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The Online Community Knowledge Flows: Distance and Direction

Whilst the role of online communities (OCs) in knowledge exchange and generation has been widely discussed, limited research exists on the distance and direction of OC knowledge flows. In this paper, we examine this issue by taking the case of an industry-founded OC that rendered around the use of a specific ERP module used by public sector organisations. Through a grounded analysis approach, we extend literature on OCs by identifying user-generated practices that enable knowledge flows in the online space as well as by examining the travels of these knowledge flows taking particular account of the distance they cover and the direction they take. Findings point to within, outwards and inwards travels of OC-related knowledge flows showing a widely spread OC knowledge impact. The theoretical and practical implications of the study are discussed.

Keywords: Online community, knowledge flows, direction, distance, practices, industry-founded OC, vendor, ERPs, public sector

Type: Empirical Research

Introduction

Online Communities (OCs) are increasingly recognised as spaces that facilitate knowledge exchange and knowledge flows amongst strangers (Faraj et al., 2011, Von Krogh and Von Hippel, 2006, Faraj et al., 2016, Majchrzak and Malhotra, 2016, Yan and Tan, 2014) and as such, they enable collaboration across geographical distances (Bateman et al., 2011, Kanuka and Anderson, 2007, Haefliger et al., 2011). Although researchers have shown an interest in OC collaborations and the knowledge generated from them, there has been limited research on the distance and direction of OC knowledge flows. Yet, knowledge flows, the passing of knowledge from one entity to another, has been deemed an embedded component of knowledge sharing and vital for knowledge creation and innovation (Erden et al, 2014). By exploring the distance and direction of knowledge flows within the OC context, in this study we aim to articulate

and appreciate how impactful OC knowledge can be.

OCs have been presented as “generative” spaces (Faraj et al. 2011, p. 1225) replacing traditional knowledge collaborations with new organisational mechanisms for continuous knowledge creation at the same time as allowing for highly flexible or permeable boundaries. To this point, explorations of the mechanics of online knowledge collaborations in communities and the motives to participate have largely focused on their innovative outcomes (Jeppesen and Frederiksen, 2006, Stock et al., 2016, Safadi et al., 2018). These accounts, neglect the extent of knowledge transfer, the complex relations that exist between different users, and the resulting influences as a result of knowledge flows. Yet, a fundamental part in management of knowledge flows is to spread the knowledge and make it accessible and usable by different organizations within and beyond the OC. Therefore there is a need for understanding how far the knowledge spreads (e.g. dissemination among OC members only or dissemination both within and outside the OC), but also whether the spread is unidirectional or multi-directional (e.g. knowledge flows that may be traveling out and in). Therefore, while the literature has given emphasis on knowledge generation and exchange within OCs, limited understanding exists on the direction that knowledge flows take as well as the distance these travel to. Appreciation of the distance and direction as key elements of knowledge flows enables us to further understand the opportunities that different stakeholders have in terms of learning from the knowledge, and the resulting influence of the flows. With this in mind, the research questions that drive the study are: *Where do OC knowledge flows travel in terms of distance and direction? What are the practices that enable these knowledge flows? And what is their impact?*

We respond to these questions by taking the case of an industry-founded, inter-organisational OC. Though limited research exists to-date on inter-organisational OCs,

industry-founded OCs are not uncommon as many organisations encourage, support, and even initiate and sponsor OCs (Fisher, 2019). Reasons cited include an organisational interest in increasing customer integration (Füller et al., 2010) and in stimulating collaboration and engagement among different groups of customers (Erat et al., 2006). Such organisations include vendors and developers of information systems ranging from open-source software providers such as Linux and Apache, to closed-source application providers, such as IBM and Oracle.

We take the case of an OC founded by a vendor of an Enterprise Resource Planning (ERP) system which aimed to facilitate knowledge exchange and generation among the user-organisations of a specific ERP module. The inter-organisational nature of the OC has allowed the examination of within, inwards and outwards knowledge flows as well as the identification of practices that have facilitated the formation of OC knowledge flows as well as the impacts of these. Understanding the dynamics of OC knowledge flows is important not only because of their general prominence in online collaborations, but also because of the increasing effect they have on improving vendor products and strategies.

The paper is structured as follows: initially, we conduct a critical review of the literature on OCs and present the gap that our paper aims to address. We then identify the methods used to collect and analyse data. Our findings are then presented under three main headings: knowledge related practices, knowledge formation, and knowledge flows and travels. These findings are then brought together to explain the diverse spaces of knowledge travel and their respective practices and impacts. Finally, the findings are discussed in light of the literature.

Online Communities and Knowledge Exchange/Generation and Flows

Online communities refer to a collective of dispersed individuals who voluntarily form

a social aggregation through a web-based system, sharing interests, knowledge and experiences (Rheingold, 2000). They represent emergent organising spaces that provide opportunities for knowledge exchange and generation, new product designs, collaboration and learning (Kankanhalli et al., 2005). OCs have been described as self-organising, (Nan and Lu, 2014), informal (Ganley and Lampe, 2009) and organic (Ross, 2007). Several researchers have also associated OCs to communities of practice describing them as electronic networks of practice where members have an interest in knowledge integration despite their dispersed location (Agterberg et al., 2010).

OCs vary in terms of focus and activity with exchange of knowledge, coordination, and emotional support often cited as key OC purposes. Knowledge exchange refers to online provision and collaborative production of information and has been found as the primary OC aim in several studies (DeSanctis et al., 2003, Kudaravalli and Faraj, 2008). In these cases, forums are seen as spaces for members to collaborate on various issues over extended periods of time (Kudaravalli and Faraj, 2008). OCs may also be created in order to promote and support the coordination of activities in order for example to deal with emergencies caused by natural disasters like hurricanes and earthquakes (Lakhani and Von Hippel, 2003, Haefliger et al., 2011). Further, individuals may use OCs in order to discuss and exchange experience about challenging problems and issues (Oh, 2012, Galegher et al., 1998). Online health communities often fall within this latter category (Fan and Lederman, 2018, Hur et al., 2019, Yan and Tan, 2014).

