

# KNOWLEDGE NEEDS: UNCHARTED AREA IN KNOWLEDGE MANAGEMENT

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## ABSTRACT

In the knowledge management domain, few researchers have studied knowledge maps in depth. Most discussions on using knowledge maps as a transfer mechanism focus on the benefits they can bring to organisations and the different mapping schemes that can be used to develop maps serving different business requirements. No literature has explored the role of knowledge maps in the context of knowledge transfer models. This paper contributes to this by looking at how knowledge maps are used by using knowledge transfer models to consider their role at both high and low levels. It is suggested that current knowledge maps used to advertise locations of available knowledge can be enhanced with a complementary mechanism that allows people to express their knowledge needs. Knowledge needs maps are suggested for this purpose. A subject-based and a task-based mapping schemes are proposed in this paper as ways to implement knowledge needs maps. Needs mapping gives people more choices to search for knowledge and helps them understand others' needs for knowledge, so that knowledge transfer can take place more easily.

## KEYWORDS

Knowledge management; Knowledge transfer; Knowledge maps; Representing knowledge needs

## 1. INTRODUCTION

Research in knowledge management suggests that an organisation's competitive advantage depends on its ability to transfer knowledge and that knowledge transfer remains a problem for many organisations (e.g. Goh, 1998). One of the knowledge transfer mechanisms currently used in organisations is the knowledge map. Only few researchers have explored this mechanism in depth (e.g. Vail, 1999; Grey, 1999; Eppler, 2001; Wexler, 2001; Liebowitz, 2005) and there is no generally agreed definition of a knowledge map. In the context of this research, we take a knowledge map to be a visual representation designed to facilitate the process of organisational knowledge transfer by increasing the visibility of available knowledge sources to organisational employees. In this research, we also distinguish:

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- **Direct knowledge** people's knowledge in the ordinary sense
- **Location knowledge** people's knowledge about where to find knowledge (i.e. where the knowledge resources are)
- **Knowledge needs** people's personal needs for knowledge

According to the above definition, knowledge maps in organisations are designed to provide location knowledge. The main purpose of using knowledge maps is to enhance people's awareness of location knowledge and bring them together so that they can have direct communications / transactions for knowledge transfer to take place. Review of available knowledge mapping schemes suggests that two main strategies are used to help organise location knowledge in knowledge maps – organisation by subject or organisation by task.

The role of knowledge maps can be explained in the context of a model of knowledge transfer. In this paper we use two models for this purpose – Davenport and Prusak' (1998) knowledge market model and Tong and Ayres' (2009) transaction-oriented transfer model. The former is a high-level model that suggests three major transfer roles, while the latter is developed from a lower level perspective where detailed transfer actions and decisions are exposed. Discussion of current knowledge maps based on the above two models both suggest that use of such maps is skewed towards advertising where to find knowledge rather than advertising what people want to know. Both location knowledge and knowledge needs should be taken into account in order to make current knowledge maps more effective. This requires people's knowledge needs to be represented in a map. Representing knowledge needs ties in with the knowledge transfer approach used in open source communities (OSS) where people publish their needs online (von Hippel & von Krogh, 2003). They describe problems they have experienced, ask for solutions, and get responses from other members. Surveys show that this is an effective approach. However, the effectiveness of the approach used in OSS has not been discussed from the perspective of knowledge management. Representing people's knowledge needs is an uncharted area.

Considering both these two models of knowledge transfer suggests that enhancing knowledge maps with mechanisms allowing people to express their needs could enhance their utility. A new mechanism – knowledge needs map is proposed to represent people's knowledge needs. There is one problem in that an individual with a knowledge need may not know what kind of knowledge is appropriate, so he may have difficulty in describing his need. In order to address this issue in encoding knowledge needs, we adapt the strategies used in current knowledge maps in organising direct knowledge and suggest subject-based and task-based schemes.

This paper is organised as follows. The next section reviews two knowledge transfer models and provides a short list of the main knowledge mapping schemes currently used in organisations. In section three, the role of current knowledge maps is discussed using the above two transfer models. The major limitation of these maps is highlighted and the necessity of a mechanism representing knowledge needs is emphasised. Knowledge needs maps are suggested as a needs representation mechanism to enhance current knowledge maps in the next section. Both subject-based and task-based mapping schemes are proposed to implement this mechanism. In the fifth section, a list of potential benefits of using the proposed mechanism to represent people's needs is discussed. This paper ends with concluding remarks and an outline for future research.

## 2. BACKGROUND

In this section, we first review the main mapping schemes used in developing current knowledge maps. Then we look at models of knowledge transfer, since these models will be used to explore role of knowledge maps in the following section.

### 2.1 Review of knowledge mapping schemes

Some of the knowledge mapping mechanisms that have been proposed are reviewed. The main mapping schemes used in developing current knowledge maps include yellow page scheme, concept mapping scheme, application mapping scheme and competence mapping scheme. Another type of mapping scheme closely relating to knowledge maps is social network analysis (SNA, cf. Liebowitz, 2005). Some researchers (cf. Plumley, 2003) view diagrams constructed using this scheme as one kind of knowledge map. However, according to the definition of knowledge maps given earlier, SNA diagrams cannot be seen as knowledge maps, because they only focus on the knowledge flows not the visibility of available knowledge sources. They do not help people to locate knowledge sources within organisations.

#### 2.1.1 Knowledge yellow page scheme

Yellow page is one of the popular knowledge mapping schemes used in organisations. It is also called a knowledge directory as it can provide simple profiles for individuals and display their contact details in a logical directory. It can be implemented fairly quickly and it remains one of the best ways to initiate knowledge transfer within wider-scale organisations (Dalkir, 2005). The following example shown as Figure 1 illustrates a typical example of knowledge yellow pages that is produced for a large, distributed publishing company. In this example, individual experts' contact details can be viewed against one of the four criteria -- expertise, business area, geographic area and function. Knowledge yellow pages are presented in different views for different business requirements. Figure 1 below is the yellow page view where experts are listed along their domain of expertise and its purpose is to show available expert sources in each subject domain.

Function	Geographic Area	Business Area	Expertise
Vice President	Northeast	Sales	Content Management
Director	West Coast	Operations	Electronic Production
Line Manager	Midwest	Distribution	Knowledge Management
Operator	South	Finance	Publishing Management

Expertise		
Content Management		
Jane Dennys	Head Office	555 434-4564
Will Jameson	Regional Office 6	555 212-3212
Electronic Production		
Jan Zariski	Regional Office 6	555 212-3233
Sarah Marxman	Regional Office 6	555 212-3232

Figure 1 – Knowledge map example using the yellow page scheme  
(Adapted from Dalkir, 2005: p. 120)

### 2.1.2 Knowledge concept mapping scheme

Knowledge concept mapping scheme is normally used to construct knowledge maps that can outline the global architecture of a knowledge domain and how its parts relate to one another (Eppler, 2001). Knowledge maps adopting this scheme are also called concept maps. They are widely used for educational purposes because this scheme allows complex knowledge concepts to be organised in a more precise and logical hierarchy (cf. Darmofal *et al*, 2002). This can help learners locate knowledge resources in a complicated knowledge domain. Figure 2 below shows an example map using the concept mapping scheme. Locations of knowledge resources required by a web administrator are included in each knowledge domain.

