

2007

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Recommended Citation

Cooper, Vanessa A.; Lichtenstein, Sharman; and Smith, Ross, "Understanding Knowledge Transfer in Web-based B2B IT Support" (2007). *ACIS 2007 Proceedings*. 3.

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Understanding Knowledge Transfer in Web-based B2B IT Support

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Abstract

In managed information technology (IT) support environments, transferring solution-oriented knowledge from an IT service provider to an enterprise customer offers benefits to both firms. However, the process of inter-organisational knowledge transfer is not well understood in such complex settings where Web-based Self-service Systems (WSSs) are increasingly employed. This paper draws on findings from an interpretive study of six large multinational IT service providers to provide a staged model of after-sales knowledge transfer from an IT service provider to an enterprise customer when a WSS is used. The paper also identifies and discusses the key challenges involved at each stage.

Keywords

Knowledge Transfer, Web-based Self-service, After-sales Support, Information Technology Services

Introduction

The outsourcing of information technology (IT) support to IT service providers is known as “managed IT support” and is an increasingly popular IT support strategy for non-IT organisations. In 2006 Forrester estimated the North American desktop outsourcing market at \$12.8 billion, forecasting an increase to around \$15.5 billion by 2009 (Forrester 2006). Business-to-business (B2B) IT support provision relies on knowledge management (Tourniaire & Kay 2006) and involves the transfer of solution-oriented knowledge from service provider to enterprise customers (CSI 2002; Koh *et al.* 2004). IT service providers respond to after-sales enquiries, incidents and problems by sharing solutions. When an IT service provider successfully transfers solution-oriented knowledge to an enterprise customer there are benefits for both firms. For the service provider, support agent productivity is increased and agents are better able to resolve customer problems (Delic & Hoellmer 2000). For the customer firm, future support costs are lowered and the supported IT product is better accepted (CSI 2002; Tourniaire & Kay 2006). The customer may be more productive and satisfied when IT resolutions are assimilated within the firm. It is, therefore, important for IT service providers to understand how the inter-organisational knowledge transfer process works and the key challenges involved.

A theory of knowledge transfer in managed IT support is sought to enable such understandings. However, theories of inter-organisational knowledge transfer are rare in the information systems, knowledge management and electronic business literatures, particularly in managed IT support, where *Web-based Self-Service Systems* (WSSs) are increasingly used as support delivery mechanisms. We argue that a staged processual conceptualisation best allows for the temporal nature of the inter-organisational knowledge transfer process, the involvement of multiple stakeholders, the use of WSSs and other complexities. This paper draws on key findings from an interpretive study of six multinational IT service providers and reports the development of a temporal staged model of inter-organisational knowledge transfer in the provision of after-sales IT support for enterprise customers when WSSs are used. The paper also discusses the key challenges involved in knowledge transfer at each stage.

The remainder of the paper is laid out as follows. The next section provides a theoretical background in order to situate later empirical findings. The section reviews: (1) WSSs and knowledge transfer in after-sales B2B IT support, (2) knowledge transfer models, highlighting their deficiencies in the present context, and (3) barriers to knowledge transfer. The next section discusses the research methodology and design, focusing on illuminating research processes underpinning the development of the knowledge transfer model and the identification of related challenges. A staged model of knowledge transfer in managed IT support is provided. Challenges for knowledge transfer at each stage are then discussed. A final section summarises the key contributions of the paper, draws conclusions, discusses research limitations and offers closing remarks.

Theoretical Background

This section first reviews the use of WSSs and second, outlines a high level model of knowledge transfer for after-sales B2B IT support delivery, developed in the research project. Third, the section reviews representative knowledge transfer models, highlighting their shortcomings in the after-sales managed IT support context. Finally, the section discusses a range of recognised barriers to knowledge transfer.

Web-based Self-service Systems

A WSS is a type of Network-based Customer Service System (NCSS) which has been defined as “a network-based computerised information system that delivers service to a customer either directly (e.g. via a browser, PDA, or cell phone) or indirectly (via a service representative or agent accessing the system)” (Piccoli *et al.* 2004, p. 424). A WSS enables pre-sales, sales and after-sales self-service via a Web interface and is complemented by a customer contact centre and a multi-channel service strategy (Negash *et al.* 2003).