Despite their different aims, OCs may overlap in nature and practice, meaning that different OCs have a tendency to have a dominant concentration on one of the three, but they tend to also cater for the other two purposes. A stream of OC research has explored OC inputs such as members' motivations and reasons for participating in

OCs. Wasko and Faraj (2005) provided reasons for knowledge sharing within OCs and these ranged from reputational motives, having the expertise to do so and being structurally embedded, thus central to the network. With reference to open source communities, Lakhani and Wolf (2006) categorised members' motives into five areas including intrinsic/hedonistic (enjoyment, fulfilment), extrinsic (acquiring reputation, improving job prospects through signalling), political (hacker culture, anti-commercialism); social (sense of belonging, generalised reciprocity); and environmental (learning cutting edge technologies, user-driven innovation).

Another stream of research has given emphasis on OC outputs, such as promoting an organisation's image and brand (Bapna et al., 2019). Further, an outcome that has received a lot of attention in the literature is that of knowledge innovation. New software, ideas and tangible products are being designed and developed within OC through contributions and interactions among previously unrelated individuals (Bateman et al., 2011). Such online spaces have been described as online co-production communities with open source communities being an often cited example of such OCs (Kane et al., 2014, O'Mahony and Ferraro, 2007).

A third stream of research has focused on the inner-workings of OCs. Within this stream, researchers have examined practices (in response to a change), control structures and leadership and members' identification as well as trust and tensions (Fan and Lederman, 2018). For example, Panteli and Sivunen (2019) have examined how members develop identification with OC over time and show the role of the OC founder as well as emergent OC leaders in this process. Johnson et al. (2013) show that while OCs are spaces for multi-user relations functions (Mozaffar, 2016), and some functions take place within the OCs, other functions are pushed out of the community to third-party organisations. Majchrzak and Malhotra (2016) discuss the differences between

communities with formal control structures (i.e. incentives, identities, organisation and norms) and communities where there is minimal knowledge sharing structures, and show that knowledge collaborations need to take place in a certain temporal order to produce effective outcomes. Lindberg et al. (2016) identified routines and their variations as enablers of coordination and knowledge collaboration in communities with interdependencies between actions where there is limited formal control. In a similar vein, researchers have shown an interest in OC leadership. For example, Johnson et al. (2014) point to the complexity of power law distributions in OCs and show that despite the mainstream belief that preferential attachments are the single mechanisms for explanations of power laws, a wide range of different mechanisms, combined together, can offer a better explanation for such power relations. Collectively, these studies, have initiated a better understanding of the internal constitution of the communities and the practices involved in knowledge creation amongst users and their effects on the internal and external tensions and competitions.

It follows that OCs have established themselves as spaces for facilitating knowledge sharing albeit for different reasons and motives. Faraj et al. (2016) clarify that both explicit and tacit knowledge may be exchanged and generated across time and space, providing opportunities for numerous knowledge flows to emerge: explicit to explicit, explicit to tacit, tacit to explicit, tacit to tacit. Thus in their study, Faraj et al. (2016) refer to the types of knowledge flows and the role of OCs in capturing, encoding and disseminating knowledge and how these are flowing within the OC. Our study extends this literature by taking account of the direction of OC knowledge flows as well as the distance that these travel to. Researchers have so far presented OCs as spaces that enable knowledge flows among their dispersed members (Faraj and Shimizu, 2018), whilst evidence also exists of knowledge flows benefiting the wider organisation when

an OC is of an intra-organisational nature (Agterberg et al., 2010). However, limited understanding exists of knowledge flows in inter-organisational and/or industry-led OCs. In these cases, knowledge flows are expected to be more entangled due to the numerous partners involved, prompting researchers to argue for more research on inter-OCs flows being needed (Faraj et al, 2016). The inter-organisational nature of the OC is expected to have an influence on the direction of knowledge flows which has not been previously studied. By focusing on OCs that span across organisations, studies show that a key reason for the growth of such spaces, is the increasing belief that the innovation is being democratised through these communities (Gambardella et al., 2016, Von Hippel, 2009). Our research adds to this line of inquiry by showing the extent of knowledge flows between an OC, its user organisations, vendor and other external partners and by exploring the implications on the participating organisations. In what follows, we present the research design and methods adopted including the empirical setting of the study.

Design and Methods

Following the social constructionist approach, an inductive approach is adopted for generating theoretical insights. It is based on an in-depth examination of an OC which was founded by an IT vendor with the purpose to support users of an enterprise wide system. Prior to this, several informal user groups existed around the country. The vendor founded the OC in order to provide a space for users from around the UK to engage in discussions, ask questions and clarifications about the use of the specific system. The OC founding organisation, users and the system have been anonymised to maintain confidentiality.

Research Site

Data for this study was collected from the OC formed around the human resource management (HRM) module of an ERP package. The ERP solution in this study is one of the largest and most implemented ERP products available in the market. We refer to this forum as the HuOC (HRM user Online Community) for short. HuOC, which is part of a larger ERP user community, is used on day-to-day basis by the staff (members) of user-organisations (users). Though HuOC provided the opportunity for face to face annual events, only some members attended these whilst the majority of the users preferred to interact within the online forum. The topics of discussion in the OC and face-to-face meetings varied, however there were some overlaps. For instance, the OC was used to extract user requirements, which were sometimes discussed in the face-to-face meetings. The OC was also used to discuss daily needs and enquiries raised by its members. For example, system errors and solutions were widely discussed within the OC.

Data Collection

Following Vaast and Walsham (2013), we used several sources to collect data. These included observation of collocated meetings, OC posts, interviews and relevant documents. Table 1, shows the overview of data collection methods and sources of data.

[Insert Table 1 here]

The main source of data comprised of the messages posted online between January to June 2010 and October 2016 to April 2017. We analysed all 250 message exchanges in the selected periods. To complement this, we also conducted non-participant observations of HuOC face-to-face meetings (five days, 35 hours in total). This helped us to a) understand the context and perceived challenges and b) follow the

face-to-face actions that may influence, or be influenced by, the online activities. We conducted follow-up semi-structured interviews with 16 members who were involved in the message exchanges during our online data collection. Interviews were used to explore the processes involved in use of information after the online exchange. Selection of participants for the interviews was done as a purposive sampling in which users who had received one or several responses to their questions were approached. Amongst those individuals who had received answers, the selection was done based on 'convenience sampling' strategy as we collected data from participants who were 'available' in the meetings and were 'willing' to participate in the interviews (Hesse-Biber and Leavy, 2005). We used open-ended questions (e.g. How useful were the responses to your question posted on the OC? How did you use the responses? Did the responses have sufficient details for implementation? If you have not used the responses, explain why?) in the interviews to minimise the likelihood of theory forcing and allow for data emergence (Glaser, 1992). We also interviewed two members of the vendor organisation. Our combined data collection strategy (shown in Table 1) and use of several supportive sources was in line with recommendations of grounded theory approach to ensure validity of the research (Glaser, 1992, Glaser, 1978).