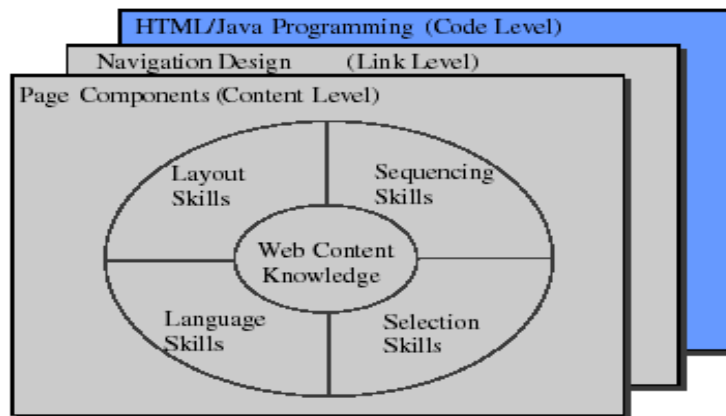


Figure 2 – knowledge map example using the concept mapping scheme (adapted from Eppler, 2001: p. 5)

### 2.1.3 Knowledge application mapping scheme

Knowledge application mapping scheme is mainly used to develop knowledge maps that illustrate sources of various knowledge that have to be applied at certain stages during a work process or in a specific business situation (Eppler, 2001). Figure 3 below is an example of knowledge map using the application mapping scheme. It shows the top-level view of a dynamic knowledge map that embeds required knowledge resources to particular steps within a process for an online auction.

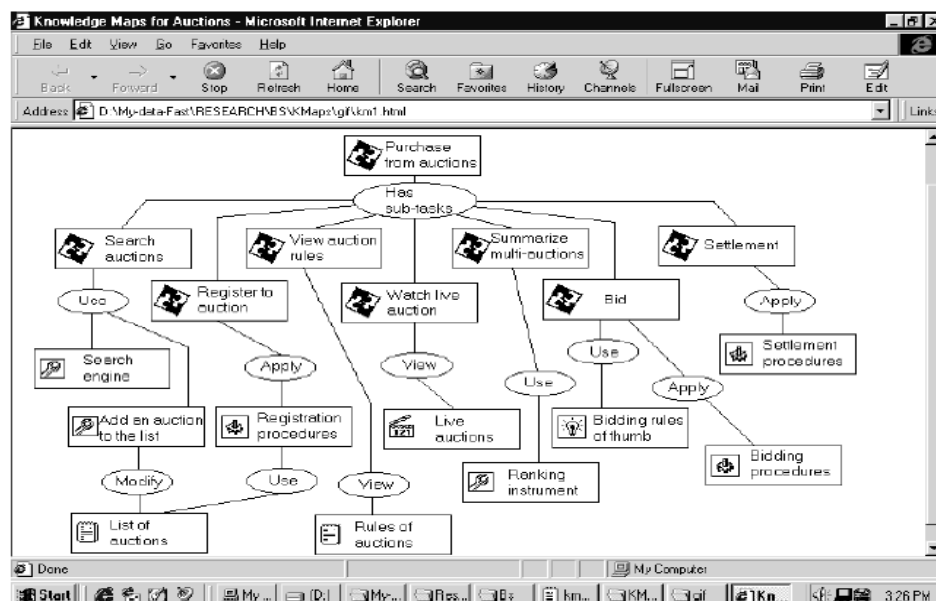


Figure 3 –knowledge map example using the application mapping scheme (Adapted from Wong, 2002: p.361)

### 2.1.4 Knowledge competence mapping scheme

The last major mapping scheme used in current knowledge maps is competence mapping scheme. It is used to construct knowledge maps that can be used to depict the necessary stages to develop a certain competence for individuals or an organisation (Eppler, 2001). Figure 4 below is an example map using this scheme. It illustrates necessary paths that an individual or an organisation needs to follow to develop required competencies in doing e-business. Related knowledge resources are attached to each stop in these paths.



Figure 4 – Knowledge map example using the competence mapping scheme (adapted from Eppler, 2001: p.7)

### 2.1.5 Discussion

From the perspective of map structure -- how knowledge resource elements were organised in a knowledge map, we can classify existing knowledge maps as either subject-based or task-based.

Subject-based maps organise available knowledge resources according to the subject areas they belong to. Most “yellow page” systems follow this model, where experts are put into categories according to their specialism. Knowledge maps using the concept mapping scheme are obviously subject-based, because categories of different knowledge domains is used to define the hierarchy in these maps.

On the other hand in task-based maps, knowledge resources are mapped to some representation of the tasks or steps within organisational work processes. Knowledge maps constructed using both the application scheme and the competence scheme can be recognized as task-based knowledge maps, because both of them rely on the representation of a particular process that an individual or an organisation needs to follow.

## 2.2 Review of knowledge transfer models

We look at two knowledge transfer models here. One of them is from Davenport and Prusak's (1998) widely referenced book on knowledge management. This is a high-level model that only explains different roles involved in transfer processes. The other one is a low-level transfer model. It provides details of steps and transactions followed by people during the process of transferring knowledge. Both of them can be used to explain and assess the role of current knowledge maps. There are other models available, but they do not provide further insights of knowledge transfer details in the context of this paper.

### **2.2.1 Davenport & Prusak's (1998) knowledge market model**

Davenport and Prusak (1998) propose a model of knowledge transfer that uses the analogy of a market. Just as in an ordinary market people take different roles, so this model identifies three roles in knowledge transfer – buyers, sellers, and brokers. Buyers are knowledge seekers who try to search for new knowledge to satisfy their knowledge needs. Sellers are knowledge providers or sharers as they share what they know with others. Not only people, the physical knowledge repositories can also be the knowledge sellers. Knowledge brokers are people or mechanisms that connect buyers and sellers. For instance, librarians often act as brokers when they direct people who seek knowledge to the ones who can provide it. An individual can play different roles in different transactions. The knowledge market requires some medium of exchange, or currency, for knowledge transfer to take place successfully. In their model, the role of currency is taken by reciprocity, repute, or altruism. For example an expert may provide advice in response to a request since he sees it as enhancing his reputation or because he is repaying an earlier favor.

Davenport and Prusak (1998) also emphasize the importance of the broker's function for effective knowledge transfer and suggest several ways to activate it. For instance, making the knowledge market signals (indicating where and how to access the knowledge) more visible is a good way to guide the buyers finding the sellers, or brokers can also provide platforms for people to meet.

### **2.2.2 Tong & Ayres' (2009) transaction-oriented knowledge transfer model**

The discussion in this section is based on Tong and Ayres (2009). Here we give an overview of the key points of the model. A full description is given in the reference. Their model investigates knowledge transfer at a lower level, and view it as the overall process by which knowledge is transferred between people. In this model, knowledge transfer involves a sequence of specific steps (actions taken and decisions made) and transactions (interactions between people or between people and knowledge repositories). A person is seen as taking different roles at various stages of a transfer process. Six different roles were identified in this model:

- **Knowledge Seeker** Someone in the seeker role searches for knowledge to address his knowledge needs.
- **Knowledge / Needs Recipient** In the recipient role, someone receives knowledge or requests for knowledge from others.
- **Knowledge Absorber** Someone in the absorber role assesses received knowledge and decides whether to use it or not.
- **Needs Assessor** In the role of a needs assessor, someone assesses received requests and decides how to respond.

- **Needs Transmitter** Someone in the needs transmitter role passes on received requests to others.
- **Knowledge Provider** In the provider role, someone provides knowledge to others directly or shares it through some repositories.

