Computers in Human Behavior 30 (2014) 773–786

Contents lists available at SciVerse ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Ambient affiliates in virtual cross-organizational tourism alliances A case study of collaborative new product development

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ARTICLE INFO

Article history:
Available online 17 April 2013

Keywords:
Ambient communities
Practice environments
Distributed collective practice toolkits
Tourism alliances

ABSTRACT

The paper presents intrinsic properties of cross-organizational collaboration in shared information spaces and motivates the concept of ambient communities with particular reference to the tourism sector. Our approach is informed by an ethnographic analysis of assembling innovative information-based products for tourists. Qualitative data collection methods combined with online 'tells' reveal that in cross-organizational settings *togetherness* stems from ambient affiliates' recurrent co-engagement in computer-mediated distributed collective practices. Intriguing aspects of such practices are its boundary function, an underlying emergent knowledge process and its entanglement with socio-material realities of partners.

1. Introduction

In recent years, knowledge management studies and particularly the literature devoted to the concept of 'communities of practice' (Brown & Duguid, 1991; Lave & Wegner, 1991; Wenger, McDermott, & Snyder, 2002; Wenger & Snyder, 2000) have produced convincing evidence to claim that organizational knowledge is informal, collective and situated, rather than merely formal, individual and abstract. While these works provide critical insights (Roberts, 2006; Thompson, 2005), our understanding of collaborative knowledge management in cross-organizational settings remains limited. Challenging issues still pending empirical foundations include how firms can effectively mobilize their knowledge, the mechanics of co-engagement in virtual settings and how this co-engagement leads to improved professional capabilities and innovation.

The present research aims to shed light to the above by focusing on a service sector, namely tourism, which over the years is rapidly being transformed from a leading application in B2C e-commerce into an information business (Rayman-Bacchus & Molina, 2001). Key trends driving this transformation include technological advancements (Cardoso & Lange, 2007; Fodor & Werthner, 2004–2005; Akoumianakis, 2010b) but also new business models for customer-relationship management, such as e-shop, e-mall, e-auction, e-procurement, e-marketplace, e-communities, e-brokers and e-intermediaries (Timmers, 1998; Stockdale & Borovicka, 2006) and novel forms of online marketing, destination branding and consumption (Aschoff & Schwabe, 2009; Blain, Levy, & Brent Ritchie, 2005; Stockdale, 2007; Walsh & Gwinner, 2009; Werthner & Ricci, 2004). Furthermore, the emergence of Web 2.0 has created new opportunities for user involvement and innovation (Cardoso & Lange, 2007; Sigala, 2012; Wang, 2008; Wang & Fesenmaier, 2003). There is also evidence, but very sparse and limited, of research efforts focusing on the knowledge exchanges that drive new product/service development in tourism and the various modalities through which these are manifested i.e., design contests (Bullinger, Neyer, Rass, et al., 2010; Faullant, Krajger, & Zanker, 2012) and practice-oriented toolkits (Akoumianakis, 2009, 2010b).

Against this background and inspired by practice-oriented perspectives (Gherardi, 2009; Orlikowski, 2000, 2002) and theories of social production (Benkler, 2006), the present work sets out to investigate intrinsic properties of shared and collaborative practices of virtual teams, comprising ambient affiliates and spanning inter-organizational boundaries, as they are formed, re-shaped and cultivated to negotiate aspects of new product development. The empirical base is derived from a detailed analysis of collaborative vacation package development – a boundary spanning practice (Levina & Vaast, 2005) which is framed as an emergent knowledge process (Markus, Majchrzak, & Gasser, 2002) with dynamically evolving requirements, an unpredictable set of actors and deliberations that have no best structure. Vacation packages of the sort examined in this study are information-intensive products comprising multiple service offerings (i.e., accommodation, transport, cultural excursion, food and beverage, etc.) whose details are negotiated by service providers and prospective customers to derive maximally preferred vacation arrangements. In such settings, we are particularly concerned with two primary research targets. The first is to assess how cross-functional and boundary-spanning virtual teams are nurtured inter-organizationally, particularly with external parties, so as to facilitate effective mobilization of knowledge and improved innovation capabilities. The second target

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http://dx.doi.org/10.1016/j.chb.2013.03.012

is to investigate the extent to which 'practice' can provide the glue for recurrent co-engagement in cross-organizational virtual settings so as to enable and sustain collaborative ties in the absence of pre-existent togetherness.