Data Analysis

Our analytical approach was guided by grounded theory (Urquhart, 2013) which can facilitate understanding of processes that lead to better conceptualisation of acts over time (Corbin and Strauss, 1990) in online collaborations (Vaast and Walsham, 2013). Figure 1, demonstrates the overall analysis procedure. We began by exploring data within each message, then examining the whole thread, followed by comparing it to other threads, and then combining the results with findings from observations and interviews. This focus on messages allowed us to examine interactions that occurred

within the OC as well as across the different user-organisations.

[Insert Figure 1 here]

We followed the Glaserian stages for data coding: open coding, selective coding, and theoretical coding. This was supplemented with analytical memos during the project (Glaser, 1992). The open coding was primarily conducted in a line-by-line manner, and then on the observation field-notes and interview transcripts. The coding involved understanding the ‘meanings’ of the messages, rather than the words used to communicate (Miles and Huberman, 1994). Table 2, demonstrates an example of first level coding for each message. The open codes were then sorted into selective codes. This involved searching within and across data sets (from online observations, semi-structured interviews, and participant observations) and iteratively choosing possible core categories and relating the open codes to each category. This was then followed by theoretical coding which identified the relationship between the selective codes, and finally arrived at the core category.

[Insert Table 2 here]

Grounded theory analysis of data, revealed knowledge travel as a core category, which formed the basis for the emergent findings. We identified three selective codes: a) Knowledge Related Practices; b) Knowledge Formation; and c) Knowledge Flows. Finally, we scaled-up the findings and integrated them with existing theories about OCs (Urquhart, 2013, Urquhart et al., 2010) to form a theorisation for OCs.

In the next section, we start by explaining the conditions that led to OC use, followed by presenting the findings around each of the above mentioned themes.

Findings

Conditions that led to HuOC use

The HRM module of the ERP system was the backbone of many activities performed within user organisations. It was a tool for running not only the internal activities of an organisation, but also for delivering services to external clients (e.g. payrolls for schools) or legal entities (e.g. tax reports to the Treasury). The user-organisations relied on the system as a core source of information for technical and functional challenges. At the same time, both their internal and external activities were highly reliant on government regulations. Hence, when these regulations changed, user organisations were obliged to change their processes, outputs, or data to conform to the new instructions. This could mean a need for change in the HRM module itself. Similar to other ERP modules, the HRM module is categorised by its standard nature – i.e. configuration, process adaptation, or change of systems are needed to align system and user needs. Being a standard application meant that not all user demands were met by the HRM vendor. An executive from a user organisation noted:

“The system does not support teachers’ pension scheme, but it’s not a local need... all [UK] councils need to process this data...” (Member, Observation log)

The distance between the vendor and user, could lead to a time consuming process for provision of the appropriate solution by the vendor company. Receiving the right solution from the vendor sometimes involved numerous exchanges of e-mails, firstly for the vendor to find out what the exact conditions and context are, and secondly for the requester to carry out the procedures given by the vendor, one at a time. This often involved a time consuming process, which Pollock et al. (2008) called the Ping Pong practice: the requester organisation asks a question, initial response received from

the vendor (usually asking for further details), requester responds back and this loop continues until a resolution is achieved.

The changing needs of organisations, encouraged OC members to seek knowledge particularly around adopting new features. Therefore, expertise and experience, apart from those written in vendor specification documents, were required to gain an understanding of how to perform such actions and understand their consequences.

Taken together, these work conditions, and external and internal demands, required consultation from other user organisations with similar demands or prior practices. The vendor-founded OC, HuOC, provided the opportunity for such interactions to take place. For example, many users of the HRM module used the OC as a primary source of seeking solutions from other user organisations. OC members identified similar needs, on one hand to find possible solutions, and on the other hand to use a common voice to speak to the vendor:

“...whenever we face an issue in our HRM system, the first point of contact outside our organisation is the [HuOC]... the forum is the place where we receive that timely reply, because people are not worried about whether their solution is the perfect fit, they just share what they believe is relevant and for the most part it solves your problem... The Forum is also where we identify similar needs and find ways to influence vendors' strategies...” (Interview, member)

HuOC knowledge related practices

Four inter-organisational user-driven knowledge exchange practices were identified within HuOC: display, audience attraction, representation, and co-construction.

Display practice: Using a set of activities, HuOC members made their problems and needs visible to each other. In every thread of messages that was posted in the community, the initiating participant, informed others about the particular choices of

configurations, local needs, or problems. This was due to the diversity of the product versions and the wide range of options for configuring the system. To do this the OC members who initiated threads started by explaining the state-of-the art situation of the system in their own organisation.

“[...] we are on [version X] and it appears in this version the copying functionality has been locked down to prevent copying from one business group to another [...]”
(OC post)

OC posts provided the base for forming correspondences between community members whilst they also took the opportunity to highlight a problem they had and request for support “... If anyone has had a similar experience or possible solutions I would be very grateful...” (OC post)

Audience attraction practice: Following the display practice, some messages involved a pitching activity: displaying the problem as a common issue and attracting audience to voice similar or related needs. We identified many cases in which OC members pointed out a need for a functionality and they tried to collect evidence of similar issues to present to the vendor.

“It appears that teachers allowances must be set up on Individual Elements in order to be compatible with the Standard Solution[...] Are there any other Councils who have set up Teachers Allowances using one element/formula to capture the relevant input values and calculate payment amounts, rather than setting up each allowance on an individual element? I am hoping the answer is yes as this may persuade [vendor name] to modify the development to cover councils who use one element/formula.”
(OC post)

This pitching activity helped other members with similar issues to move forward to form a common entity with a shared goal.