An individual can take more than one role at the same time in different transfer processes. Detailed steps and transactions followed by each role within transfer are described in this model. For example, Figure 5 below shows the detailed seeker role<sup>2</sup>. It can be described as follows:

*“A seeker must decide whether to search for knowledge in a repository or seek help from others (Decision SD1). If he decides to use a repository (Option 1-SD1), there are two possible outcomes of his search (S.1A). If he discovers new knowledge (Outcome 1), he then becomes a knowledge absorber. But if he does not find anything (Outcome 2), he may abandon the search (S.3). On the other hand, if he had decided to seek help from others (Option 2-SD1), he would have made a request to another person (shown as the thick arrow from S.2B). Once the seeker has abandoned the repository search or made a request to another person, he returns to a neutral state where he is not currently playing any role in the transfer.” (Tong & Ayres, 2009: p. 172)*

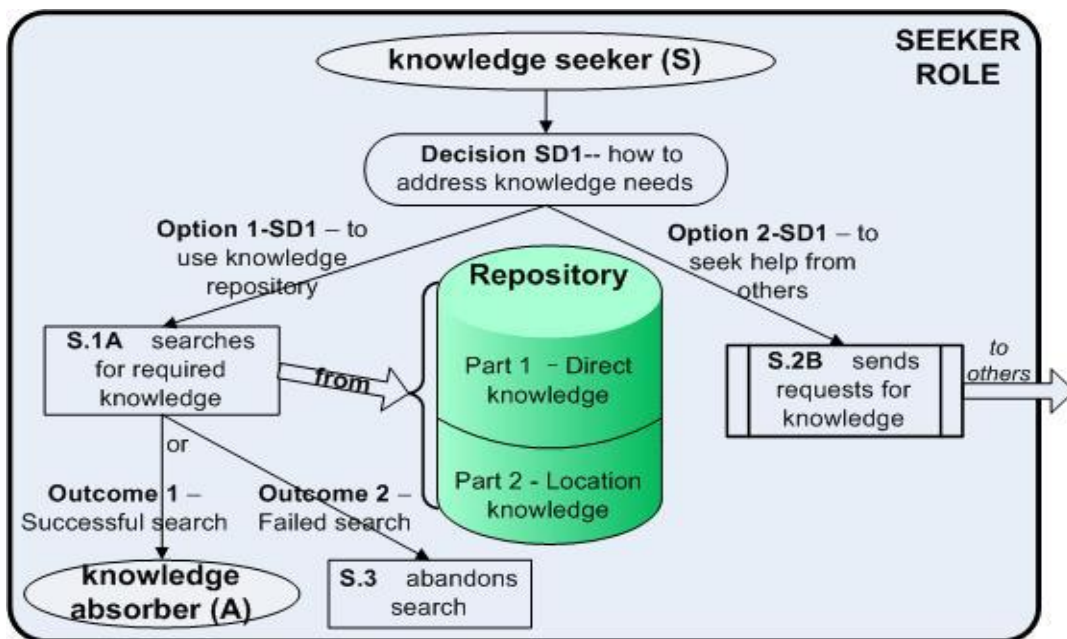


Figure 5 – Seeker role in Tong and Ayres’ model (Adapted from Tong & Ayres, 2009: p. 171)

<sup>2</sup> In Tong and Ayres’ paper (2009), part 2 of the knowledge repository in this model was originally named ‘Indirect knowledge’. It indicates people’s awareness of where to find useful knowledge. This type of knowledge has been defined as ‘location knowledge’ in this paper. In order to ensure the consistency of terms used in this paper, we rename this part of the repository ‘Location knowledge’.

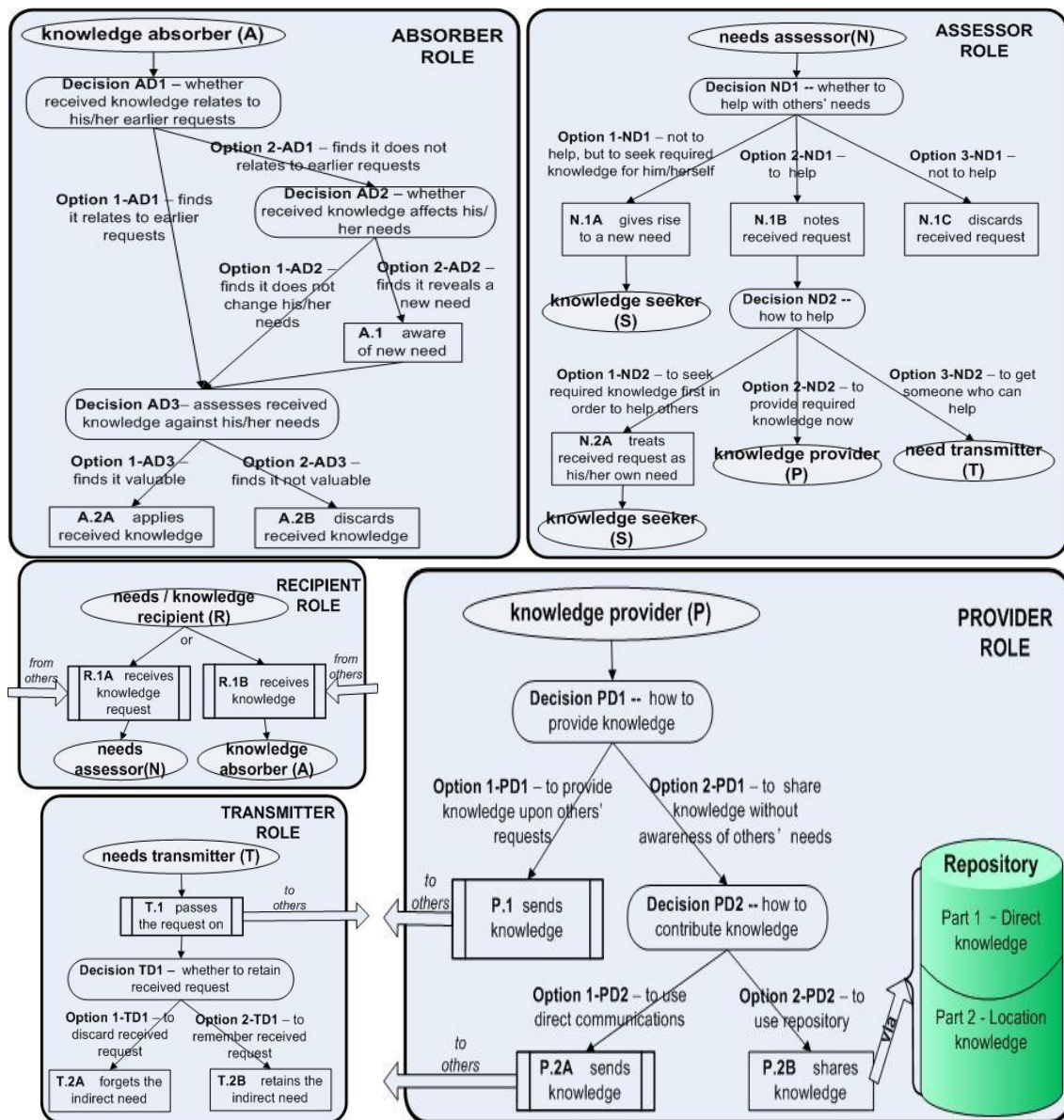


Figure 6 – Other five roles in Tong and Ayres's model (Adapted from Tong and Ayres, 2009: p. 171)

As shown in Figure 6 above, other roles in this model are defined in a similar way. These roles are presented individually rather than in an integrative framework, because the model is designed to represent a variety of knowledge transfer processes and these individual role elements can be used to form various dialogues between different parties involved in the process of transfer. For example, a transfer involving three people can be represented as Figure 7 below using this model. In this transfer, Person 1 decided to address his knowledge need by seeking help from others. He then sent a request (Query) to Person 2. Person 2 became a recipient, then acted as an assessor to assess Person 1's request and decide how to respond. His choice is to help Person 1 by passing his request to Person 3. Meanwhile, Person 3 acted as a recipient, and then became an assessor. He also decided to help Person 1, but his choice of way to help was to act as a provider and send a response to Person 1 directly. Next, Person 1 became a recipient, then an absorber to decide whether he is going to use the received knowledge. His final decision was to use Person 3's response to address his need.



