. The MD saw the diffusion of the network’s reports as the most important strategic priority to be supported by an ICT system (Table 2). A new technology platform supporting dissemination of the network material could help with signing on new sponsors. Such a platform could help with raising extra income through the sales of the reports produced by the network.

The MD saw little value in building a platform to support feedback, discussion forums, etc. among members; the potential to enhance the informal communication, information and knowledge sharing routines of the network received the lowest score when the MD was asked before the system implementation. In his opinion, this would be too costly – requiring an extra full-time person – with serious doubts about the system’s effectiveness.

Fifty regular members were invited to a presentation of the platform. The network MD wrote about this event:

1. All were against the idea of a ‘chat’ system: this takes a lot of time and is fine for teenagers, not for the EdP users, who thought this was not of their age. They also stated they did not have the time those who like chats have.
2. Could voting forums help them to choose topics? No! Finding adequate topics means finding speakers, convincing them to give a presentation and preparing the session with them, it is not voting on abstract topics!
3. Could the votes serve to assess the quality of a document, a conference? No, this would be in contradiction with the spirit of the EdP whose challenge is to develop original work and to produce quality documents without upsetting the speakers (who work free of charge).
4. Could the system be used to make the working of the network more ‘democratic’? The dominating point of view was that EdP is in fact a centralised network, and that everything is just fine the way it is!

Other users, with a more positive attitude, stated that several possibilities should be proposed and you had to wait and see what works. According to the network MD:

This last point of view made sense, but it was not the dominant one: the majority of the people present were hostile and too busy. A bypass strategy was therefore sought to have the system accepted despite this hostility.4

| Planning and management of learning activities | 3.86 |
| Communication, information and knowledge sharing | 3.00 |
| Organisation and access to learning resources and contacts | 3.53 |
| Learning dissemination | 4.75 |

Table 2. Initial representation of the ICT system by the EdP intermediary.
7.3. Introduction of the system to EdP

The EdP MD decided to use a simulation game, developed by another project partner, an international university based in the same region. He decided to simultaneously launch the use of the platform while inviting the participants in the game. The volunteers visited the platform to download the necessary data for the game. Some answered the questions of a linked discussion forum ‘Comments and suggestions’ and some voted in the associated voting forums. The MD monitored the visitor’s access to the platform and welcomed them with ‘Instant messages’, a function that was appreciated a lot. He answered many questions and encouraged members to go to the platform, but above all, the preparation of the game was creating a motivation to connect.

Finally, came the day of the simulation. The participants were enthralled and had a first discussion on resistance to change. The next day, a discussion forum ‘post-simulation thoughts’ was set up in the system – by the professor behind the simulation game – with five questions on the game, the strategy and the tactics used by the players. Nearly all the participants in the game looked into the forum and several responded. Following this discussion, another forum ‘Change, dynamics and resistance’, also received several messages. As this issue was of interest to many, new members were introduced to the system and several took part in the discussion about change.

According to the network MD:

the participants tested this simulation and were surprised by the relevance of the game which makes one understand why human systems are reluctant to the introduction of technical innovations. … In short, the game was realistic and fun. These qualities played a significant role later.

7.4. System embeddedness and authoring activity in EdP

The EdP intermediary did not invest any major effort to upload items in the system (Figure 4).
Redefining learning networks through ICT capabilities

The lion’s share of authoring took place in the discussion forums with nearly 100 messages. A more detailed analysis revealed an interesting difference from the other networks (Figure 5). The EdP intermediary did not initiate necessarily any more discussion topics (‘Forum Folders’ in Figure 5) than the other network intermediaries. However a different picture emerged with the intermediaries’ contributions to these threads. In contrast with the other two intermediaries, the EdP intermediary has adopted a much more active stance in the learning dialogue, taking place in the system after the initial set-up of the discussion threads.

7.5. **Members reading activity in EdP**

In EdP, the network members demonstrated a high reading activity in the Forums area—the second highest in all system areas among all networks (Figure 6). EdP members also instigated a moderate reading activity in the area of system library by accessing documents and other learning resources.