“We are having a similar issue occurring at line 51 (Exact Code Given) after the patch application and have raised also raised a [request to vendor] relating to this issue [request number].” (OC post)

Sometimes this initiating act of pitching attracted further pitchers to take a step forward and elevate the discussions. For instance, in one case, a user very briefly mentioned that they needed a particular functionality that was not available as a standard functionality. Another user followed by stressing that, this was a common need forced by policymakers. He further asked for further inputs into the issue.

“[vendor name] does not support X_functionality which is the format required to upload to the Gateway so you are stuck with a third party... I did ask about this at the seminar yesterday... I have also asked [name] to raise it as [priority at] the forum [meeting]... Anyone else have any further views?” (OC post)

Representation Practice: Subsequent to displaying the case, members with knowledge or experience, represented their responses. They made their knowledge visible to others in the community. This practice did not involve construction of shared meanings across the members of the community. Instead, respondents made sure that they respond in a fast, tangible, observable and readable way. As a result, different individuals could use the responses in various ways. To achieve this, respondents used tacitly shaped genres (Yates et al., 1999) by representing the technical implementation details including application version, application terms, and particular configurations. Use of these genres within HuOC, structured the communications by offering a socially recognisable template for communication, which helped flow of information in the community. Therefore, without having a collective agreement, the members used these genres to communicate without a need for translation.

In addition, to keep the communication going, there were no restrictions on the relevance of responses. While some responses were directly related to the question,

others were barely allied with the case. In the former case, responses were direct solutions on an identical case in respondent's organisations. An example was when a requester asked how to record half-day sickness for employees and he received a direct answer.

“We enter absence days as decimals (e.g. 0.5 days) where appropriate.” (OC post)

Conversely, in the latter case, respondents sent responses for dissimilar cases, which the respondent perceived to be useful for the requester. An example was when a user asked how to use a particular functionality (“AD Responsibility” to give permission to staff to complete timecards for staff in a different organisation and he received an indirect response to his request.

“I have not heard of this responsibility. We use ‘... Timekeeper’ [responsibility] to manually create groups and assign individuals from any part of the organisation to them.” (OC post)

Furthermore, while some requests attracted a handful of responses, other requests received numerous responses due to discussions formed between one respondent and the requester, or between a number of different respondents and the requester. These responses could lead to collective solutions. In such cases, different respondents, sent messages based on their own experiences, so they could offer different or supplementing replies to one message. This led to an assemblage of responses to be analysed and used by the requester.

Co-construction practice: The fourth coordination practice observed in some of the threads was contribution of members to form a collective case. This practice involved OC's members to revise and align needs. In contrast to the response representation practice, in which separated elements were juxtaposed by the requester to

form a local solutions, this practice involved collaborative efforts in which continuous identification of commonalities and elimination of differences took place. Use of the OC facilitated this inter-organisational work by creating a common space within which members could locate and learn about common needs and engage in dynamic construction of a case (to be presented to the vendor). Constructing a case usually started by creating list of requirements and prioritisation.

“[we need to] compile a list of topics... I have started the list but email me some content...” (OC Quote)

When requirements became clearer, whitepapers were produced to provide the details. Members added their contributions and comments to various sections. As they did so, conflicting needs became more clear which led to further *revising* and *aligning* activities. In this way, the OC allowed for speedy formation of groups with similar needs, and provided a middle space for co-construction of cases or solutions.

HuOC Knowledge Formation

Findings have shown evidence of the extent of new knowledge formation within HuOC. In other words, knowledge shared within the community can stay ‘intact’ (new knowledge is not formed, only existing knowledge held by an individual organisation is shared), or knowledge can transform and new knowledge can be formed (and reformed) as it is being shared within the community (and beyond). Findings also highlight that a combination of different practices are involved in the formation (or mere exchange) of knowledge. For instance, display practice combined with presentation practice leads to the exchange of existing knowledge, whereas for new knowledge to be produced in the community, all four types of practices need to take place.

Table 3 shows examples of knowledge formation.

[Insert Table 3 here]

Knowledge Flows and ‘Travels’

The knowledge shared within the OC, among the different organisational users and between users and vendor was intended to ‘travel’, as described by our interviewees.

“What we discuss in the forum could travel far and wide... Sometimes we make a problem statement in the forum, and in a matter of several weeks there is a product patch released by [vendor name].” (Interview, member)

The knowledge travel incorporates two features: distance and direction. In terms of distance, knowledge can travel over a spectrum, starting from ‘short’ (knowledge flowing to one or few interested user organisations) to ‘long’ (knowledge flowing to a large number of user organisations, or to technology vendor and other third party organisations). In terms of direction, knowledge can travel and stay within the community, proceed outside the community (outward travel), or can travel back to the community (inward travel). Table 4 shows an example that illustrates analysis of data with regard to knowledge travel.

[Insert Table 4 here]

Figure 2 presents a two dimensional model that illustrates the possible combinations of the two core themes that emerged from the study: extent of knowledge formation and extent of knowledge travels.

[Insert Figure 2 here]

The four areas (hereafter referred to as knowledge spaces) on the figure (whilst not fully separate), point to differences in influence as a result of knowledge sharing in the community.

Area A

The first area (A), illustrates that the community can facilitate (existing) knowledge to travel (short) from one user organisation to another individual user organisation (or a limited number of user organisations), to be (customised and) used *within the receiving* organisation. In this case the direction of travel of knowledge is within the community.

We observed messages seeking information about the configuration of the applications. These messages ranged from asking for possible solutions (including process and configurations) for a specific need or guidance on best practices, to discussing advantages and disadvantages of adopting a particular configuration amongst the various available options.

“We are interested in what calculations others are using to calculate a day's pay as we want to review our current processes. We have a couple of different calculations so before we try and standardise these, we wanted to know if it was common.” (OC post)

In response to the various needs expressed by members, other OC members responded by sharing a solution which they employed in a similar situation. In doing so, they expressed their experience about configuration of standard functionalities, customisation of existing application, or experience of choosing a strategy over many possible functions. By analysing the large number of messages and following them up with the interviews, we found that whilst there were possibilities of various solutions, the requester tended to adopt the solutions that a) best matched their circumstances, and b) had sufficient details to be implemented.