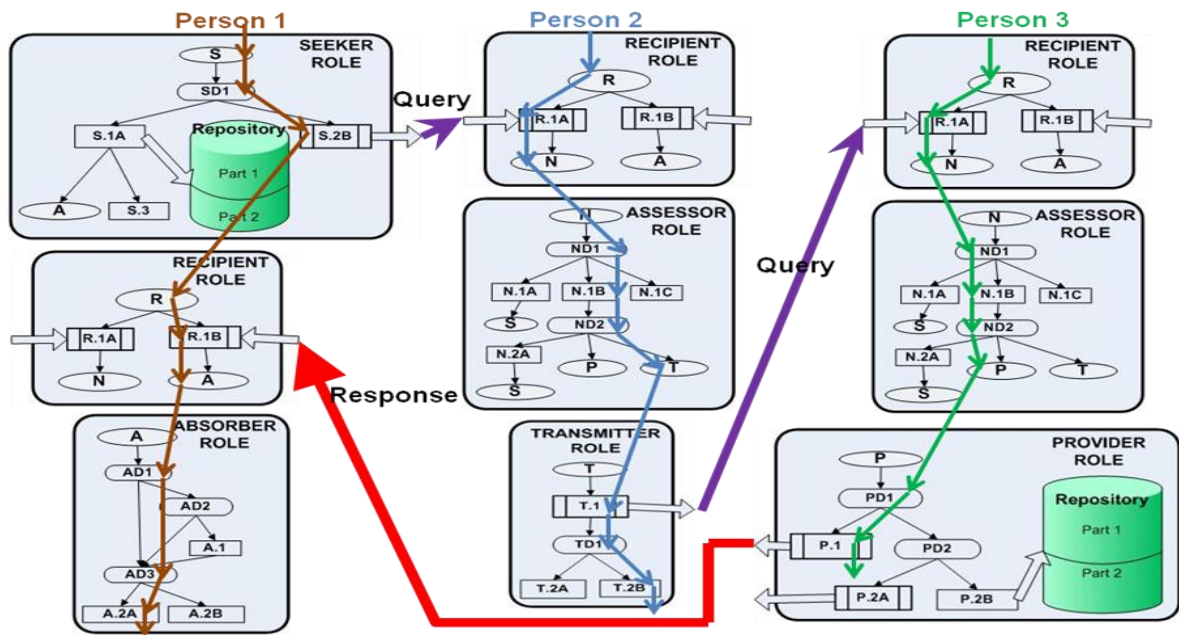


Figure 7 – An example transfer process represented using Tong & Ayres' model (Adapted from Tong & Ayres, 2009: p. 173)

One major feature of this model is that it allows current knowledge transfer strategies and mechanisms to be represented in detail by showing the steps and transactions that take place in the course of transfer.

### 3. LIMITATIONS OF CURRENT KNOWLEDGE MAPPING TECHNIQUES

Limitations of current knowledge maps can be highlighted by considering their role in a knowledge transfer process. We use Davenport and Prusak's (1998) high-level model and Tong and Ayres' (2009) low-level transfer model for this purpose.

#### 3.1 Role of knowledge maps explained using knowledge market model

In Davenport and Prusak's (1998) model, knowledge brokers can connect buyers and sellers because they can provide both location knowledge and people's knowledge needs. Location knowledge enables brokers to guide buyers to sellers, while their awareness of others' knowledge needs allows them to guide sellers to buyers.

According to this model, knowledge maps are actually taking the role of knowledge brokers because they are also designed to connect buyers and sellers. Using knowledge maps, knowledge buyers will be able to know where the potential sellers are to ask for required knowledge. However, current knowledge maps do not have the ability to guide sellers to buyers, because they only hold location knowledge, but not people's knowledge needs. This limitation restricts them to provide all the services of a broker. Therefore, people's knowledge needs must be included in knowledge maps before they can be seen as playing the full role of a knowledge broker.

#### 3.2 Role of knowledge maps explained using transaction-oriented transfer model

People normally recognize their own expertise and can place themselves in a knowledge map, so that others who need help can use these maps to find out who / where they should go to search for required knowledge. The transfer route they follow can be represented as shown in the following figures.

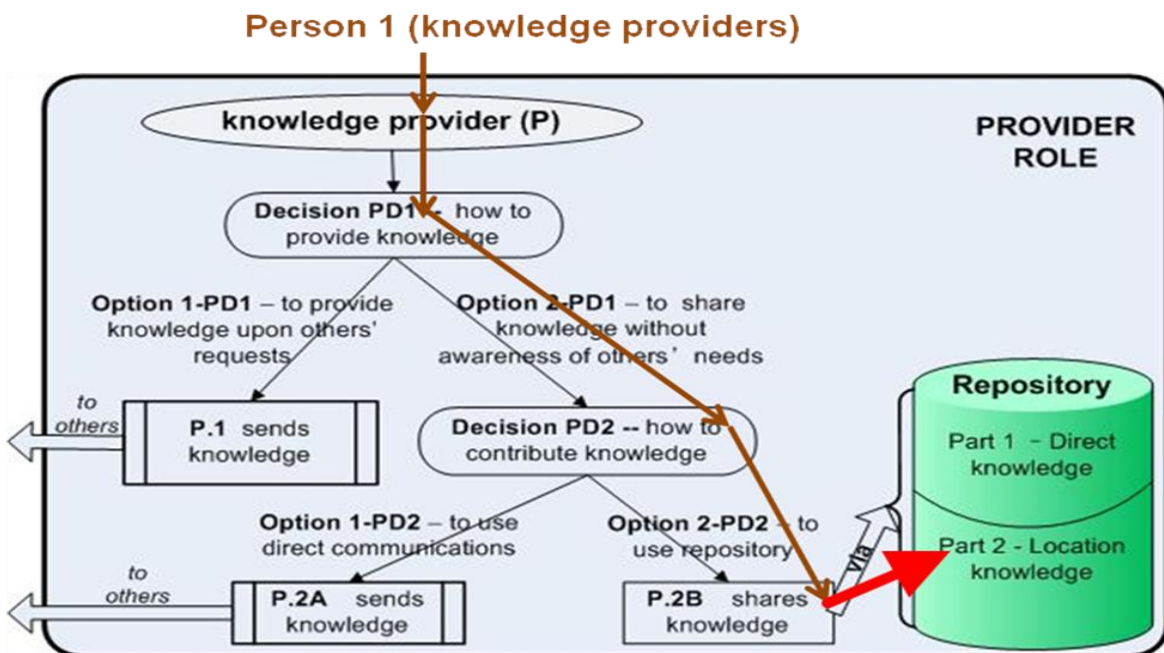


Figure 8 – Transfer route followed by knowledge providers using knowledge maps

Figure 8 above shows that Person 1 as a potential knowledge provider recognizes what he knows and decides to share it with others (P → PD1). Because he may be not aware of what exactly others want to know, he decides to advertise his expertise using knowledge maps (PD2 → P.2B), instead of going to talk to others individually. The knowledge maps he used now contain information about how to get in touch with him for further knowledge transfer communications, so that these maps are placed in the second part of the knowledge repositories – Location knowledge (P.2B → Part 2).