We approach these targets using a case study in the social production of vacation packages in a regional setting. It turns out that vacation packages, but also other categories of information-based products/services, obtain their competitive advantage from their informational content, their cultural standing and expected value for customers, as well as their capacity to generate novel social encounters amongst interested parties. Furthermore, their innovativeness stems out not only from the way in which they are compiled (i.e., factory-based assembly line), but also from their inherent plasticity which allows them to exhibit both locality and boundary function.

The rest of the paper is structured as follows. The next section reviews related work with the aim to assess current thinking and emerging trends in cross-organizational virtual collaboration and the means through which innovation may be fostered in information-based new product development. The emphasis is on identifying the theoretical and engineering gaps relevant to and motivating the present work. Then, we present a case study covering collaborative vacation package assembly and elaborate on the findings related to intrinsic properties of ambient communities and how they emerge through co-practicing. The paper is wrapped up with a critical appraisal of key findings in the light of current practice-oriented theorizing, a discussion of implications and summary of key contributions.

2. Theoretical foundations & research focus

The present work links with two prominent theoretical streams of research; the first relates to knowledge management in collaborative work contexts, while the second concentrates on the mechanics of user involvement in innovation in virtual community settings. In both cases, our interest spreads across a range of topical themes such as what constitutes distributed collective practices in virtual settings (Turner, Bowker, Gasser, & Zacklad, 2006), the intrinsic properties of knowledge management and user-driven innovation (von Hippel, 2001; von Hippel & Katz, 2002) and how practice (Orlikowski, 2000, 2002) forms the glue for establishing sense of community, togetherness and virtual communities of practice (Wenger & Snyder, 2000; Wenger et al., 2002). We will therefore attempt a brief but representative review of related literature to set the focus of our current research and motivate the subsequent discussion on cross-organizational virtual tourism alliances.

2.1. Qualifying collaborative work practices in new product development

Collaborative work practices can be analyzed using different conceptual lenses depending on constructs such as the type of collaborators (i.e., customers, organizations and virtual teams), the form of collaboration (i.e., working on, with, through or within representations), technology genres (i.e., ERPs, e-intermediaries and online communities, geo-collaboration portals), etc. Accordingly, different configurations of characteristics may be more or less conductive to success. Two currently prominent themes of research relate to cross-organizational collaboration and the end users' involvement in innovation processes.

Cross-organizational (or inter-organizational) collaboration for attaining competitive advantage is a multi-faceted phenomenon (Kumar & van Dissel, 1996; Shin, 2006). The basic hypothesis is that cross-functional teams, enabled by some sort of networking tactics, become key players in defining and implementing incremental innovation projects. Referring to the systems for attaining this goal, Kumar and van Dissel (1996) coined the term Inter-Organization Information Systems (IOSs) as "technologies designed and implemented to operationalize the relationships between partners in an alliance" (p. 8). In a recent special issue of the Journal of Management Studies the topic is reviewed from a variety of perspectives. Easterby-Smith, Lyles, and Tsang (2008) concentrate on inter-organizational knowledge transfer and provide a framework identifying key themes and priorities. Mason and Leek (2008) provide an informative review of dynamic business models and argue that such models represent continuous change and therefore make firms learn constantly new and better ways of doing things. Finally, Harryson, Dudkowski, and Stern (2008) introduce the notion of transformation networks and discuss how such structures foster networked-innovation demonstrating their results through a case study in the automobile industry.