“[...] two solutions were offered to me, a custom report and a standardisation validation on the fields [...] since we did not want to go down the [form] standardisation path, and [responder name] provided us with the details of the report standardisation, we only changed the report [...]” (Interview, member)

The representation of the solution in an understandable and implementable shape, led to selection of solutions within the requester organisation. In this way, the ‘power of expertise’ in a field which involved both having the knowledge and being able to represent it, led to influence at a local (i.e. single organisation) level. In such cases, the knowledge was said to travel a ‘short’ distance, usually at a ‘quick pace’.

Area B

Area B shows that the (existing) knowledge can influence *a large number of organisations*, including user organisations (within the community or beyond) and external organisations (such as the vendor or third party organisations).

This occurred in particular due to the standard nature of the application, which led to a noticeable user-vendor distance. In such cases due to the generic strategies adopted by the vendor, the organisational users gathered in the community to form a common voice and get on the vendors radar. We found several examples of this community exercise of power leading to development of patches, system upgrades, new functionalities or extension of license de-support dates, hence leading to inward travel of knowledge subsequent to an outward travel. Such cases of common needs (in terms of the product or vendor strategies) tend to drive long discussions which start as a message thread and may eventually lead into general surveys and future face-to-face meetings. Whilst in this type of knowledge sharing, there is no immediate production of new knowledge within the community, it can still have an effect on the technology, as vendors are pushed to respond to the need by changing products, or they are forced to adapt their strategies to respond to community need. This change of product or strategy will then influence the wider community of technology users (who may or may not be part of the OC). One organising member of the community explains:

“Through this common voice, we urge for solutions and when there is a collective need, [vendor_name] will eventually respond.” (Interview, member)

A combination of ‘power of collectives’ (formed as a result of relationships between different members) and ‘political power’ (resulted from conflicts of interests between members and the vendor) was used to extend the direction of knowledge travel outwards.

Area C and D

The knowledge can be *reshaped to form new knowledge* that could either travel within the community (short) or beyond (long). The existence of user needs, which were not responded to by the vendor, could lead to creation of collective solutions within the community. In such cases, members with experience in developing solutions used the OC to exchange ideas and collectively design a solution that could be adopted by a few user organisations (area C), many user organisations within the community (intersection of area C and D), or beyond (area D) – i.e. the user innovations could become part of the standard product through being adopted by the technology vendor or other third parties and being developed into the actual products. In such cases the knowledge was formed and reformed within the community to achieve a solution to be used by different user organisations (travel short or long). In the cases of new knowledge staying within the community the direction would be within, and in the cases of knowledge travelling outside the community the direction of travel would be outwards. Furthermore, if the outwardly travelled knowledge was adopted into the product and travelled back into the community as a standard solution, this would result in an inward travel too. ‘Power of expertise’ was the main driver of short travel of new knowledge within the community, while a combination of ‘power of expertise’, ‘power of collectives’, ‘political power’, and ‘legitimate power’ (formed as a result of some members having the legitimacy to

derive unification of different users views/needs), and was needed to lead the knowledge to travel long distance and to multiple directions.

Bringing the four Areas together

Figure 3, depicts the possible direction of travel of knowledge. In areas A and C, we observe that the knowledge travels a short distance to a limited number of user organisations and the (existing or newly formed knowledge) stays ‘within’ the community user organisations. In areas B and D, the knowledge travels long, meaning that it reaches a wide number of organisations (including users, vendors, and third parties), which maybe within the community or outside. For the knowledge that travels outwards (to organisations which are not part of the community – be it users, vendors or third-parties), many different organisations could be impacted. There is also possibility of new knowledge formed outside, to travel back into the community (inward) as a result of knowledge travel.

[Insert Figure 3 here]

By combining the three sets of findings (inter-organisational user-driven knowledge related practices, the knowledge formation, and knowledge flows and travels) we illustrate what practices are involved in each of the knowledge spaces. Figure 4 shows that display and representation practices are experienced in all types of knowledge travels. Whereas, audience attraction and co-construction only take place at certain knowledge travel types. Audience attraction takes place when the distance of travel is long. This is because, for knowledge to have a wide impact (travel long) consensus needs to be made amongst different user organisations. Similarly, co-construction also takes place in long-travels as different members revise and align needs and solutions. The difference is, co-construction is also possible in short travels when new knowledge is generated as different members build-up on each other’s responses.

[Insert Figure 4 here]

Discussion

In this paper, through a qualitative study we have explored the travels of knowledge flows in inter-organisational and industry-founded OCs. By doing so, we offer a new conceptualisation of the phenomenon by introducing the distance and direction as key elements of OC knowledge flows. In particular, it was found that OC knowledge flows travel both short and long distances taking different directions; the latter range travelling within, outwards and inwards. Furthermore, we identified *display, audience attraction, representation, and co-construction* as the key practices adopted by individual OC members, which enable the formation of the aforementioned knowledge flows. Our findings conform with earlier studies in showing that OCs enable their members to shape knowledge flows (Haefliger et al., 2011), and specifically show how inter-organisational OCs offer opportunities where users from different organisations meet and discuss the challenges and possible approaches to tackling those issues. Through these communities, members can voice their criticism towards vendors and their technologies (Kaplan and Haenlein, 2010, Kozinets and Handelman, 2004) and find ways to present a collective voice to the vendor. In this manner, the OC offers a platform for users to share their problems and suggestions and request further action by the vendor in face-to-face meetings.

The study makes the following contributions to the literature.

First, the study adds to the OC literature by showing how the knowledge, that has been exchanged or generated within OC, travels. To our knowledge, no other study has covered this aspect even though the extant literature has indicated that research is needed in this area (Faraj and Shimizu, 2018). In doing so, the distance and direction, as two inter-related elements of knowledge exchange and generation, have been unpacked

in the study. In some cases, knowledge travels within the user-organisations, whilst in other cases, this goes beyond the OC (and its members) to external stakeholders who upon enacting on the generated knowledge, may themselves share their work with OC members (inwards). Within our specific case, we have shown that, the varying distance and direction of travel lead to different influences on technology use, technology formation and even strategies deployed by technology vendors and user organisations. Beyond however the specific OC examined in this study, understanding the distance and direction of OC knowledge flows shows the extent and spread of OC impacts and contribution to learning and innovation, which may happen both within and beyond the OC.