A WSS has important advantages for service providers, customer firms and consumers. For the service provider, it may reduce the cost of support transactions by empowering support agents, consumers and enterprise customers to more easily capture, transfer and re-use support-oriented knowledge and information (Delic & Hoellmer 2000; Negash *et al.* 2003; Pujari 2004). Such systems also offer qualitative advantages to enterprise customers by improving operational performance (Bhappu & Schultze 2006) and building greater consumer satisfaction, loyalty and retention (van Riel *et al.* 2004). Finally, consumers can employ a WSS to contribute knowledge and so co-produce services (Schultze & Bhappu 2005).

In this paper we focus on WSS implementations in the context of multinational IT service providers that provide after-sales IT support to commercial enterprise customers. We are particularly interested in modelling the process of inter-organisational knowledge transfer from an IT service provider firm to customer firm when a WSS is used, as discussed next.

Inter-organisational Knowledge Transfer in After-sales IT Support Provision Using WSS

We begin by defining knowledge and several related concepts. Codified observations from a marketplace of data, when placed in a decision context, are transformed into information (Barabba & Zaltman 1991). When information is analysed, intelligence is created. When high levels of confidence are developed in a body of intelligence, knowledge is created. Alavi and Leidner (1999) suggest that “information becomes knowledge once it is processed in the mind of an individual (‘tacit’ knowledge according to Polanyi (1976) and Nonaka & Takeuchi (1995)). This knowledge becomes information again (Nonaka and Takeuchi term this ‘explicit knowledge’) once it is articulated or communicated to others in the form of text, computer output, spoken or written words, or other means” (Alavi & Leidner 1999, p. 6). Alavi and Leidner note that a process of reflection, enlightenment and learning is required for explicit knowledge to become tacit in the mind of a receiver. This learning process is likely to occur when a receiver has an interest in applying explicit knowledge in context.

Early in the research study we developed an initial high level non-staged conceptual model of inter-organisational knowledge transfer in the managed IT support context as shown in Figure 1 (Cooper *et al.* 2006). The model conceptualises the transfer of IT solutions to resolve customer firms’ after-sales IT support needs as a complex transfer of tacit and explicit knowledge from an IT service provider (termed “*support organisation*” in the figure to highlight the customer support role) to a customer firm. An example of explicit knowledge in this context is a resolution (“solution”) to a customer’s IT problem, stored in a solutions knowledge base.

When an enterprise customer experiences IT incidents or problems, an IT professional (or end-user) at the customer firm may telephone the support organisation’s Service Desk to access assisted support via support staff or directly access the support organisation’s Web site seeking a solution. In the event that the IT professional (or end-user) does not find a solution available as explicit knowledge, first tier Support Agents at the support organisation identify potentially successful solutions: (1) from their tacit knowledge of the subject matter; or (2) by searching the solutions knowledge base. Complex problems are escalated to experienced second and third tier Support Agents.

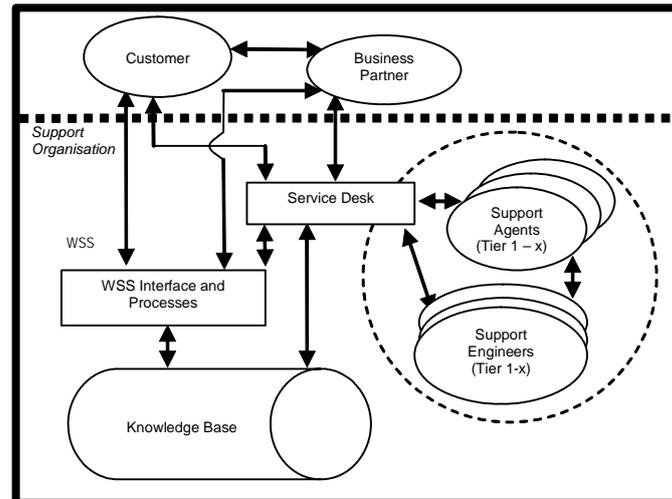


Figure 1: Knowledge transfer in after-sales B2B IT support when WSSs are used (Cooper *et al.* 2006)

Downstream are tiers of Support Engineers – technology specialists who ultimately resolve the most difficult problems by drawing on their valuable tacit knowledge. New and evolving solutions are captured in the knowledge base as explicit knowledge and organised for reuse. Successive efforts by Support Agents to address related questions by customers are aimed at helping the customer firm institutionalise solution-oriented knowledge. Sometimes IT support is provided by a business partner in which case an enterprise customer’s IT professionals may interact directly with the partner firm’s IT professionals. Business partners may also contribute to, or retrieve, knowledge from the support organisation’s knowledge base using WSSs.