In addition to the management literature, cross-organizational collaboration has attracted substantial attention in Computer Supported Cooperative Work (CWCS) and Information Systems scholarships. The field of CSCW has historically emphasized technological solutions and challenging design-oriented problems (Turner et al., 2006; Carroll, Rosson, Convertino, & Ganoe, 2006; Monteiro, Pollock, Hanseth, & Williams, 2012). On the other hand, Information Systems researchers tend to focus on technology implications (Barrett & Konsynski, 1982; Eckartz, Daneva, Wieringa, & van Hillegersberg, 2009), strategic choices (Choudhury, 1997; Kurnia & Johnston, 2000; Volkoff, Strong, & Elmes, 2005) and enacted phenomena such as boundary spanning (Levina & Vaast, 2005). Nevertheless, and despite of their theoretical rigor, these works lack detailed treatment of end user involvement in innovative new product development. A proposal to fill this gap is user toolkits for innovation (Franke & Piller, 2004; Franke & Shah, 2003; Franke & von Hippel, 2003; von Hippel, 2001; von Hippel & Katz, 2002), which is grounded on innovation management scholarship that recognizes the value and benefit of user involvement in innovation processes (Hagel & Armstrong, 1997; Fuller, Bartl, Ernst, & Muhlbacher, 2006). User toolkits were conceived as a technology that allows users to actively contribute to the design of novel products by trial-and-error experimentation and by delivering immediate (simulated) feedback on the potential outcome of their design ideas (von Hippel & Katz, 2002). Such toolkits are especially suited and are becoming more attractive in such fields as advances in computerized design and computerized production technologies since they reduce the associated fixed costs (von Hippel & Katz, 2002, p. 830).

In the tourism sector, cross-organizational collaboration presents several challenges. This is due to the fact that the industry comprises of interrelated businesses (i.e., travel companies, accommodation facilities, catering enterprises, tour operators, travel agents, etc.) and represents a highly fragmented reality due to the actors' different culture, background and operating business models. In the past, there have been various initiatives aiming to enhance cooperation by providing solutions based on standards and common interchange formats, but also different technology genres aiming to facilitate interoperability across information systems and data formats. This form of interoperability has been attempted using ontologies (Gruber, 1995), dynamic packaging (Cardoso & Lange, 2007), semantic web technologies (Dell'Erba et al., 2005) and service-oriented architectures (SOAs) (Erl, 2005; Fodor & Werthner, 2004–2005). Despite the fact that these technologies may offer a solution for interoperability, they fall short from addressing key challenges of cross-organizational virtual collaboration. These are briefly elaborated in subsequent sections.

2.2. Partner affiliation

With the advent of Web 2.0 and new social media, collaborative work is increasingly confronted with an additional challenge,

namely the affordance for ambient affiliation where peers, either intentionally or unintentionally become affiliated with a virtual co-present but impermanent community through bonding around evolving topics of interest. Recently, the phenomenon has been acknowledged by several researchers, offering useful insights on how it is brought about. Zappavigna (2011) discusses how a typographic convention, the hashtag of the Twitter microblogging service, renders the language searchable and is used to upscale the call to affiliate with values expressed in a tweet. Other means that hold the potential for creating ambient affiliation include semantic annotation services but also user generated content such as tags and bookmarks. Golder and Huberman (2006) were two of the earliest researchers to look at the dynamics of tagging, but many other soon followed to address the new affordances from different perspectives (Halpin, Robu, & Shepherd, 2006; Marlow, Naaman, Boyd, & Davis, 2006; Sen et al., 2006).

For the purposes of the present work, ambient affiliation is an enacted social accomplishment resulting from distributed collective practices (Turner et al., 2006) and the appropriation of systems that support emergent knowledge process (Markus et al., 2002). Thus, the hashtag of the Twitter microblogging service is a feature inscribed in technology in such a way that it extends its meaning potential to operate as a linguistic marker for ambient affiliates interested in a referent target (Zappavigna, 2011). In a similar fashion, Web-based tagging systems such as Del.icio.us, Technorati and Flickr make provisions that allow participants to annotate a particular resource, such as a web page, a blog post, an image, a physical location, or just about any imaginable object with a freely chosen set of keywords (Marlow et al., 2006). Then, by allowing users to share their tags for particular resources, an ambient affiliation is established relying almost exclusively on shared and emergent social structures and behaviors. It can therefore be argued that ambient affiliation prevails in online settings where participants may not have interacted directly and/or likely do not know each other and/or may not interact again. Consequently, any form of togetherness should be attributed to the shared practice or cultural value of topical subject that brings together certain configurations of people, artifacts and social relations.