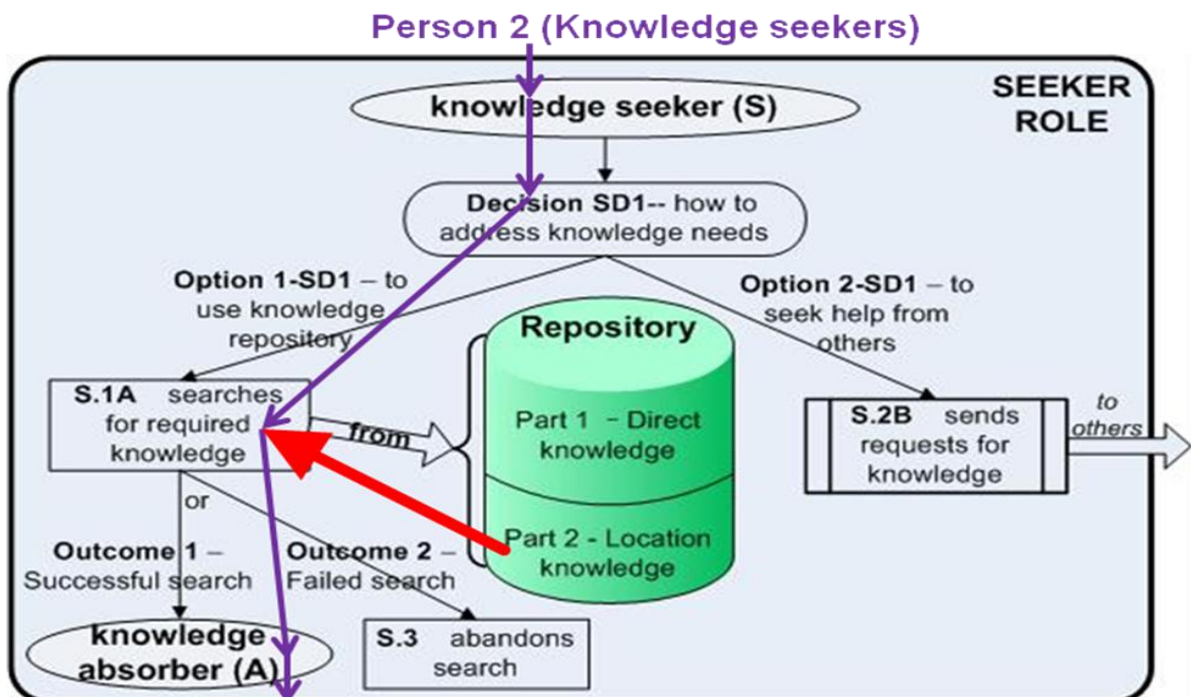


Figure 9 – Transfer route followed by knowledge seekers using knowledge maps

On the other hand in Figure 9 above, Person 2 taking the knowledge seeker role, develops knowledge needs and decides to address his needs by searching for required knowledge from the repositories (S → SD1 → S.1A). He may come across these

knowledge maps during his searches (Part 2 → S.1A) and target the potential providers according to their own expertise advertisements in the maps (S.1A → A). Before the two parties start to have conversations for further knowledge transfer, the knowledge map's task of helping seekers locate providers is completed.

The routes highlighted using this model shows that there is only one direction of information flow between seekers and the potential providers – from providers to seekers. This reveals one limitation of how knowledge maps are used currently, that is providers cannot learn anything about the people they want to share knowledge with, while advertising their expertise. Therefore, a mechanism that can advertise knowledge seekers' needs will potentially enhance the utility of current knowledge maps. The ability of representing people's needs also gives the seekers more options to address their needs while using knowledge maps.

Tong and Ayres (2009) suggest that more routes for knowledge transfer become available if knowledge needs can be represented in a repository. The new paths which become possible are shown as highlighted in Figure 10 below. In the enhanced knowledge seeker role, knowledge seekers have to make one more decision after deciding to address their needs by seeking help from others – whether to express their needs through repository (Option 1 – SD2) or express needs through direct communications with others (Option 2 – SD2). The former choice is an extra option for knowledge seekers when their needs can be expressed and stored in the third part of the knowledge repositories – Knowledge needs.

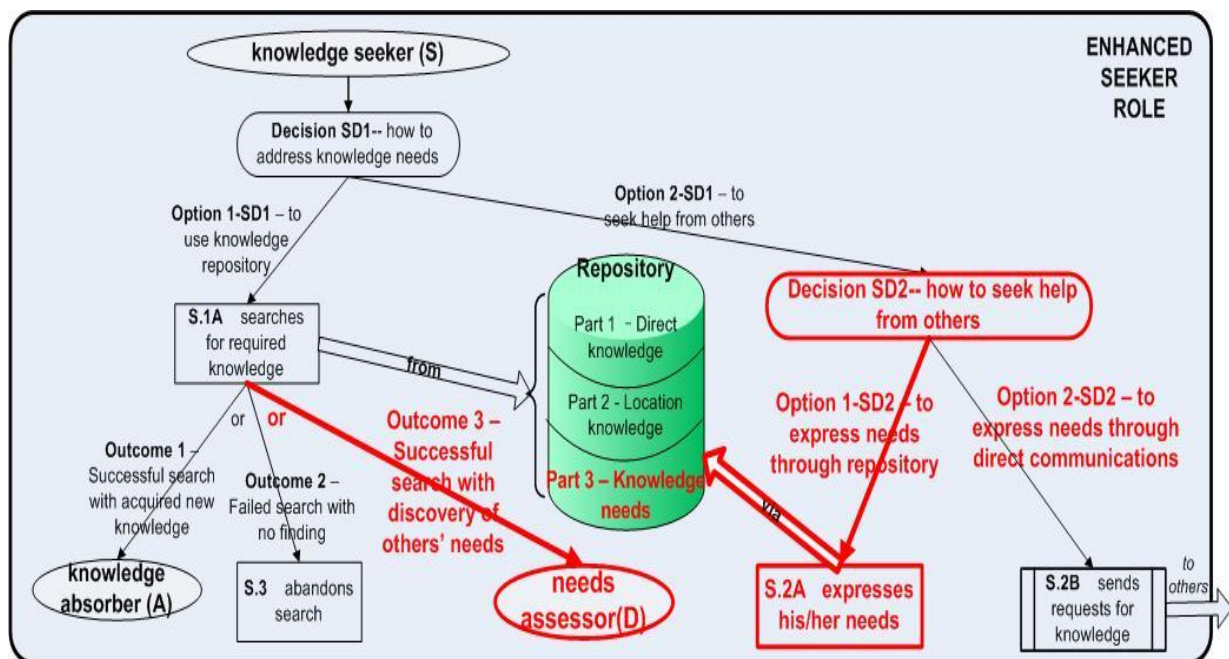


Figure 10 – The enhanced seeker role with the option of expressing knowledge needs in repositories (Adapted from Tong & Ayres, 2009: p. 176)

For example in Figure 11 below, if Person 2 (the knowledge seeker) followed the newly added paths (S → SD1 → SD2 → S.2A → Part 3), knowledge transfer between him and the potential provider – Person 1 can take place in an alternative way. As shown in Figure 12 below, Person 1 may come across Person 2's knowledge needs stored in the knowledge repository (Part 3 → S.1A) while searching for knowledge to address his own needs (S → SD1 → S.1A) using the repository. He may then assess Person 2's needs (by acting as a needs assessor -- D) and decides to provide knowledge to Person 2 upon his request (P → PD1 → P.1 → Person 2).

Person 2 – 2<sup>nd</sup> way of using knowledge maps

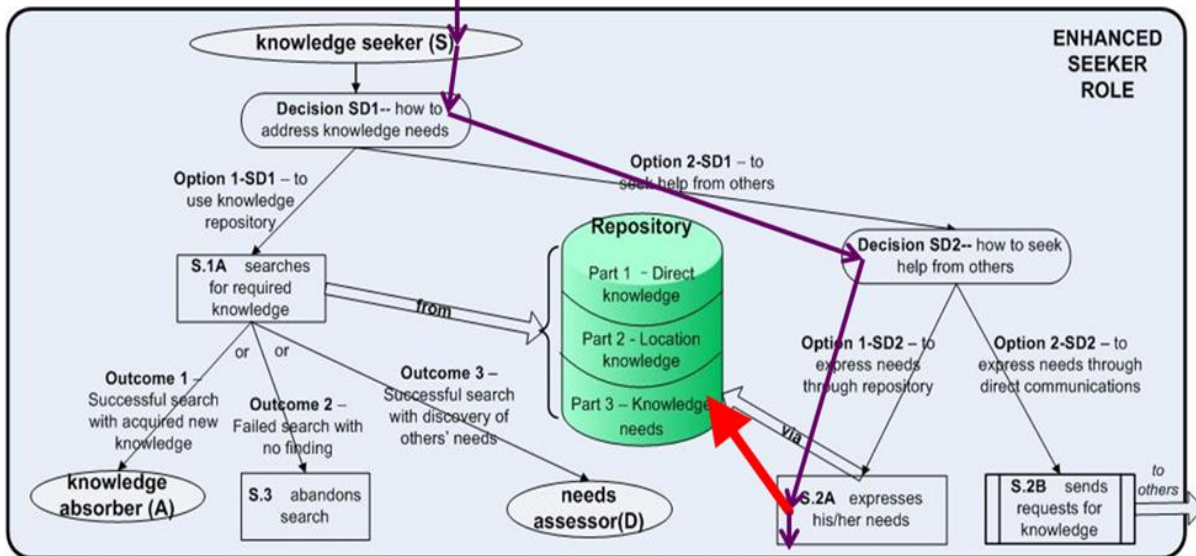


Figure 11 – An alternative transfer route followed by knowledge seekers using the enhanced knowledge maps