Second, our findings reinforce earlier arguments that apart from the exchange of existing knowledge, new knowledge, both explicit and tacit, may be generated within OCs (Faraj, et al. 2016). More importantly, the study extends understanding in this area by identifying specific practices that can contribute to OC knowledge flows, notably *display, audience attraction, representation, and co-construction*. In doing so, we have responded to calls on examining the activities of members and understanding the inner workings of communities (Faraj et al. 2016). Following our findings, a model has been developed (Figure 4), which highlights the practices involved in each type of knowledge flow. Some practices require individual acts while other practices involve collective acts of many user organisations in the community. Hence, this shows that knowledge flows require deliberate acts of community members.

A third contribution is that the study extends understanding on the different types of OCs. Whilst mainstream OC literature has focused on user-initiated OCs where members are individuals (e.g. Fan and Lederman, 2018), in this study we take the case of a vendor-founded OC that aims to bring several user organisations together in order

to exchange and generate knowledge on a specific information system whilst enabling the vendor to merit and benefit from their ideas (von Hippel, 2017). Our study on this vendor-founded but user-orchestrated OC, is different to all types described here in different ways including formation, management, motivations, and purposes. This particular type of OC serves different stakeholders in different ways. The primary beneficiaries of the community are users from technology user organisations who contribute to the community in order to achieve business goals. The technology vendor, is yet another beneficiary of the activities that occur in the community. On one hand, the vendor uses the community as a source of knowledge, as well as a space to interact with a wide range of users. On the other hand, users contribute to the community not only to exchange knowledge, but also to use it as a space to wield influence on the vendor. The interactions span across a number of user organisations and lead to further interactions and change on non-member user organisations, technology vendors, and third party service and product vendors.

Limitations and Future Research

This study has several limitations and implications for further research. First, whilst we present that the internal knowledge practices of OC have an effect beyond the community, we have not collected data from external beneficiaries. Future research can examine the views of external bodies in particular the organisational users, who are not members of the OC. Secondly, our study does not investigate network centrality and the role of individual organisational members who drive knowledge flows. This aspect of the OC requires further research. Third, our research has a focus on industry-founded OCs. Further work is required to examine knowledge flow distance and direction, and practices in other types of OCs including mainstream OCs where members join on a voluntary basis. Finally, our research points to existence of tensions within OCs. Further

work is required to clearly present these tensions and how the OC members overcome the conflicts and challenges.

Conclusions

This study was carried out as a response to a critical research gap on OC knowledge flows. This study provides a new conceptualisation of OC knowledge flows by introducing the distance and direction as key elements of knowledge travel. In doing so, we examined a particular type of OC initiated by a technology vendor and used by organisational users of the technology. The study shows that such an OC has various types of beneficiaries within and beyond the community space. Furthermore, the study highlights the enabling practices of an OC and indicates that different practices lead to various outcomes. Our research also highlights the dynamics of OC knowledge flows and shows that different types of knowledge (existing and new) may travel different distances (ranging from one user organisation within the OC to a wide range of user organisations and vendors outside the OC) and varied directions (within, inwards and outwards).

The study offers practical implications to user organisations, OC organisers, and technology vendors. In the field of enterprise systems, there is a distance between vendors and their user organisations. Vendors develop complex methods of connecting to users to understand their needs and demands. OCs are important spaces that allow information to be gathered from user organisations. The outward flow of knowledge is the mechanism that enables this information gathering. The inward flow, on the other hand, is used as a mean to tap into the user organisations by providing knowledge back to the community. Therefore, OCs can act as facilitators of a more direct engagement between vendors and their user organisations. The outward flow of knowledge also benefits user organisations, as they can use this to impose collective power on

technology vendor. By understanding the dynamics of knowledge travel (including distance, direction, and practices) user organisations can benefit from these spaces by finding both short- and long-term solutions to their requirements. Finally, awareness of the various types of knowledge related practices within the OC allows OC organisers to better manage the activities that take place within the community and beyond.

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Tables

| Method | Data Period | Description |
|----------------------|--|---|
| Observations | 2010 to 2013 | <ul style="list-style-type: none"> • Observation of face-to-face meetings (5 day-long meetings) |
| Interviews | May 2010 to April 2013 | <ul style="list-style-type: none"> • 18 semi-structured interviews (ranging from 15 minutes to 1 hour) with attendees of meetings including organisational users, community organisers, and vendor employees |
| OC posts | January to June 2010 And October 2016 to April 2017 (received emails as a member of the mailing list) | <ul style="list-style-type: none"> • Full access to 13 month of HuOC posts |
| Documentation | May 2010 to April 2013 | <ul style="list-style-type: none"> • Different types of online documents such as event presentations (4 events) |

Table 1. Overview of Data Collection

| |
|---|
| <p><i>"... we have our council employees (non Teachers) on a 2 weekly pay cycle"</i></p> <p>Code: Organisational context, type of employee, actual ERP process</p> <p><i>"and we are considering a possible move of these employees to a 4 weekly payroll cycle."</i></p> <p>Code: Ideal process</p> <p><i>"We have about 10,000 employees on a 2 weekly payroll(s) and we wish to move all these assignments to a new payroll(s) with a 4 weekly payroll cycle"</i></p> <p>Code: Technical details; technical limitations</p> <p><i>"we wish to consider the various options which are available to do this."</i></p> <p>Code: Open to alternatives</p> <p><i>"If you have done something like this we would be keen to know what approach you have taken."</i></p> <p>Code: Calling for those with similar experiences, request for details of approach</p> <p><i>"If you think there is a standard piece of functionality to do this (we are on version_X) we are keen to consider this. Is there such a thing?"</i></p> <p>Code: Technical limitations, type of response needed (standard)</p> <p><i>"All information and assistance appreciated in advance."</i></p> <p>Code: Social niceties/appreciation</p> |
|---|