Cross-organizational collaboration is a typical case where multiple ambient affiliations may be formed and catalyze individual and collective outcomes. Raybourn, Kings, and Davies (2003) confirm this and suggest that cultural artifacts may be used to facilitate collaborative engagement with strangers. Our recent work (Akoumianakis & Alexandraki, 2012) also provides similar evidence. Moreover, social networking sites such as ResearchGate (https://www.researchgate.net/) and LinkedIn (http://www.linkedin.com/) foster ambient affiliation in academic and professional cooperation respectively, as users find themselves to affiliate with co-present but impermanent communities around topics of common academic and/or professional interest. Ambient affiliations are also common in information-based industries and through various technological regimes. For instance, geo-collaborative portals for trip planning purposes (Sigala, 2010) and online advisors (i.e., http://www.tripadvisor.co.uk/) bring together people who may have not have interacted directly and/or likely do not know each other. Similarly, in the e-health area, social networking services can facilitate rich interactions between ambient affiliates sharing concerns about certain disease (Akoumianakis, Karadimitriou, Vlachakis, Milolidakis, & Bessis, 2012). Interestingly, in these cases ambient affiliation is not the result of appropriating a linguistic convention or marker as in the case of Twitter. Instead, it is the user's profile, maps, indexing schemes and classification of user generated contents that create opportunities for enacted ambient affiliation. This leads to the conclusion that certain artifacts, such as linguistic markers, cultural referents and user profiles, act as boundary objects establishing bridges across individual settings, social worlds and/or organizational contexts, and in this capacity, they enable or constrain new affordances such as ambient affiliation. It is therefore important to assess not only the range of artifacts that serve this purpose but also how they afford ambient affiliates' recurrent engagement in a shared practice and how such recurrent engagement implicates emergent knowledge processes (Markus et al., 2002) that progressively drive new forms of organizing.

2.3. Boundary artifacts and sense of togetherness

The concept of boundary objects was introduced by Star and Griesemer (1989) to coin a category of artifacts that '... are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (p. 393). The same authors qualify even further boundary objects as being '... simultaneously concrete and abstract, specific and general, conventionalized and customized' (Star & Griesemer, 1989, p. 408). An equivalent connotation is provided by Bowker and Star (1999) who define boundary objects as 'objects that inhabit multiple contexts – all at the same time – whilst having both local and shared meaning' (p. 297).

Since the introduction of the boundary object concept, research has matured in several different directions, examining different types of boundary objects such as process maps (Fenton, 2007) diagrams, drawings, and blueprints (Henderson, 1999), workplace timelines and schedules such as Gantt and PERT charts in project-based work (Yakura, 2002), digital documents (Murphy, 2001) as well as the role of boundary objects in translation (Bowker & Star, 1999) and new product development (Carlile, 2004). More recent works, link boundary objects to virtual practices ranging from established professional or organizational activities to entertainment (i.e., gaming) and even informal encounters such as sharing a meal (Barden et al., 2012) or a cooking event (Foley-Fisher, Tsao, Wang, & Fels, 2010). In this vein, scholars in tourism and hospitality management acknowledge the role of boundary artifacts and how they afford sense of togetherness. Specifically, Molz (2012) introduces the notion of coordinating togetherness while 'on the move' and uncovers the new forms of mediated and face-to-face togetherness that become possible in a mobile world. Sigala (2012) discusses the use of map-based services in geo-portals and how they lead to customer value during collaborative trip planning and bonding processes.

A more detailed analysis of the available scholarship reveals that researchers recognize as the turning point in the design of boundary artifacts the extent to which they can foster making of sense (i.e., structuring unknown contexts and/or actions and assigning them with meaning). Such a focus on artifacts should not undermine the role of organizational conditions, known to influence sense making (Weick, 2001). Nevertheless, it is widely acknowledged that this is where boundary objects are mostly beneficial, as through their abstractness, they foster sense-making of the shared information space and 'local' binding of its elements to different organizational conditions. In cross-organizational and distributed settings boundary artifacts can shift the focus away from the local and the situated realities of individuals or organizations to the process of organizing (and making sense of) the distributed work itself. This is especially the case with online partnerships (Kern & Kersten, 2007), strategic alliances (Gulati, 1998) and virtual teams (Powell, Piccoli, & Ives, 2004). Notably, when the members' co-engagement with designated boundary artifacts is recurrent across time and agendas, inevitably, it evokes a kind of togetherness through practice. This form of togetherness assumes the mutual connection between remotely located participants engaged together in a technology mediated social practice,

but does not necessarily implicate sense of community. Rather, it refers to a social accomplishment which is sustained through co-practicing and co-engaging with certain boundary spanning artifacts (i.e., iconic representations, virtual prototypes, game settings, etc.). In such cases boundary artifacts act as shared linguistic vocabularies (Maturana & Varela, 1992) through which people remain connected when at a distance. However, as discussed below, togetherness may also lead to sustainable social bonding, more permanent ties and the enactment of a variety of social cyber-formations.