7.6. **Emergence of new routines**

The network intermediary decided to use the platform to support a dialogue before a controversial session. The network MD asked the speaker to provide a text to include it in the platform. The speaker sent a short and provocative text which the MD uploaded and connected it with a discussion forum for the members. The MD gave the speaker access to the forum. The text gave rise to powerful reactions by members in the system:

- This is an old reactionary, nevertheless, I shall participate!
- This is nothing but bar-room philosophy, and I cannot understand why [the intermediary] invited this person.
Figure 6. Normalised reading activity of members in all three networks.

The MD decided to intervene in the forums in order to calm the members down:

- First of all, [the speaker] is the well-known organizer of ‘learning expeditions’ to the USA by top managers of European and particularly French companies;
- Next, America is an issue for all those who are involved in business life;
- This book, which I have read, is full of accurate and very enlightening details, and is therefore worth reading, even if the argument bringing everything back to the issue of weaning seems a little basic;
- The session could allow us to learn about the learning expeditions, the way French managers operate when they go to the USA, the author’s vision of the gap between France and America, and it should allow us to discuss these issues according to the best EdP tradition.
- I am therefore proposing that the forum helps us to get ready for the discussion.

The speaker was also quite upset by these messages. The network MD used the system to provide reassurances to him, and to discuss ‘at length the manner in which he could present things’. The actual (face-to-face) session took place with great success. According to the intermediary:

The session was extraordinary. I am sure that if we had not done this ‘small preliminary exercise’, the session would not have been as magical. … Never had a session been prepared with such care. Without the platform and its unexpected exchanges, it would not have had such quality.

He then shared these events with the members of the second pilot group and invited them to periodically take part in discussions forums before or after sessions. There were many favourable responses. This time, the forum was very active from the very beginning with the participation of the speaker. These successes motivated another group facilitator, to propose using the system for
a forthcoming event. In addition, more members, who have heard about the success of discussion forums, started requesting to be introduced to the system.

8. The heavyweight strategy: the case of PLT

8.1. The PLT network

PLT with 450 small businesses is part of a wider network in Ireland which developed a unique model of learning engaging both large and small companies on the basis of their complementarity. A group of managers, who were very experienced in the PLT process were asked to pilot the system which was then expanded to a group of small ICT companies.

8.2. Initial representations in PLT

At the time of project, PLT, was subject to a competitive attack from another learning network, a spin-off from PLT. Before the project, PLT had an ICT system in place which was ‘extremely limited … was not very user friendly, had low perceived value … and was not very time effective’. The combination of these factors made the PLT network develop a very ambitious agenda:

1. We anticipate that the Internet technology (IT) resource package will augment existing, generate new or lead to advanced knowledge transfer between network participants;
2. The system will map/document tacit knowledge interactions/transfers and archive such data in an internal system archive, which can be accessed by other members;
3. The system will aid in the communication of knowledge ‘back through’ member organisations, so that the organisations as a whole develop, as opposed to solely the group member doing so. (PLT Environmental Audit and Stakeholder Analysis, 4)

Moreover the project champion was hopeful that:

the system will directly or indirectly permit members to learn together in ways we had not foreseen … perhaps through … other methods that have not been purposely built for knowledge sharing. (PLT Environmental Audit and Stakeholder Analysis, 3)

8.3. Introduction of the system to PLT

The network MD acknowledged that the members of his network had “varying degrees of IT familiarity”. He organised a focus group with a member with a strong ICT background, a member with very little ICT familiarity and a very experienced group facilitator. Members of the development team were invited to explain what the system was planning to do. The results were very encouraging and the MD decided to go ahead.

The MD of the network insisted that the project champion should undertake the role of facilitator for the first pilot group, rather than simply promoting the system to them. To his opinion, this would help the project champion to have more legitimation towards the group while at the same time it would put in a better position to integrate the system functionalities and the learning process in the network.

A key part for the introduction of the system was the negotiation with the group in order to ensure the ‘buy in’ of the members. For instance a special workshop was organised for the pilot group, for the members to give their ‘wish list’ for the system functionalities. The facilitator
ensured that the group were given regular updates on the development of the system and gave one to one inductions to individual members.