Knowledge Transfer Models

Five models of knowledge transfer are now reviewed, highlighting their inadequacies for potential representation of the transfer of solution-oriented knowledge from an IT service provider to an enterprise customer via WSSs. A comprehensive review of knowledge transfer models is outside the scope of this paper, however, the interested reader is referred to Kwan and Cheung (2006).

First, as an example of individual models of knowledge transfer, Lichtenstein and Hunter (2006) describe a receiver-based model of knowledge transfer comprising six steps: (1) sharer becomes aware of the value of her knowledge to a potential receiver; (2) sharer brings knowledge to the attention of a potential receiver; (3) knowledge is transferred to a receiver through a channel; (4) receipt and assimilation of knowledge by receiver; (5) effective application of received knowledge in practice; (6) feedback from receiver to sharer about receiver knowledge needs and behaviours. This model emphasises the role of a receiver in providing feedback to sharers regarding knowledge needs, preferred communication channels, and other knowledge sharing concerns. A set of receiver-based influences on knowledge sharing accompanies the model, showing how factors such as perceived need-to-know, perceived power influences, and other sharer perceptions of receivers influence key decisions in knowledge sharing and transfer. This knowledge transfer model does not, however, consider: (1) the institutionalisation of transferred knowledge at an organisational level; (2) the temporal complexities of managed IT support; (3) influences and needs of a network of stakeholders; or (4) the use of complex systems such as WSSs to facilitate knowledge transfer.

Second, a networking perspective of knowledge transfer adopts a relational approach to knowledge transfer based on how patterns of connections between individuals and groups facilitate knowledge sharing and knowledge transfer (Kakabadse *et al.* 2003). Huysman and de Wit (2002) argue that social networks and knowledge connections are important enablers of technology-mediated knowledge transfer. We note, however, that the network approach to knowledge transfer does not provide a temporally staged view or consider other complexities of the managed IT support context.

Third, Cranefield and Yoong offer a staged model of inter-organisational knowledge transfer (Cranefield & Yoong 2005). Their model comprises six stages: engaging; defining; seeking; articulating; integrating; and disseminating. The model also identifies key organisational influences on knowledge transfer during each stage, including: top management support; organisational structures; cultural issues; prior experience with the knowledge; codification issues; and accessibility. The factors most relevant to knowledge transfer in an inter-organisational context include the need for fit between the transferred knowledge and the receiving organisation’s current organisational objectives and traditional discipline area, and the need to avoid use of “non-transferable examples” which cannot be readily transferred to other organisational contexts. This model is

relatively new and does not yet have significant peer recognition, but is potentially valuable in a range of contexts.

Fourth, Nieminen (2005) presents a model of inter-organisational knowledge transfer that focuses on the role of a receiving organisation in enabling transfer. He writes of the need for a receiving organisation to have a range of competencies among its employees in order to reduce significant absorptive gap (Lane & Lubatkin 1998) between the two firms involved in the transfer. However this model, while promising, is not directly related to managed IT support and ignores the role of a complex structure such as tiers of support agents inside the support organisation.

Fifth, Szulanski's intra-organisational model of the transfer of best practices (Szulanski 1996) comprises four stages: initiation; implementation; ramp-up; and integration. The model considers the transfer of knowledge from a source to a receiver. The initiation stage consists of all events that lead to the decision to transfer knowledge from a source to a receiver. In the implementation stage, knowledge flows between the source and receiver who must be motivated to understand, learn and assimilate received knowledge. Social ties are established between the source and receiver and the transfer is customised to suit receiver needs. The ramp-up stage begins when the receiver commences using the received knowledge, typically inefficiently at first but gradually identifying and resolving unexpected problems that arise while using the new knowledge, ramping up towards a satisfactory level of performance. The integration stage begins after a receiver achieves satisfactory results with the transferred knowledge. The transferred knowledge is routinised and institutionalised in the organisation, whereby the new knowledge replaces old knowledge and practices. In the study reported in this paper, Szulanski's model, having undergone extensive peer review, was explored and adapted in the inter-organisational context of managed IT support.

Barriers to Knowledge Transfer

There are many recognised barriers to transferring knowledge within and across organisations. This section synthesises a representative selection of knowledge-, receiver-, sharer- and context-based barriers, concluding with a discussion of issues related to technology-mediated knowledge transfer.