2.4. Enacted social formations: Online communities and communities of practice

Togetherness, when materialized in practice, can lead to a variety of emergent social formations. One kind is online communities, which may be nurtured either intra- or inter-organizationally. Fuller et al. (2006) examined how a business-sponsored online community model signifies a trend towards more user-centric solutions by accumulating customer information, improving pre- and post-transaction services, testing new products and reinforcing brand recognition. Innovative tourism actors have exploited this model quite successfully. There are several such travel communities now evident on the Web (e.g. Travelocity.com, Lonely Planet and Fodors.com) and some of them have been the subject of academic study. Hagel and Armstrong's (1997) early work discussed the case of Travelocity and the adoption of the virtual community as a business model. Weissmann (2005) and Stockdale and Borovicka (2006) studied how Lonely Planet succeeded to establish one of the most successful online travel communities. More recent works concentrate on Web 2.0 technologies. For instance, Schmallegger and Carson (2008) examined how Web 2.0 applications, and specifically the increasing number of travel blogs, might influence promotion, product distribution, communication, management and research by destination marketing organizations and tourism enterprises. Wenger (2008), analyzed blog contents to identify positive and negative perceptions of Austria as a tourism destination, and compared these with other research into Austria's destination image.

Another perspective builds on early works on communities of practice (Brown & Duguid, 1991; Lave & Wegner, 1991) and its subsequent alignment to knowledge management (Wenger & Snyder, 2000; Wenger et al., 2002) to advance a proposition for virtual communities of practice and the conditions under which they may be more or less conducive to success (Roberts, 2006). In tourism detailed studies of how virtual communities of practice are formed either intra- or inter-organizationally are lacking. This is surprising as vacations are known to have strong cultural connotations (Costa & Ferrone, 1995; Osti, Turner, & King, 2009) that could strengthen sense of community and foster communities of practice. Additionally, as suggested by Akoumianakis (2010b), detailed treatment of this type of social formation necessitates more involved insight into the notion of 'practice' community members become engaged in, beyond the current focus on interpersonal interactions.

2.5. Consolidation of findings

The literature review leads to the conclusion that cross-organizational collaboration entails a phenomenon which is subject to various connotations, theoretical footings and engineering conceptions. Clearly, the domain of application is an important factor determining not only the type of collaboration needed but also the overall setting i.e., the parties engaged, the means of collaborative engagement and the range of potential outcomes. In this vein, the available research suggests that virtual teams can be nurtured inter-organizationally, but does not detail the different configurations of characteristics that may be more or less conducive to success. Additionally, in most studies there is a tendency to examine such virtual teams in relation to established 'best-practice' technologies and packages such as ERPs, portals, online forums, and blogs, rather than assessing what technologies may be best suited for cross-functional virtual teams. These shortcomings make compelling the need for further research to establish more informative accounts of how virtual cross-organizational collaboration implicates and is implicated by technology-mediated distributed organizing.

3. Methodology

3.1. Research objectives

The present research rests on the assumption that cross-organizational collaboration is a multi-faceted phenomenon that raises social, organizational and technical considerations. Treatment of isolated aspects leads to partial understanding and biases either towards technology inscribed features – for example groupware, process specification languages and architectural styles – or the enacted capabilities shaping and re-shaping organizational life. In recent years, this polarization has failed to explain sufficiently certain intrinsic properties of cross-organizational virtual collaboration that form the research objectives of the present work:

- how can cross-functional and boundary-spanning virtual teams be nurtured inter-organizationally, particularly with external parties, so as to facilitate effective mobilization of knowledge and improved innovation capabilities; and
- can 'practice' provide the glue for recurrent co-engagement in cross-organizational virtual collaboration in the absence of pre-existent togetherness?