Table 2. An Example of first level coding of one message

| | Enquiry Example | Response Example | Knowledge formation |
|----------|---|---|----------------------------|
| Thread 1 | Seeking guidance on pros and cons of adopting a specific solution amongst available alternative solutions | Five OC members gave description of solution on similar cases including system configuration options, available forms and reports, and consequences | Existing knowledge |
| Thread 2 | Need for advice on designing new processes | Several OC members join in to respond and build on each other's solutions. | New knowledge |
| Thread 3 | Announcement of error discovery | Confirmation of error by 11 other OC members | Existing knowledge |
| Thread 4 | Updates on patches and bug solutions | Confirmation of solution by three other OC members | Existing knowledge |

Table 3. An example of analysis of four threads with regard to knowledge formation

| | Enquiry Example | Response Example | Knowledge Travel |
|----------|---|--|---|
| Thread 1 | Seeking guidance on pros and cons of adopting a specific solution amongst available alternative solutions | Five OC members gave description of solution on similar cases including system configuration options, available forms and reports, and consequences | Direct replies to one user organisation, direction of travel within community |
| Thread 2 | Need for advice on designing new processes | Several OC members join in to respond and build on each other solutions. | Reply to one organisation, Direction of travel within the community |
| Thread 3 | Announcement of error discovery | Confirmation of error by 11 other OC members | Responses accumulated to be sent to the vendor (external). Direction of travel outwards |
| Thread 4 | Updates on patches and bug solutions | Confirmation of solution by three other OC members | Direction of travel inwards |
| Thread 5 | Announcement of a new report needed by the government | Several OC members join in to map out the generic requirements then built on each other's solutions. | Reply to many members, Direction of travel within community |
| Thread 5 | A new government law is imposed | Several OC members join in to map out requirements and then build on each other's solutions. Then they used a collective voice to make a case for the vendor to provide a standard solution. | Reply to many members, and vendor to provide a solution on the product level. Direction of travel outward |