Knowledge-based variables that can inhibit knowledge transfer include the tacitness and complexity of knowledge (Simonin 1999), and characteristics of unprovenness and causal ambiguity (Szulanski 2000). Tacit knowledge, such as expertise in the debugging of software, is notoriously difficult to transfer (Nonaka & Takeuchi 1995; Simonin 1999). Complex knowledge, such as an IT resolution, may be difficult for a receiver to internalise. Knowledge that is lacking a record of proven usefulness is also more difficult to transfer, as in the absence of such a record it can be more difficult to persuade a potential receiver to engage in knowledge transfer (Szulanski 2000). Finally, causal ambiguity exists when the precise reasons for success or failure in replicating a capability (knowledge) in a new setting cannot be determined, or when the idiosyncratic features of the context in which the knowledge is applied are not well understood (Szulanski 1996, 2000). Given such ambiguity, knowledge transfer may not be successful.

Receiver-based variables that may inhibit knowledge transfer include absorptive capacity. In an inter-organisational context, a firm may lack sufficient expertise to identify, assimilate and exploit knowledge arriving from another organisation (Lane & Lubatkin 1998). According to Lane and Lubatkin, strong relationships between organisations can partly close an absorptive gap. Partial duplication of knowledge bases can also help (Simonin 1999) as can ongoing interaction between partners (Simonin 1999) and partner interdependence (Steensma & Corley 2000).

Sharer-based variables that may inhibit knowledge transfer include issues of motivation (Davenport & Prusak 2000; Szulanski 2000). A sharer may resist sharing knowledge for fear of losing ownership or power (Davenport & Prusak 2000). A lack of incentives may deter a sharer (Davenport & Prusak 2000) as sharing takes time and resources. Sharers have been found to be motivated by altruistic feelings or receiver cues such as a receiver's need to know, desire to know, ability to access knowledge and anticipated use (Lichtenstein & Hunter 2006).

Context-based variables include organisational context and relationship issues. Factors that differentiate organisational contexts are formal strategies, structures and systems, sources of coordination and expertise, and how the organisations frame behaviours – that is, the organisational culture (Szulanski 1996; Davenport & Prusak 2000; Gold *et al.* 2001). Rewards, recognition, and cultures of trust, openness and honesty can motivate knowledge sharing (Gold *et al.* 2001). Positive relationships can also facilitate the transfer of tacit knowledge (Lane & Lubatkin 1998; Szulanski 2000; Nieminen 2005).

Further complicating successful knowledge transfer are the challenges of *technology-mediated* knowledge transfer. The potential of knowledge technologies to support knowledge transfer has been supported by many experts. Albino *et al.* (2004) argue that organisations can leverage organisational culture and technology to

improve knowledge transfer, but the role and value of technology in knowledge transfer depends on how it fits the cognitive processes involved, the cultural environment where the transfer takes place and the aim of the transfer.

Research Methodology and Design

The research project first explored the critical success factors (CSFs) for use of WSSs in the managed IT support environment (see Cooper *et al.* 2005a, 2005b), and second, the nature and challenges of the knowledge transfer process when WSSs are used. This paper focuses on reporting findings from the second objective – the knowledge transfer process. The methodology of the project is outlined below.

As the environment in which a WSS is planned, developed, implemented and used is a human activity system, we used an interpretive research approach (Walsham 1995) to better deal with the subjectivity and social construction of human perceptions. The success or failure of a WSS relies to some extent on the managers, developers, content providers and other users at the IT service provider. In this project, we sought to understand the IT service provider perspective of a successful WSS and the knowledge transfer process.

As there is relatively little theory available for electronic business, field studies are needed that focus on theory development (Clarke 2001). In *Stage One* of the research project an extensive literature review was first conducted to develop a theoretical background including a working model of inter-organisational knowledge transfer adapted from Szulanski (1996) as mentioned earlier. The literature review was followed by an interpretive case study conducted at a large best-in-class multinational IT services organisation ‘ServIT’ (a pseudonym). ServIT was chosen for its progressive approach to IT support, award-winning support Web site, extended enterprise status, and mature, successful WSS strategy integrated with multi-channel, multi-vendor support. The choice of such a company also enabled issues of high service volume, complexity, dispersion and electronic business to surface. The Australian headquarters of ServIT comprised the unit of analysis.