The conceptual lens to approach these objectives is grounded on framing cross-organizational collaboration through the intertwining of technology inscriptions (i.e., representations that qualify collaborative work, boundary artifacts and toolkits) and enactments (i.e., ambient affiliation, togetherness and enacted social formations). A case study is used to shed light on the conditions and the extent to which recurrent co-engagement in a shared practice can foster sustainable social cyber-formations in cross-organizational settings. Such a commitment distinguishes our work from earlier efforts since instead of attempting to identify reasons such as friendship, common interests, professional neighboring or cultural bindings leading people to online gatherings, our focus is on the virtual practices and the extent to which they foster sustainable communities in the absence of pre-existent togetherness. In the tourism sector, but also other service industries, this bares implications on how inter-organizational partnerships are established, on the conditions that enable or constrain distributed organizing of interrelated work practices across boundaries, and on the factors leading to success and innovation.

3.2. Research setting

Our case study is designed to assess possibilities of and impediments to cross-organization collaboration in building tourist vacation packages in a regional setting. Vacation packages of interest to the present work constitute a different type of offering from the typical vacation packages offered by tour operators and destination management companies. In effect, they are 'local' in-vacation arrangements lasting for a few days and being independent of the customers' pre-packaged travel plans. As such, they can be conceived as supplements to a chosen vacation plan since they offer

specialized and highly customizable local services to customers. In some cases and under certain conditions, they may also act as catalysts for choosing or stimulating demand for destination sites. Traditionally, vacation packages of this sort, are compiled by local travel agencies ad hoc to respond to predetermined events (i.e., Christmas period), seasonal or circumstantial incidents (i.e., concert or a cultural event). As a result, overheads are high and the returns may not always be as expected. Furthermore, prospective customers may be reluctant to consume as customizing parts of or the entire vacation package is not an option. Virtualization of the process of constructing vacation packages by setting up an appropriate information infrastructure to support an emergent knowledge process, multiple social worlds, online engagements and direct deliberations between peers, was conceived as a plausible intervention. The work was organized in three stages resulting in the system described in Akoumianakis (2010b). Subsequent refinements and extensions led to the version used for the present study.

Briefly, the first stage entailed an exploratory 6-month survey to define and represent existing work practices, technological capabilities and their implications, using a mixture of techniques. We surveyed established codes of practice and international and de facto standards, as published in the literature, documented a wide collection of vacation packages announced through various marketing channels (electronic and print) and inquired into organizational procedures of selected travel agencies through direct contact and interviews. This led to a rich data pool on current practices for developing vacation packages (i.e., workflows and activities), the objects/artifacts of practice (i.e., drawing boards, schedules, etc.) and the tools used either for communication (i.e., fax, e-mail) or community management (i.e., portals, reservation systems, customer relationship management systems).

In the second phase, scenario-based techniques such as essential use cases (Constantine & Lockwood, 2001), scenario inspection (Leite, Doorn, Hadad, & Kaplan, 2005) and scenario retooling (Erskine, Carter-Tod, & Burton, 1997) were recruited to allow envisioning of new improved practices as remedies for the current sub-optimal situation. The scenario-based design work was organized in cycles of essential use case formulation, scenario inspection to devise breakdowns and growth (or retooled) scenarios for envisioning. Rationale and informal argumentation were captured using dedicated tools (Akoumianakis, 2010a). These cycles enabled the consolidation of key workflows, the subsuming activities and how they are assigned to the lifecycle stages of the corresponding cross-organization virtual community of practice. The initial set of scenarios was extended in the part that entails use of mobile devices to facilitate the study reported in this paper. Such extensions turned out to be of critical importance as they expand the cycle of innovation to account for post-consumption experiences, whilst fostering special configurations of people, artifacts and social relations, referred to as ambient communities.

In the final phase, a new system was developed to support vacation package assembly as a distributed collective practice (Akoumianakis, 2010b). Fig. 1 depicts instances of the system in its early desktop version (left) and the subsequent mobile client extension (right). As noted in the mobile client new services were introduced for rating vacation legs, finding out who is around, what they are doing and what their impressions are.