Table 4. Example of analysis of five threads with regard to knowledge travel

Figures

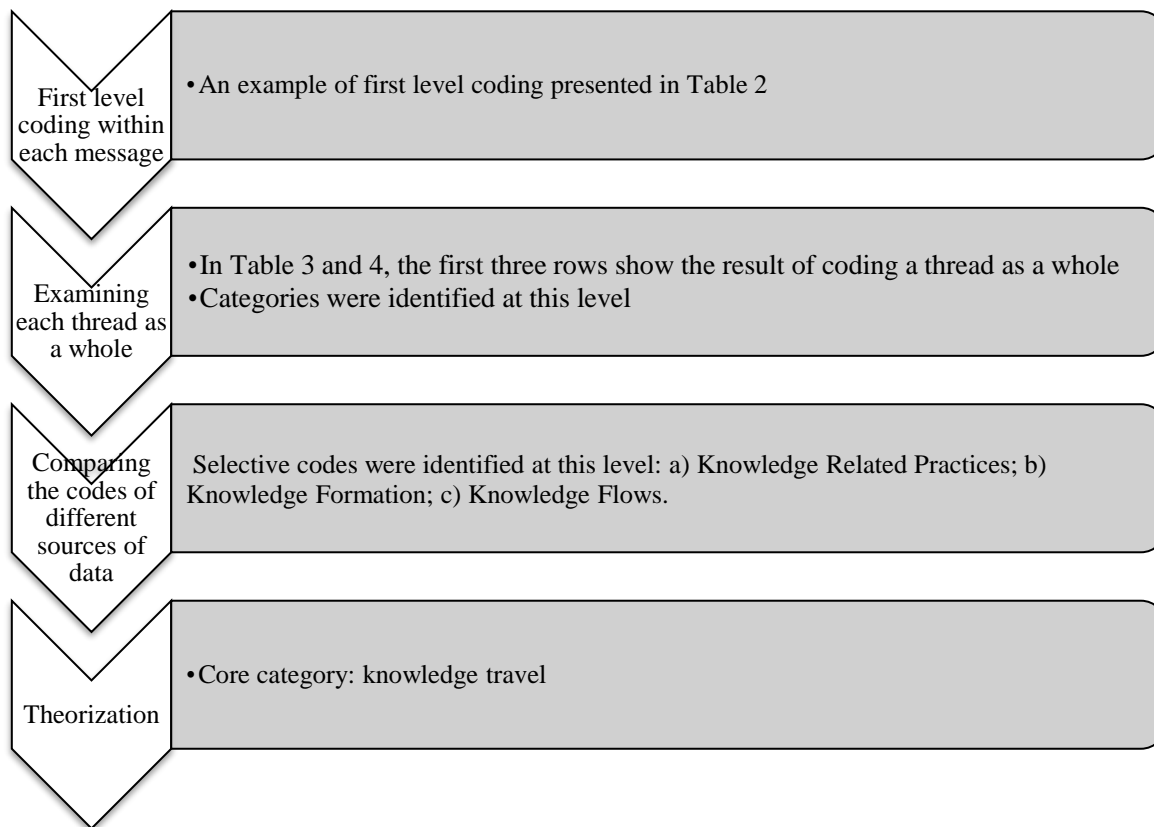


Figure 1. Data analysis procedure

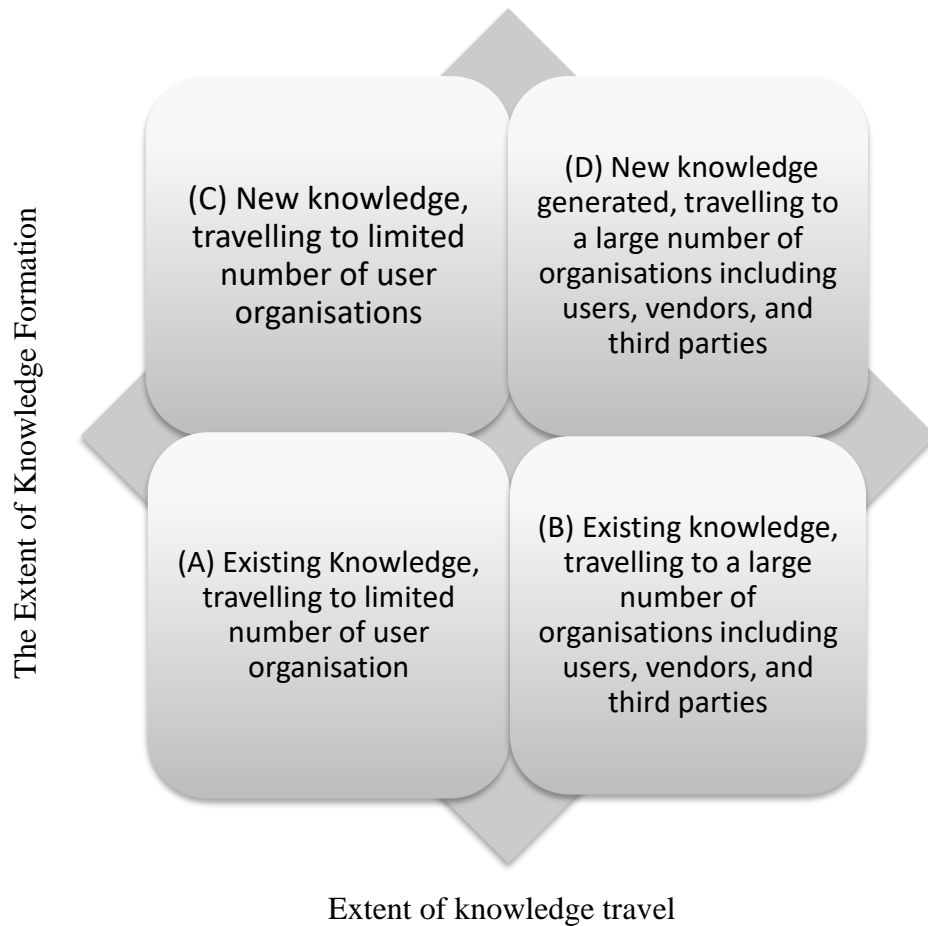


Figure 2. The four areas of knowledge formation and knowledge travel

The Extent of Knowledge Formation

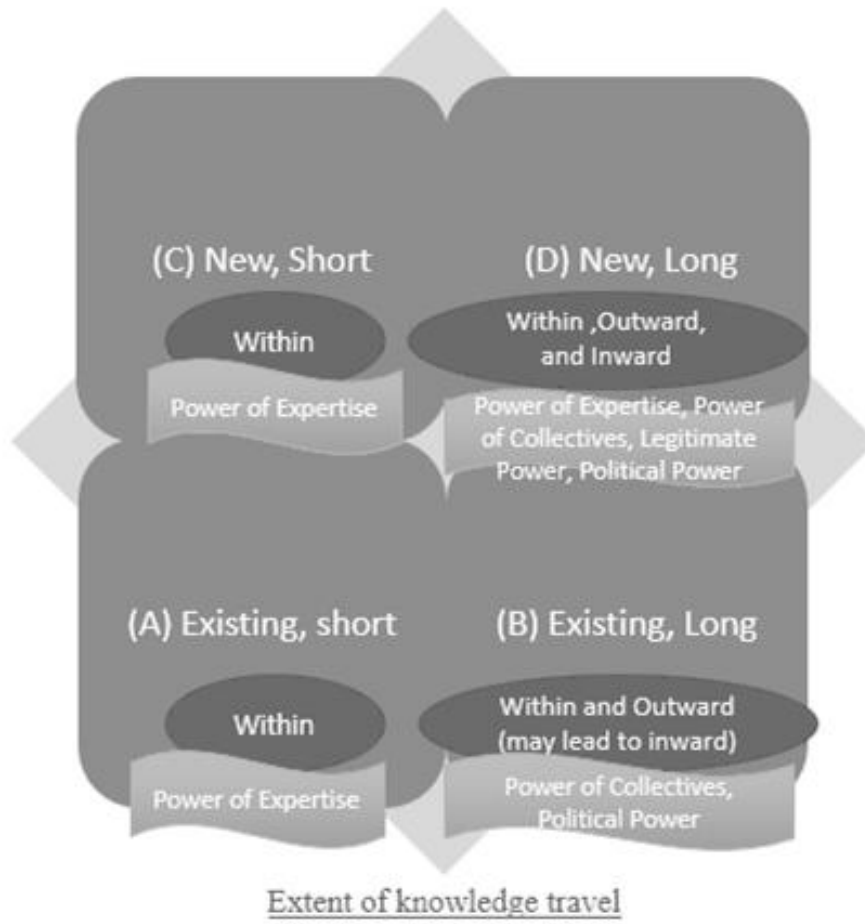


Figure 3. Direction of knowledge travel

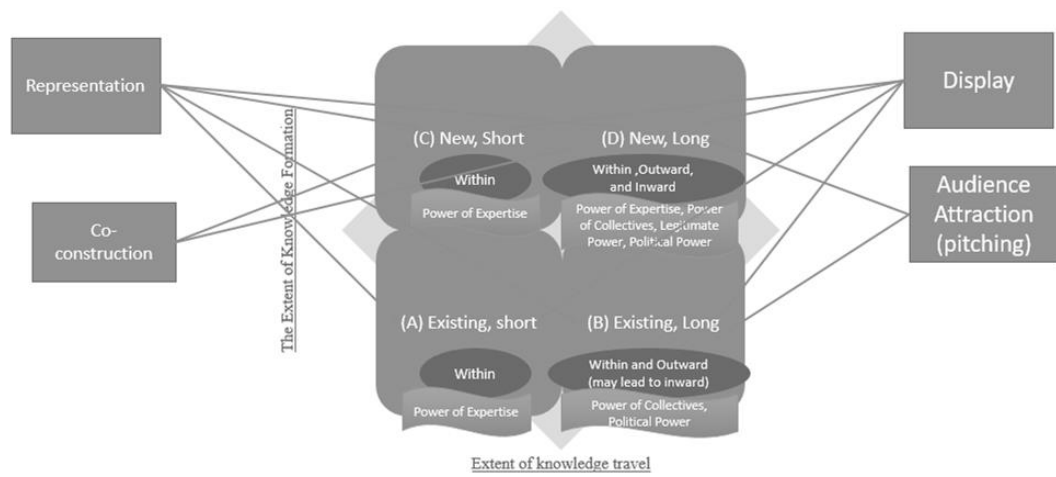


Figure 4. Model presenting the practices involved in knowledge travel

Figure Captions

Figure 1. Data analysis procedure

Figure 2. The four areas of knowledge formation and knowledge travel

Figure 3. Direction of knowledge travel

Figure 4. Model presenting the practices involved in knowledge travel