8.4. System embeddedness and authoring activity in PLT

From the beginning of the project, the network MD made ‘the creation, development and support of a knowledge bank’ top priority (PLT Pedagogical Audit, 4). As a result the intermediary has embarked in a massive effort to upload a large amount of content in the network area of the system. The intermediary was responsible for 92 calendar items, 35 uploaded files and more than 10 discussion topics in the forums in the network area. This content exceeded by far the equivalent content uploaded by the other two intermediaries in the network area of their systems (Figure 7). The vast majority of this content has been uploaded or authored by the intermediary (Figure 8) – the only exception being the discussion forums.

The clear winner of this massive authoring and uploading activity was the documents and the other learning resources. The system had 80 documents uploaded, six times the documents uploaded in the ACS system or 12 times the documents uploaded in EdP (Figure 9).

8.5. Members’ reading activity

The PLT members showed the highest reading activity (compared with the other two networks) in two areas: the documents and the calendar (Figure 6).

The network members visited the documents, the calendar items and the news in the group areas more frequently than the equivalent items in the network area (Figure 10). This was reversed in the discussion forums where the visits of discussion forums in the network area (i.e. with members not belonging to the same group) was more frequent than the reading of forums within a group.
8.6. **Emergence of new routines**

The intermediary took the initiative to set up four online seminars for members across the network with experts talking about a topic of interest. Between six and 10 pilot users attended at any one
time with a number of people unable to access owing to IT errors. PLT received feedback from members that the 1-hour on-line session covered as much learning as a 4-hour face-to-face meeting (PLT Final report, 14):

1. Members found that they were able to continue and expand on the learning that they undertook in the formal learning sessions;
2. The resource allowed the project team to facilitate additional learning sessions at times that were convenient for participating members (morning and afternoon);
3. Members were requested to consider the topic before entering the conversation … This allowed them to maximise on the learning contained within the session.

The network MD was surprised to discover that members found the on-line seminars very valuable. In his words (PLT Final report, 14–15):

The group’s pre-conceived notion that only students and younger people used chat rooms was contradicted by the overwhelming benefits that active online learning sessions provided. … A misconception was that ‘chatting is occurring’ when in fact it is real time knowledge transfer in a virtual learning environment.

A key request from the members was that the data contained in these formal sessions be captured for future reference. Weekly online sessions were considered in the network following the success of these online sessions.
9. Final representations of the system

The impact of the system on the network was investigated through a survey of members. The survey asked members to evaluate (on a scale from 1 to 5) the value of the system for the four sets of network routines. The results for each scale was summarised to a single index, giving one score for each set of routines in each network. The EdP members gave the highest scores to the system among all three networks. They were followed by the PLT members which gave an upper-medium score to the system with the ACS members giving clearly the lowest score (Figure 11).

The survey asked the participants to indicate whether the system can help to improve and upgrade their network (Figure 12). ACS clearly demonstrated the weakest performance on this question with 17% of the respondents saying that the system did not contribute to the network improvement at all. Furthermore 8% of respondents in ACS accepted a substantial contribution from the system as opposed to the equivalent figures of 21% in EdP and 18% in PLT.

10. Intermediation strategies

Learning networks are networks of organisations which join the network voluntarily; nobody forces them to stay while they have to pay a membership subscription. The network intermediary can only make decisions which have the consent (if not the support) of the vast majority of members. In other words the network intermediary needs to manage creatively a web of (dispersed) perceptions, opinions and behaviours of different players, especially when the network experiences a ‘shocking’ force such as the introduction of a new ICT system in the network. The three cases revealed three distinct strategies for doing this complex job.
The ACS intermediary followed a liberal policy, a policy characterised by (i) minimal intervention to influence users’ beliefs, (ii) minimal moderation (iii) users providing most of the content and (iv) users developing their own interaction strategies. All that is needed for this strategy to work, is a reliable (from a technical point of view) system with a good user interface to enable an intuitive use. This strategy has been very popular (e.g. Facebook and Linked-In) at the very least because its low cost makes it amenable to the development of a sustainable business model.

The risk of this strategy is that the active users may lead the system to usage trajectories that are not consistent with the strategic mission of the network, risking the alienation of other users. For instance the ACS members’ authoring activity in the News and Public Article areas was three times higher than PLT and 30 times higher than EdP, with the members’ average visits in these two areas being the highest in this network (Figure 3). Nevertheless the ACS members gave the lowest score (of the whole survey) on the system contribution to learning dissemination. It seems that the ACS members activity in these areas was more about marketing their firms rather than exposure as part of a knowledge exchange process; as a result network members, who joined the network to learn rather than promote themselves, did not appreciate the relevant functionalities.