3.3. Research design, data collection methods and analysis

Initial experimentation with the system revealed not only its capability to cope with a variety of alternative vacation arrangements, but also its suitability to investigate broader and more generic research issues, such as boundary spanning virtual collaboration and the implications of new virtual practices. This is due to certain features which are prominent in this system. Firstly, the system implements a vacation package assembly line on the grounds that new product offerings stem from the micro-negotiations of virtual ensembles of 'strangers' (cross-organization business partners and prospective customers) in a manner that adheres to the characteristics of emergent knowledge processes i.e., evolving requirements, unpredictable set of actors and deliberations that have no best structure. Secondly, a vacation package emerges in practice as a situated social accomplishment, thus an instance that co-exists with other instances of a vacation package family. Thirdly, vacation package families as codified abstract representations act as 'generators' of multiple outcomes each being progressively transformed to an alternative concrete arrangement. These features make the system capable of generating a variety of concrete packages i.e., technologies-in-use (Orlikowski, 2000) all valid within the scope of the family).

Having presented the appropriateness of the system for the present work, we now turn to the details of the case study. Our empirical data draws on experiments with a system with extended functionality that supports social bonding of customers in vacation using mobile terminals and forms the sequel to earlier efforts aiming to describe tools for distributed collective practicing (Akoumianakis, 2009, 2010b) and dynamic packaging of user-adapted vacation arrangements (Akoumianakis et al., 2011). Methods used for this purpose comprised virtual ethnographic assessments and interviews with alliance members.

3.3.1. Virtual ethnographic assessments

The term virtual ethnographic assessment implies use of specialized tools to track user exchanges so as to compile rich digital trace data. For the purpose of this case study, such tools were inscribed in the code as briefly explained below. Three virtual ethnographic assessments of different vacation packages were conducted in a period of 2 months and each was organized as participant/observer inquiry with the researcher taking the role of the moderator. The vacation packages were defined as instances of three distinct vacation package families, namely cruising vacation, conference vacation and cultural excursion, intended to provide alternative in-vacation arrangements for tourists visiting Crete for a period of time through some sort of pre-arranged travel plan (which is irrelevant to our study). The vacation package families were intentionally different to ensure engagement of different cross-functional teams comprising members from different sectors of a regional tourism industry.

Data were compiled as traces of actual use retained by the system (i.e., digital trace data). To this effect, a general classification scheme was devised to anchor the context of digital trace data by qualifying each activity in relation to its initiator, vacation package assembly workflow and timing. Table 1 summarizes this scheme in a partitioned narrative form presenting activities codified so as to leave a time-stamped context-specific digital trace (in a separate database) by calling a standard function 'trace ( )'. Time stamps are used to anchor the XML scripts of each digital trace retained and to assure that they are created within the appropriate time intervals. This constraint guarantees the validity of digital traces and allows for compilations of historical records of interrelated activities per vacation package workflow. It is important to note that no other system, function or tool was used to build the data set other than those inscribed into our system.

Once our initial data set was compiled, data reduction methods (Miles & Huberman, 1994) were employed to filter out 'traces' not relevant or of limited value to our aims and objectives. These occurred mainly in the initiation phase where each vacation package was negotiated within the alliance to determine constituent services. Through this process, certain types of data, such as those reflecting overseas and all-inclusive/single site vacation offerings,