The case study at ServIT adapted the CSF method of Rockart (1979) in order to identify the CSFs for successful use of WSS for transferring solution-oriented knowledge to the customer firm. The case study was conducted in two phases. In the first phase, twelve managerial informants from relevant business functions were interviewed for approximately one and a half hours each, with questions guided by early understandings from the literature review, including the working model of inter-organisational knowledge transfer. The interviews were audio-recorded, transcribed and inductively analysed using a qualitative content analysis approach (Krippendorff 1980). From this analysis, an initial set of CSFs was identified and the working model of knowledge transfer was refined to a preliminary model of knowledge transfer. Other data sources, including documents, observations and ServIT online support sites, were used to enhance the set of CSFs and knowledge transfer model. In the second phase of the case study, a CSF focussing workshop (Rockart 1979) of three hours’ duration was conducted with five of the original interviewees. The audio-recorded transcript was later analysed using qualitative content analysis techniques. Using the results of this analysis, the set of CSFs was enhanced and the preliminary knowledge transfer model was confirmed.

In *Stage Two*, a cross-organisational focus group was conducted to confirm the findings from the case study. Participants comprised six Australia-based senior managers from five large multinational IT service organisations with branches in Australia. A three hour session took place during which participants systematically discussed the findings from Stage One, seeking confirmation and new insights. The transcribed data was analysed using qualitative content analysis (Krippendorff 1980). After receiving some final feedback collected by electronic mail, the set of CSFs and knowledge transfer model (reported in this paper) were confirmed.

A Staged Model of Knowledge Transfer in B2B IT Support

This section reports a four stage model of inter-organisational knowledge transfer (Figures 2 – 5) drawn from the study’s findings as described in the previous section. *In the description that follows, the case study at ServIT is employed to illustrate the four stages and underscore key points.* To assist reader understanding of the descriptions, it is noted that “Premia” is a pseudonym for a Help Desk tool that is used to track customer cases and is underpinned by a solutions knowledge base. “ShareIT” is a customer relationship management (CRM) tool which captures knowledge pertaining to individual customers, including knowledge pertaining to after-sales IT support.

Initiation Stage (Figure 2)

At ServIT, knowledge is initially captured from support agents, business partners and customers into the knowledge base when there is a change such as a new product release or in the normal course of support work. Knowledge is captured from customers first during the sales process, and later as cases captured by support

agents (or business partners) from IT professionals or other end-users at the customer firm. Before lower-tiered support agents can capture knowledge into the WSS knowledge base or assist customers via assisted support on the WSS, they are coached. Coaching includes formal and informal training, where lower-tiered agents can ask more experienced support staff for assistance. ServIT also conducts regular meetings to provide a forum for support agents to share “lessons learned” with managers and peers. Coaching primarily involves the transfer of the knowledge from higher-tiered support staff to lower-tiered support staff.

Where IT support personnel indicate that they have access to IT solution-oriented knowledge which has not been captured in the knowledge base but which might be of use to other support staff or customers, they are expected to share this by capturing it in the Premia knowledge base. Once captured, this knowledge can be accessed by front line support agents as needed, empowering them to some extent during WSS assisted support. Once knowledge has been initially captured into the Premia knowledge base, it is reviewed and organised for re-use by customers via the WSS knowledge base according to a set of internal standards. Support staff (and business partners) can also contribute to the WSS knowledge base directly via online fora.

Cases in the knowledge base evolve as follows. If, in re-using an IT solution, a support agent notes there are possible improvements to the current solution, case notes and ultimately the IT solution are updated by the agent. An end-user at the customer firm accesses the WSS and searches for potential resolutions from the WSS knowledge base or via online fora, electronic mail or chat. If a search is performed, intelligent case-based reasoning (CBR) software identifies and displays optimal potential resolutions from the WSS knowledge base. If a solution is not found, a customer end-user may choose to abandon the transfer process or re-initiate the transfer, either by refining the search criteria via the WSS, or by submitting the incident to the Service Desk by phone call.

To assist customers directly (for example, by phone or chat), ServIT support staff can search for knowledge in the Premia knowledge base or WSS knowledge base. If a solution is not found, the support agent begins troubleshooting the incident and, if necessary, escalates the problem to higher-tiered support staff. Root cause analysis results in new workarounds which are posted to the Premia knowledge base. Business partners may also search the WSS knowledge base for solutions to assist customers, however business partners and customers do not have access to the ShareIt or Premia knowledge bases for quality control reasons. Initiation is completed once a potential solution has been identified for transfer.