Person 1 – 2<sup>nd</sup> way of using knowledge maps

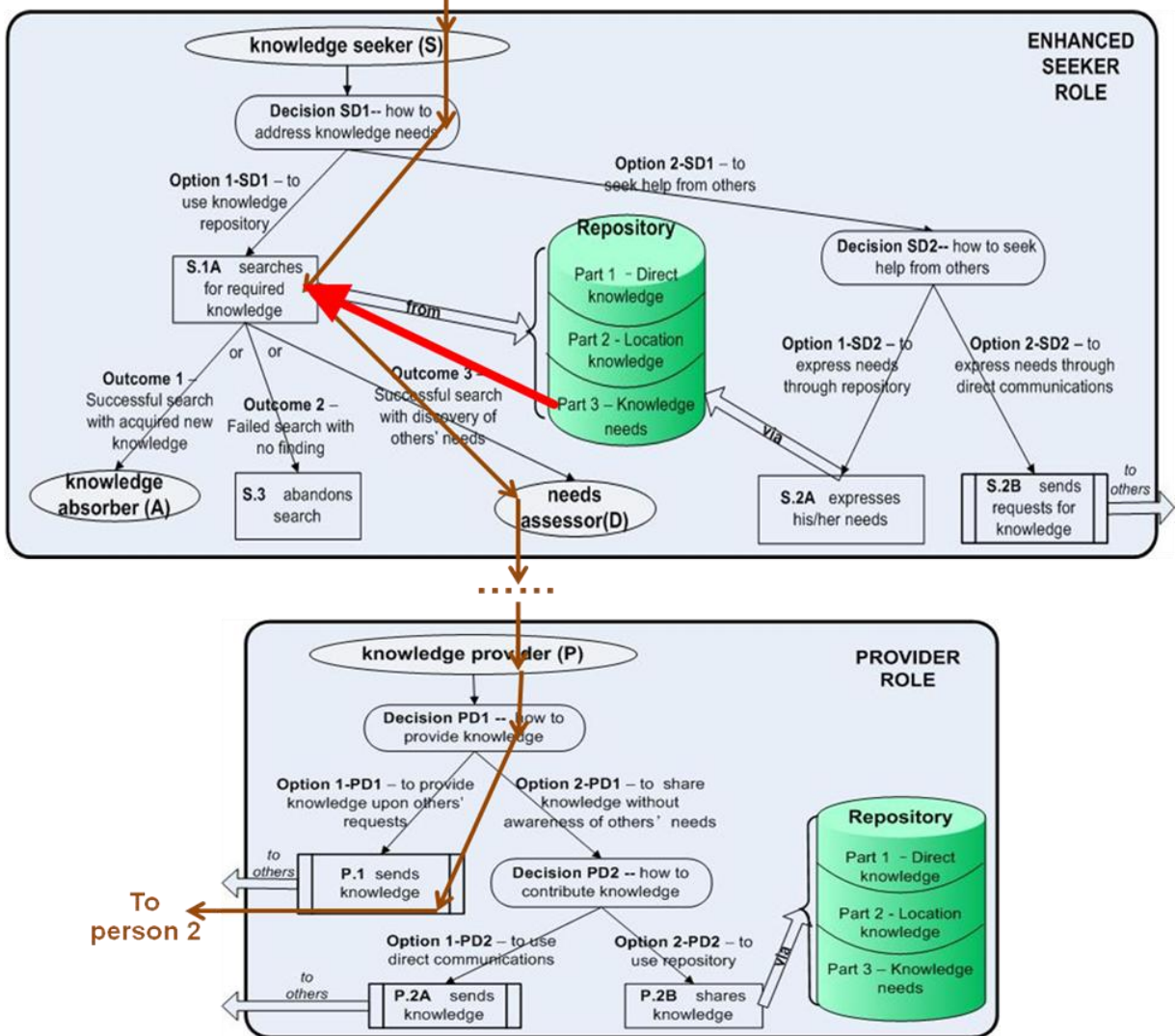


Figure 12 – An alternative transfer route followed by potential knowledge providers using the enhanced knowledge maps

### **3.3 Discussion**

Assessing current knowledge maps using Davenport and Prusak's (1998) high-level model shows that currently knowledge maps have a limitation in that they hold location knowledge but not people's knowledge needs. This allows them to only fill part of the role of a knowledge broker, because they can only guide buyers to sellers while a complete broker is able to lead buyers to sellers and vice versa. Another feature must be added to current knowledge maps – representing people's knowledge needs – before they can be seen as providing all the services of a broker.

Exploring current knowledge maps in the context of Tong and Ayres' (2009) low-level model also suggests their limitation – they only support one direction of information flow between knowledge seekers and the potential providers. Visualizing transfer routes followed by them indicates that knowledge providers' details are stored in knowledge maps, and then retrieved by the seekers. However, providers cannot learn anything about seekers using these maps. In order to enable two-way information flows between them, a mechanism that can advertise seekers' needs must be implemented to enhance the utility of current knowledge maps. This also provides more routes for people to choose while transferring knowledge.

In summary, people's knowledge needs has not gained enough attention when current knowledge maps are used for transfer knowledge. Including the feature of representing people's knowledge needs can potentially enhance the utility of current knowledge maps.

## **4. DEVELOPMENT OF KNOWLEDGE NEEDS MAPS**

Since discussion in earlier sections shows that adding the ability to represent people's needs can improve current knowledge maps' potential in promoting knowledge transfer, this paper explores schemes which could be used to represent knowledge needs in a map.

### **4.1 Issues in developing knowledge needs maps**

One issue in representing knowledge needs is how to categorise and organise them since people may not express their needs or describe their problems in a standard way. We can consider categorising people's needs using the representation methods applied in current knowledge maps. Existing knowledge maps can be viewed as either subject-based or task-based. Similarly, people's needs may be also categorised in either subject-based or task-based ways.

### **4.2 Subject-based knowledge needs map**

Categorising people's needs using a subject-based approach may be difficult, because when people have needs for specific knowledge, they may not be aware of which subject areas the required knowledge belongs to. This is not a problem in open source communities even though needs are mainly organised using the subject-based approach. People participating in these communities normally focus on specific domains (e.g. a particular technical area, a small part of source code), and this leads them to express their needs in a largely standard way.

If we make use of simple subject-based approaches, needs yellow pages can be produced. It lists people's knowledge needs in different categories. Needs yellow pages

can be seen as a simple subject-based knowledge needs map. It has been widely used in OSS communities. However as explained earlier, in other occasions people who are willing to help may not be able to target relevant needs if the original needs expressers did not classify their needs in the right category. For example, if a mobile phone company uses the needs yellow pages for customers to express their knowledge needs about its products, the categories used in this yellow page system may be simply designed based on the organisation of teams in the customer service department – complaints about the products and technical support of the products. When a customer finds the mobile phone he bought does not work as described and believes that the phone has a fault, he may express his request in the category of ‘complaints about the products’. If the fact is that this customer is not using the product correctly and what he needs is ‘technical support’, he cannot get the help in time because he placed his knowledge needs in the wrong category.