Furthermore, if the potential users’ representations of system functionalities need to be tweaked, the liberal policy is also not effective. This shortcoming was behind the failure of the ACS network to convince its members about the value of some of the system functionalities. In short the liberal policy is an efficient strategy which comes together with serious risks for reduced effectiveness.

10.2. The critical intervention strategy

In EdP, the intermediary developed a critical interventions policy which was defined by (i) putting a lot of initial effort on influencing the beliefs of the network members through powerful interventions (ii) identifying intelligent ways for materialising the first engagement of users in the system
(iii) making critical interventions that clearly add value to the learning process (iv) providing only the necessary content in the platform, most of it associated with the topic discussed in the interventions.

The most striking element of this strategy is that it enables a unique shift in the representations of the system. Before the implementation of the system, the biggest expectation of the intermediary was in the dissemination of the reports produced to a wider audience in order to enhance members’ recruitment while it ‘did not have real expectation’ in enhancing ‘the most efficient way in the field of knowledge sharing and learning … [the] small group discussions’ (EdP Environmental Audit and Stakeholder Analysis). Furthermore the first reaction of the members to the presentation of the system was that these were right ‘for teenagers, not for business managers’. The initial behaviours were very much in line with these perceptions; for instance the EdP intermediary initiated a rather low number of threads in the discussion forums (five forum folders in comparison with four in ACs and 12 in PLT).

However the way the system was introduced in the network (a simulation game run by an expert academic) in conjunction with the intermediary’s critical interventions (e.g. the uploading of the controversial paper and the messages posted during the discussion) have completely changed the scenery. Both the intermediary and the members embraced the system. The intermediary posted 11 (initial) messages and 20 replies (in contrast to three messages and no replies in ACS and 13 messages and three replies in PLT). Similarly the members posted 23 messages and 40 replies (in contrast to three messages and three replies in ACS and 17 messages and 27 replies in PLT) while the average member visits in the same area were also very high (82 compared with six in ACS and 31 in PLT). Following this high activity, the members score for the system value regarding the enhancement of communication and informal sharing was the top score of the whole survey (3.88).

These successful interventions created conditions which enabled the members to realise the wider value of the system. For instance, the score given to the system contribution to the organisation of and access to resources was also very high (3.72 – the second highest of the whole survey), despite the low number of uploaded documents (five in EdP in contrast with 80 in PLT and 11 in ACS).

There are two limitations in this strategy. First, this model requires a highly intelligent intervention policy, one which in all likelihood can be delivered only by a senior and experience moderator. This person should know when and how to intervene (Franke 2000) and more importantly he or she should be able to develop a vision for the usage of the system (Christenson and Walker 2004). It may be very difficult or very expensive to find a person with such competencies. Second, this strategy is inevitably associated with some risks since its concrete steps cannot be pre-planned; a lot of them emerge as experiments and improvisation acts responding to the unexpected incidents.

In the words of the EdP MD:

> It is difficult at this stage to provide general recipes other than to gradually find, by patient and imaginative experimentation, uses which are of interest to the members, which are even attractive and fun and, at the same time, strengthen the efficiency of the network and its identity.

### 10.3. The heavyweight strategy

The heavyweight strategy, is substantiated through (i) spending some resources up front to make users feel stakeholders of the system (ii) uploading a large amount of content to the system including learning resources and contacts of people (iii) engaging a large number of users, hoping
that the critical mass of users will create some kind of avalanche to ‘soak in’ the system people who may not be inclined to use it in the first place (iv) creating virtual space among the users to connect with each other in unforeseen ways. This content-driven strategy is a labour-intensive strategy that comes close to the strategy adopted by most e-learning systems.

These results demonstrate that the value of the system was the creation of extended linkages between various network actors. For instance 58% of PLT members found the variety of communication channels in the system as good or excellent (in contrast to 14% in ACS and 39% in EdP). Furthermore, 41% of the members in PLT believed that the system helped them to increase the communication with the intermediary (in contrast to 29% in ACS and 36% in EdP) while another 41% of members found the system contribution important in accessing resources of other network groups (in comparison with 12% in ACs and 29% in EdP).