The Implementation Stage (Figure 3)

During the implementation stage, knowledge flows between ServIT, business partner and the end-user at the customer organisation. Knowledge may flow directly from a WSS to an end-user, such as in the downloading of a White Paper, patch or trouble-shooting document. Knowledge may also flow through ServIT support staff or a business partner – for example, via an online chat session with a customer end-user. From a technical perspective, ServIT must consider the format of the knowledge and the type of channel used to transfer it. The most commonly cited example of such a consideration was the need to present the knowledge in a format to cater for customers having a range of internet connection speeds. Where a human is the source of knowledge, social ties with a potential receiver are established and maintained. At the end of the implementation stage the knowledge resides with an end-user at the customer firm.

The Ramp-up Stage (Figure 4)

During the ramp-up stage, an end-user at the customer firm begins using the transferred knowledge, perhaps inefficiently at first, but gradually identifying and resolving unexpected problems through a phase of knowledge application or practicing. The period of knowledge application or practicing by the end-user may be completely independent, or may involve requesting additional assistance. If additional assistance is requested from ServIT, this is seen as an opportunity to obtain feedback from the end-user. Feedback is subsequently consolidated in the WSS knowledge base to improve the knowledge for future transfers.

The feedback process highlights several possible outcomes to the ramp-up stage. First, the end-user may abandon the knowledge transfer if they experience difficulty applying the knowledge or if they apply it and discover that it does not resolve their issue or knowledge requirement. Alternatively, the end-user may decide to re-initiate the knowledge transfer (via the WSS or alternative channels such as the Service Desk). Re-initiation necessitates the alignment of other support channels with the WSS, including the need for ServIT to capture knowledge relevant to the end-user’s initial attempts to resolve the problem, so they do not become frustrated by having to explain or repeat these attempts with support agents. The desired outcome of ramp-up is that the end-user applies the knowledge and finds that it meets their requirement and they then progress to the integration stage which follows.