One approach to this problem is to allow knowledge needs to be plotted in more than one dimension by using more than one subject classification scheme. The mobile phone customer’s knowledge need (mentioned as the earlier example) may be more easily located by the right customer service staff if there is another set of categories used in the customer needs expressing system, such as categories defined based on customers’ experience in using different functions of the products. Taking computing programming knowledge needs as another example, people’s needs in this domain can be classified both according to the programming language used and application domains at the same time. This allows their needs to be shown visually, plotted out in two dimensions with lists of programming languages and applications domains being used as the two axes. However, this computing programming example is too simplistic to demonstrate the proposed approach, because organisational knowledge needs generally cover broader issues and are more difficult to categorise.

Consequently, a list of frequently asked questions about Manchester city council services ([http://www.manchester.gov.uk/site/scripts/faqs\\_index.php](http://www.manchester.gov.uk/site/scripts/faqs_index.php)) was used as an example of more complicated knowledge needs to explore the proposed approach. Three knowledge needs maps produced using Manchester city council data are shown in Figure 13 below.

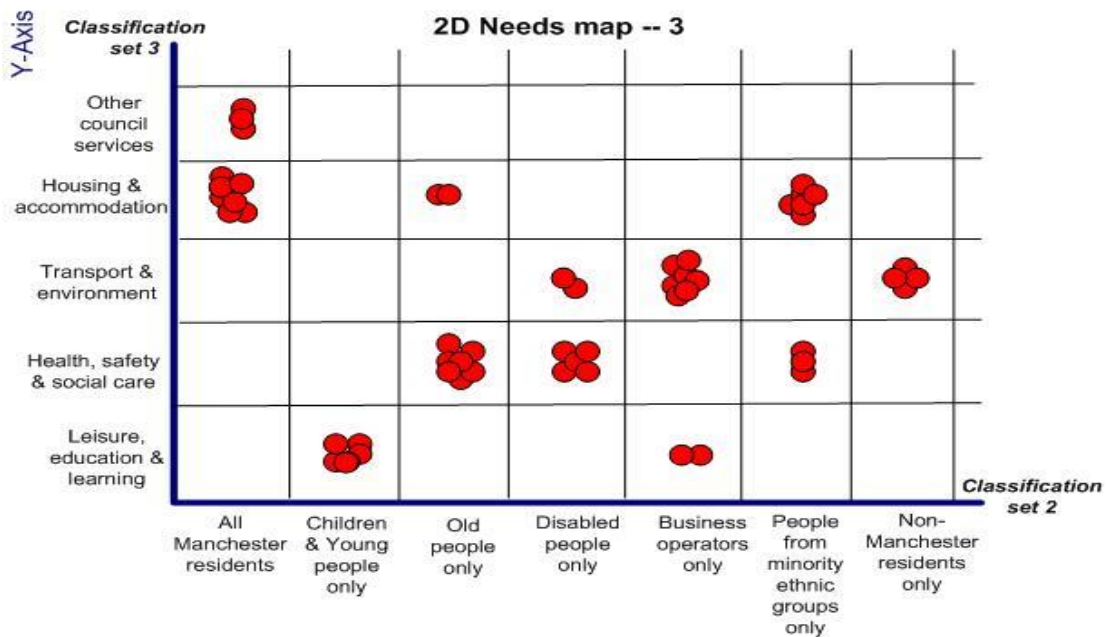
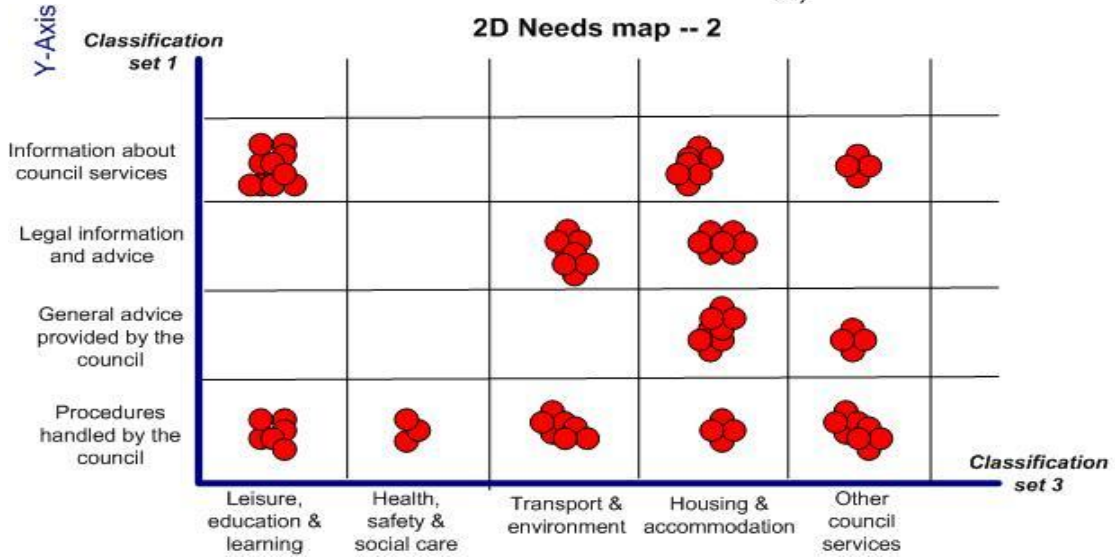
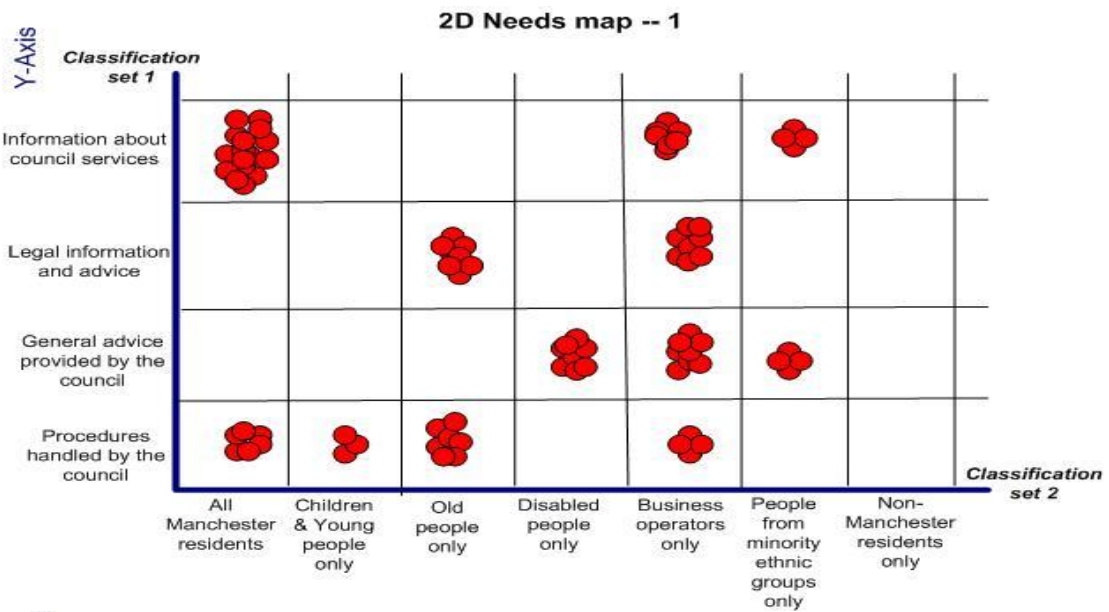


Figure 13 – Three subject-based Manchester City Council Knowledge Needs Maps

Three sets of classifications have been used to categorise various council services. The first one is based on the nature of services provided by the council. The second is based on the group of people served by the council, while the last set is based on the category of council services / subject areas the service belongs to. These classification sets have been used as axes to construct three 2-dimensional needs maps (shown in Figure 13). Using all three sets of classifications, a 3-dimensional needs map could be constructed in a similar way. Each dot in the above needs maps represents a frequently asked question. So the density of the question dots in each plot area represents the popularity of the knowledge on particular topics.