Although this strategy requires a high level of labour resources, it can become financially sustainable if the intermediary capitalises on the large number of engaging users (through a contribution fee or advertising). It is a strategy less risky than the critical interventions strategy in the sense that it can be (relatively) safely planned and executed.

Its ‘Achilles heel’ is that the achieved impact is disproportional to the required input. For instance, the PLT members scores on the system value are lower than the opinion of EdP members, despite the much larger effort that went into developing the system in PLT compared with EdP.

11. Conclusions

This paper has drawn evidence from a European research and technology development project to encourage the use of ICT by learning networks of SMEs. The presented evidence has confirmed the theoretical approaches trying to explain the interaction between technology, organisations and people by the role of human agency. The same ICT system, given to all three cases, has generated different practices clearly distinct from each other. To this extent, this research has confirmed that there is little point in discussing whether ICT capabilities can benefit networks of SME; it is much more constructive to discuss the circumstances and the practices under which that ICT can benefit SME networks.

The presented evidence has shed light on a number of aspects that influence the usage of ICT by learning networks of SME: the system representations, the system content, the members’ visiting patterns are all important pieces of this puzzle. However the most crucial piece of this puzzle is the intermediary’s practice, which include such things as the nature and frequency of the intermediation activity in the system, and the way the intermediary manages the members’ representations.

Three archetypical strategies were identified by the reviewed evidence: (1) the liberal policy, (2) the critical intervention strategy and (3) heavyweight strategy. Each one of them is associated with certain advantages and disadvantages. The stronger asset of the first strategy is the cost-efficiency. The second strategy demonstrates very high effectiveness in the sense of deepening and sharpening the learning process. The third one stands out for the extension of connections across different actors in the network.

While these insights advance our thinking in the field, caution needs to be exercised to the extent that this paper drew from three case studies with all the limitations that this choice represents. Widening the research with the inclusion of larger samples and pursuing longitudinal research can deepen our understanding of the phenomenon. To this extent this study provides only a first but valuable step in this direction.
Redefining learning networks through ICT capabilities

Notes

2. This group did not include the ICT team and the other partners of the project who were also given access to the system.
3. Interview information.
4. Interview information.
5. Interview information.

Notes on contributors

George Tsekouras is a Principal Research Fellow at CENTRIM, University of Brighton. He leads the research in the area of innovation management in SME, especially the non-research intensive SMEs. He has published on a number of related areas such as peer-to-peer learning networks, innovation management challenges for SMEs and innovation policy support for SMEs. He is the founder of the Profitnet network, a learning network that has engaged to date with more than 1000 small firms in three countries. He was the co-ordinator of the RAPPORT project, looking at best practices to connect SMEs to the public or private research base. George has also worked in innovation policy benchmarking, technology and industry forecasting and business process reengineering. He has a first degree in mechanical engineering and a DPhil from SPRU.

Despina Kanellou is a Research Fellow at CENTRIM, University of Brighton. She has been working in a range of innovation management and organisational learning projects. Her research focuses on inter-organisational collaboration and learning techniques and specifically in advancing methodologies to support companies and other organisations in their process to change and define alternative business and delivery service models. Despina led the work in the Network of Expertise Centres in Culture Heritage as part of the EU EPOCH project, where she developed a methodology for cross-country collaboration of different stakeholders (RTDs, policy makers, SMEs, etc.). She has presented her work to various international conferences. She is a reviewer for a number of international journals as well as a Grant referee for British Council, Science and Technology Research visits and Research Studentships.

Neha Rai is a Research Fellow at SPRU, University of Sussex. She has extensive research experience in innovation policy research. She is currently (2013) a part of the EU FP-7 funded research project RAPPORT that aims to understand schemes, policies and initiatives in EU countries, that promote and support Knowledge and Technology Transfer between Universities and SME. She is also engaged with Sussex Energy Group in the EPSRC funded Infrastructure Transition Research Consortium where she is examining the evolution of national infrastructure governance (ICT, energy, water, transport, waste) in the UK, and how it must be modified to enable future infrastructure transitions. Her past experience also includes a quantitative exploration of relationships between innovation performance of EU countries (based on the European Innovation Scoreboard – EIS) and their socioeconomic and environmental performance.

References


Redefining learning networks through ICT capabilities