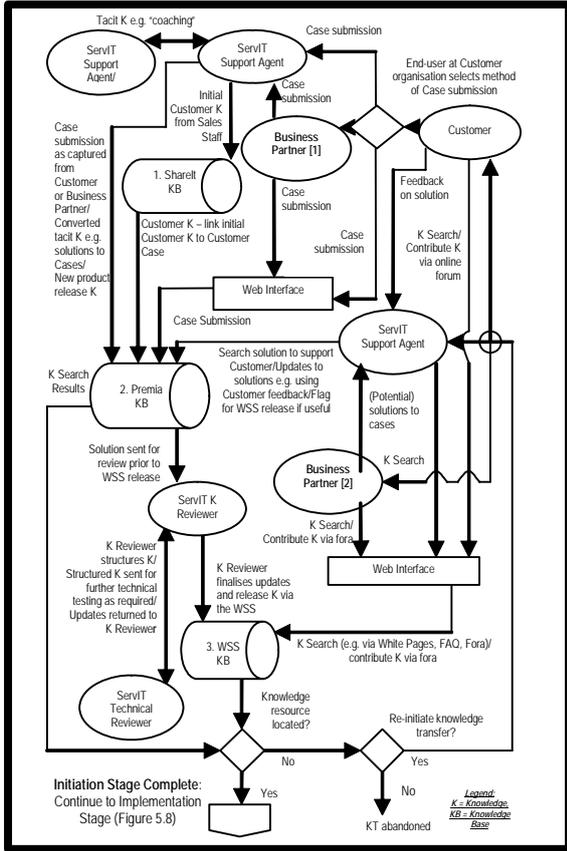


Figure 2: Initiation Stage of Knowledge Transfer

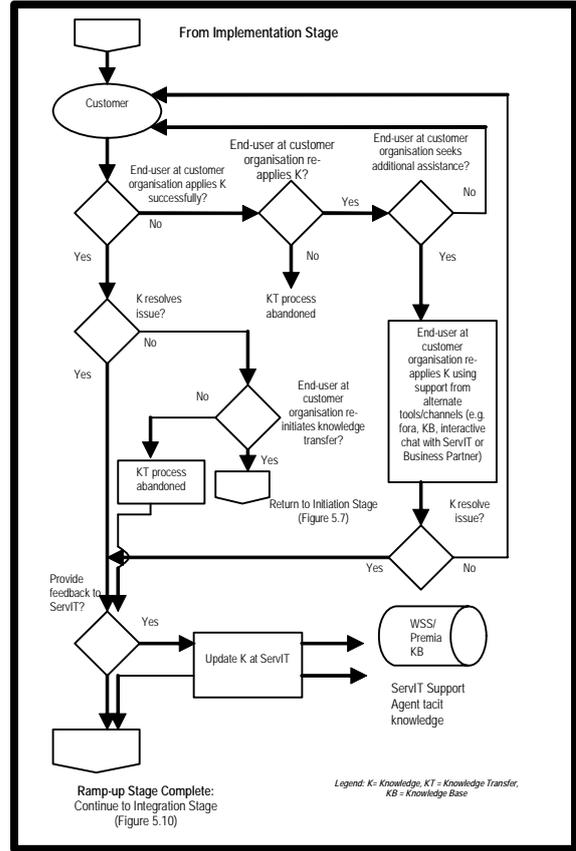


Figure 4: Ramp-up Stage of Knowledge Transfer

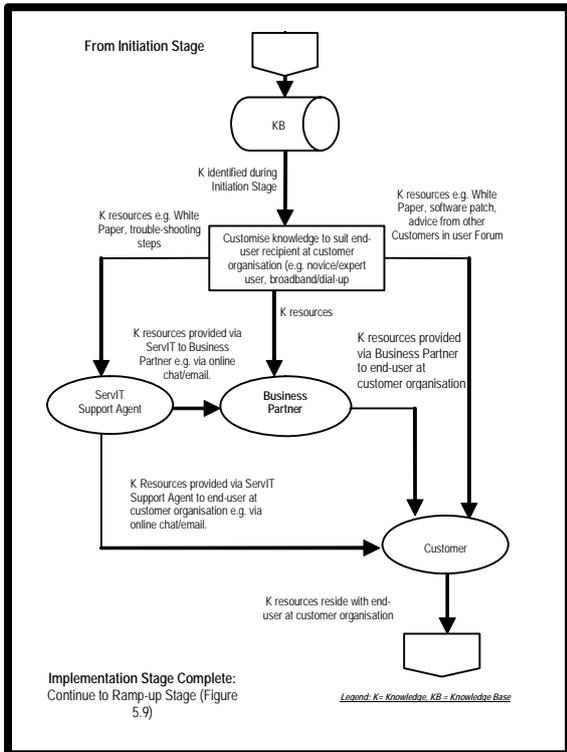


Figure 3: Implementation Stage of Knowledge Transfer

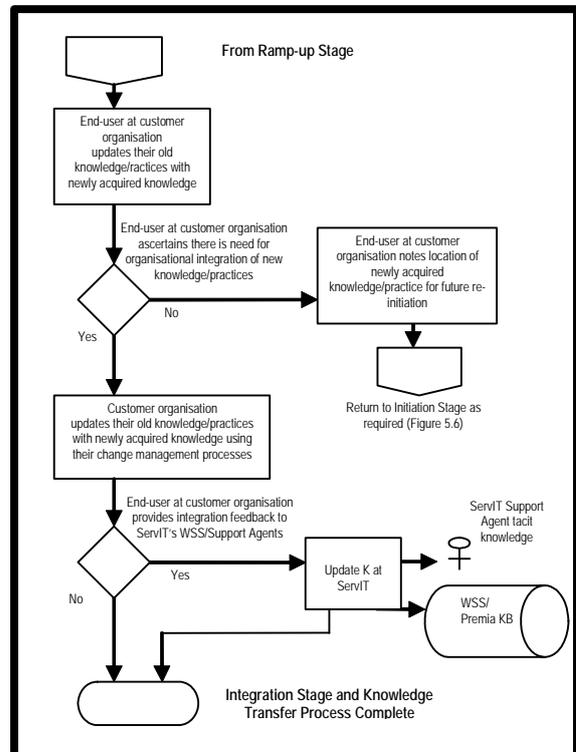


Figure 5: Integration Stage of Knowledge Transfer

The Integration Stage (Figure 5)

During the integration stage, the transferred knowledge becomes assimilated at the customer organisation. The integration stage (and the knowledge transfer process) is complete when the “old” (prior) knowledge and practices are replaced with the “new” knowledge and practices. ServIT has found that the level of integration required by customers is dependent on the nature of the knowledge transferred and the type of customer and their objectives. This insight is consistent with the observations of the support agents, who noted that often the transferred knowledge is not integrated by customers. Instead, customers require the location of the knowledge on the WSS to remain stable so that in the event they have a recurring issue, it is easy to re-locate it via the web site.

Challenges for Knowledge Transfer in B2B IT Support

In this penultimate section, challenges experienced in transferring knowledge at each of the four stages, as identified in the course of the present research, are reported. Only an indicative selection is discussed here, however others are detailed in Cooper (2007). Some tentative associations with the barriers to knowledge transfer reported in the extant literature, as previously discussed, are indicated in brackets throughout the section.