Key features of the proposed subject-based needs maps include the following:

- The multi-dimensional design in these maps allows people's needs to be plotted on more than one dimension. It also allows the maps to adopt coarser classification schemes which are easier to use. This can help knowledge seekers to place their needs in a place where the potential providers can locate these needs more easily and provide help correspondingly. The multiple choices of needs categories make expressing knowledge needs in a wrong category less critical.
- These maps are interactive, because the classifications used in them are flexible and can be changed by the map users. Each category within these maps can also be further sub-divided into a list of subcategories. This is the reason why question dots in the above needs maps have been spread in each plot area.
- These maps can highlight what kinds of knowledge are in need most. Although conventional knowledge maps also have this advantage, the proposed needs maps provide a direct view of people's knowledge needs.

### **4.3 Task-based knowledge needs map**

Using a task-based approach to categorise people's knowledge needs is easier. When people are clear with their work processes they can relate their needs to particular tasks within these processes. Because people generally see their work processes and procedures in the same way, the risk of misleading potential knowledge providers using a subject-based approach can be avoided when using a task-based needs map. On the other hand, this type of needs maps could be integrated with task-based knowledge maps easily, as they will use a common structure (work processes) to organise their elements.

A list of frequently asked questions about eBay transactions was used to produce an example (<http://pages.ebay.co.uk/community/answercenter/index.html>) of task-based knowledge need maps (Figure 14). People's knowledge needs (frequently asked questions) in the general process of buying an item on eBay are represented in detail. Each task within this process links to a list of questions (knowledge needed to complete this task). Some nodes within the example map can be replaced with a second-level task-based needs map, such as the second level of the needs map -- "Find an item".



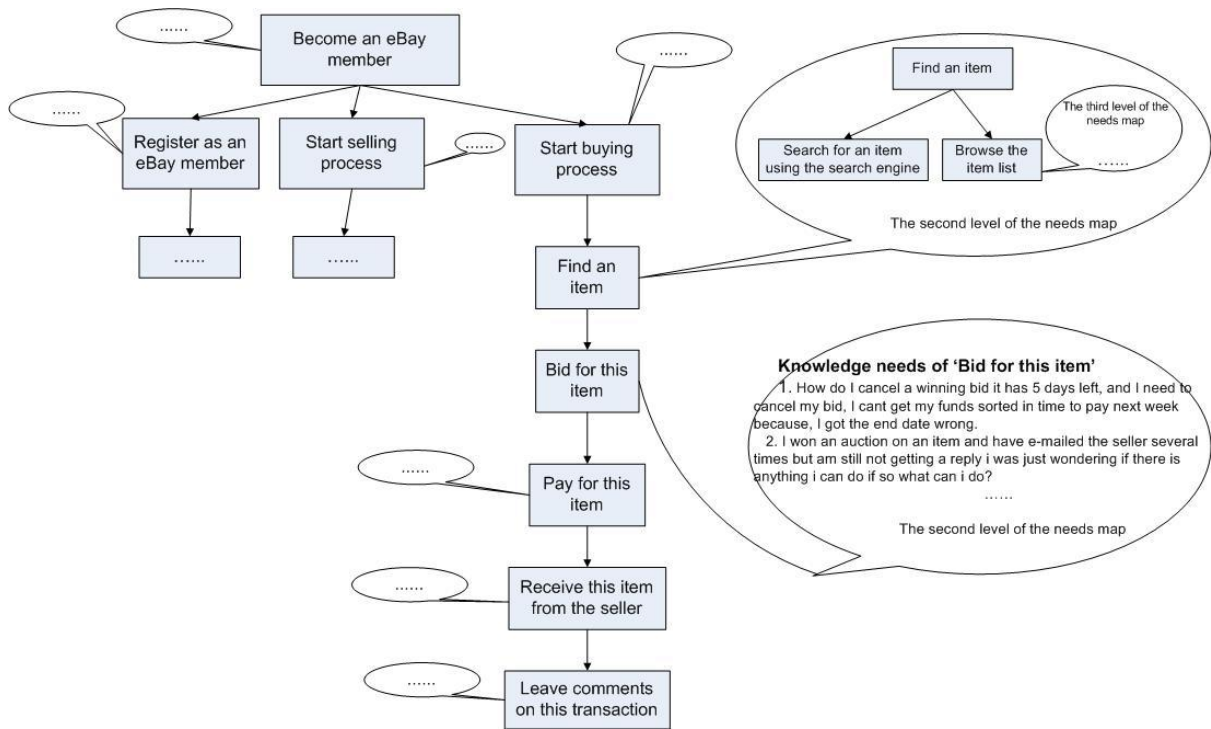


Figure 14 – Task-based eBay knowledge needs map

Although this type of needs maps can be easily integrated with related knowledge maps and implementing a task-based knowledge needs map will be easier, it is not always an appropriate approach for organising people’s knowledge needs. On the other hand, subject-based knowledge needs maps are more difficult to develop, but can be applied in wider range of situations. Specific steps / tasks identified within a work process can normally be presented in a logical sequence because there are dependency relationships between them. However, there are some other domains where there may be no clear definition of a process. When categorising people’s knowledge needs in these domains, a task-based approach is obviously not the choice. For example the Manchester City map cannot be converted into a task-oriented map.

## 5. DISCUSSING PROPOSED KNOWLEDGE NEEDS MAPS

As a new knowledge transfer mechanism, knowledge needs maps can potentially benefit organisations in the following ways:

- Knowledge needs maps can encourage people to have direct communications with others by expressing their needs. Using these maps, more people become aware of others’ needs. This provides knowledge seekers opportunities to establish more communication channels with others than targeting limited providers before expressing needs to them. Because of their focus on people’s knowledge needs which has not gained enough attention in knowledge management domain, knowledge needs maps can also be used as a complementary to other transfer mechanisms.
- Knowledge needs maps can be used to express broad or high-level needs as well as raising very specific or low-level needs. While implementing other transfer mechanisms, it is unlikely to cover every aspect to demonstrate what kind of knowledge people can provide. Since this approach does not have any restriction on what kind of knowledge needs can be expressed, it gives people chances to address specific knowledge issues that other approaches do not normally cover. For instance a user (given the appropriate representation) may be able to express

general needs relating to a standard working procedure as well as a specific requirement to resolve a particular problem that has been encountered.

- Knowledge needs maps can also be used as a part of the organisational project management process. Using these maps, the managers are able to monitor the problem solving progress and oversee the strengths and weaknesses of individual employees, or working teams.

The above potential benefits can be brought into an organisation only when knowledge needs maps are successfully implemented. Though the way to implement these maps within organisations can be flexible, the following steps are necessary. First, all employees need to be encouraged to express their knowledge needs to colleagues. Second, a formal routine allowing people to express their needs should be established. This routine can be a formally approved work process using regular office communication tools (i.e. email). It can also be a tool (software designed to serve this purpose) that allows people to express their needs and get response from others. Last, encouraging the potential knowledge providers to check others' knowledge needs and provide possible help is also essential. These steps will help set a supportive organisational culture to ensure these needs maps will be used once they are in place. However, knowledge needs mapping schemes suggested in this paper have not yet been implemented.

## **6. CONCLUSION AND FUTURE WORK**

Analysis of the major role of current knowledge maps indicates that these maps only focus on advertising location knowledge rather than knowledge needs. Addressing people's knowledge needs is an uncharted area in the knowledge mapping domain. Given that current knowledge maps' utility can be improved if people's needs can be represented, this paper suggests a new mechanism – knowledge needs maps. Both subject-based and task-based needs mapping schemes are developed to address the issue in organising people's knowledge needs. Examples of using both schemes are provided in this paper. The proposed knowledge needs mapping mechanism gives people one more option to search for useful knowledge and helps potential providers to understand what kind of knowledge other people actually need. This makes a richer set of knowledge transactions possible. However, this paper only provides theoretical justifications on the mechanism of representing people's knowledge needs. Further research will involve implementing field assessment of the proposed knowledge needs maps. A part of this may include the issue of how to encourage people to help others address their needs, once these needs are represented.

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