Challenges during Initiation Stage

The primary challenges during the initiation stage include the difficulty in codifying complex tacit knowledge (see *knowledge-based variables*) and motivating employees to do so (*sharer-based variables*), as also noted by Davenport and Prusak (2000) and other researchers. For example, the commonly reported fear of sharing knowledge out of the belief that “knowledge is power” and that transferring this knowledge may result in loss of a position of privilege (Davenport & Prusak 2000) was identified as a concern. Participants remarked that rewards and recognition for knowledge sharing had been put in place, however noted that in an industry where off-shoring is common, it is difficult to motivate employees to contribute solutions to the knowledge base. Motivating end-users at enterprise customers to adopt WSS is also a significant challenge (*receiver-based variables*). A dimension of this challenge includes reassuring customers of knowledge robustness (Szulanski 1996). Facilitating trust between users of online fora with respect to the reliability of the knowledge source (Szulanski 1996) is also challenging.

Challenges during Implementation Stage

The primary challenge to be faced during implementation relates to managing relationships with customers using electronic media. Establishing strong social ties, as required during the implementation stage of Szulanski’s (1996) intra-organisational model of knowledge transfer, is important in the provision of IT support services. However, when such services are provided in an electronic context, traditional relationships may be nonexistent. A commonly cited example surrounds the difficulty of understanding issues related to customising the knowledge transfer to suit the needs of such a wide customer base (Lane & Lubaktin 1998).

Challenges during Ramp-up Stage

Several interesting issues for the ramp-up stage were highlighted. Szulanski (2000) advocates the availability of adequate expertise during ramp-up, to assist the receiver with the knowledge transfer as required. It was found in this study that it is difficult for a service provider to know when an end-user using the WSS requires additional support, unless the end-user alerts the service provider of this. This is, in part, because many support services obtained via WSS are accessed anonymously. It was also argued that the provision of additional support to customers during ramp-up increases the cost of support provision. It was suggested by participants that while additional support is provided on how to use the WSS tool, if a customer firm has difficulty applying the knowledge, additional support is not provided unless there is a valid support contract in place.

Challenges during Integration Stage

Findings from this research support existing literature which reports that the knowledge transfer process is only considered effective when a receiver applies knowledge in their own environment, and they perceive it to fulfil their requirements (Glaser *et al.* 1983). However, it was also revealed that in some instances, integration of the transferred knowledge may not be a high priority for enterprise customers. Rather, it is the ability to re-initiate a knowledge transfer which customer firms consider of greatest importance. Re-initiating a knowledge transfer means returning to the web site and again asking for a solution. This finding is of interest for future research as service providers are keen for customer firms to actually learn and assimilate solutions, rather than look them up again as needed from the service provider’s knowledge sources. It was also challenging for the service provider

to determine how customers had integrated transferred knowledge, to enable it to support them effectively in future transfers (see *context-based variables*).

Conclusion

This paper has conceptualised the key process of inter-organisational knowledge transfer from an IT service provider to an enterprise customer when a WSS is used. It also discussed some of the key challenges involved. As a key theoretical contribution, the paper has provided a four stage model of inter-organisational knowledge transfer in Web-based after-sales enterprise customer support, in the managed IT support services environment. This model may be useful to underpin future research in this area. A discussion of the key challenges involved in such knowledge transfer has also provided important insights that add to current understandings in this area. The challenges suggest areas for future research in order to identify solutions. As a practical contribution, this paper has provided a sufficiently detailed explanation of knowledge transfer, sourced from a substantial research study, which may be helpful for other companies considering the use of WSS for IT support provision.

The knowledge transfer model and set of challenges are limited in that they were developed from an interpretive in-depth case study of one large multinational IT service provider and a validating focus group of senior managers from five other multinational IT service providers. Clearly, further research is needed to explore the model and challenges in greater depth. It may be useful for this purpose to conduct similar in-depth case studies. The current set of challenges to knowledge transfer should also be more closely studied in order to identify potential solutions, perhaps using focused interviews with key personnel involved. The knowledge transfer model might also be studied in contexts other than IT where technically-oriented support services are offered via WSS, such as the provision of after-sales support for other types of technical products. Finally, it is important to investigate how knowledge transfer takes place in non-IT enterprises which outsource their IT support and use a WSS to access that support.

Finally, the findings in this paper sound a cautionary note for IT service providers employing new web-based systems for after-sales support provision to enterprise customers. Clearly, such companies must pay attention to the social and organisational issues which can significantly limit the success of such systems.

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