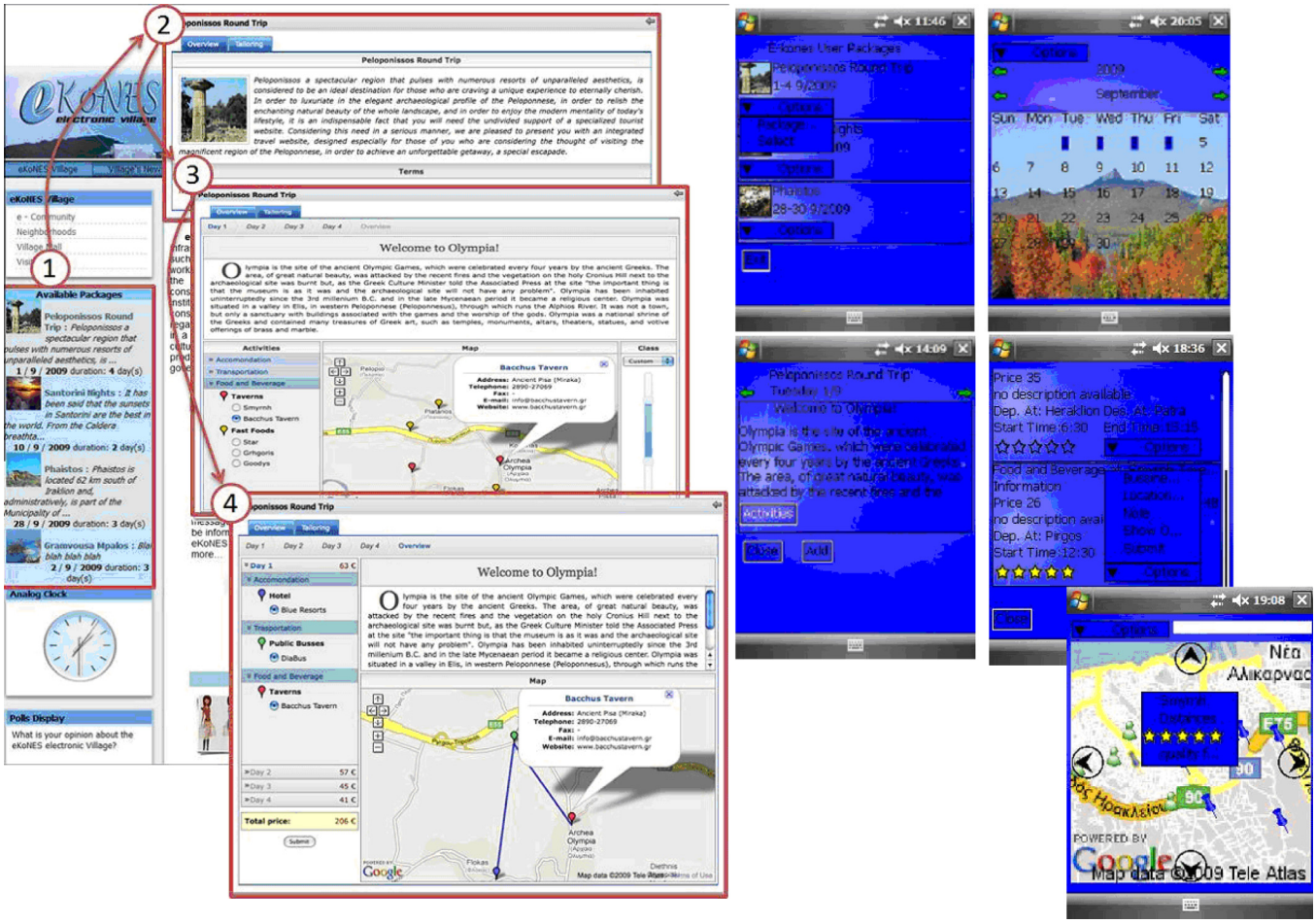

Fig. 1. The package in the tailoring phase (left) and in consumption (right).

were excluded since they are not representative of regional cross-organization collaboration. The remaining sample was screened using a coding scheme that classified each digital trace by stage in vacation package assembly. Four distinct stages were defined, namely 'development', 'prior to vacation', 'in-vacation' and 'post-vacation'. Such classification made it possible to further qualify digital traces per stages according to the underlying intention (see Table 2). Furthermore, it served the purpose of locating data items with similar or identical contents and disambiguating them by qualifying the context in which they occur. Such disambiguation turns out to be important for cross-checking responses of partners involved in more than one vacation arrangements and comparing their online behavior across vacation packages.

3.3.2. Interviews

Each virtual ethnographic study was followed by interviews with the members of the corresponding electronic squad. All interviews were conducted after the virtual ethnographic study and

Table 1
Digital trace data anchoring scheme.

	Moderator	Squad member	Villager
Initiation	2: Create package 3: Announce package 4: Invite participation	5: Confirm/reject invitation	1: Request service
Elaboration	7: Update model 8: Raise issue 10: Request offer/bit 13: Clarification of issues 14: Arrange synchronous session 15: Invite participants	6: Contribute to package 9: Respond to issues raised 11: Update parameters 12: Request clarification 16: Participate in session	
Deployment	17: Select/design template 18: Populate template 19: Request confirmation	20: Confirm/opt out	
Tailoring	21: Publish package 23: Process change requests 25: Compile instance of package 27: Notify all	24: Respond to changes 26: Accept/reject responsibility	22: Request change

took the form of semi-structured/individual interviews lasting from 15 to 40 min. Prior to each interview, the researcher had analyzed digital traces representing the interviewee's affiliated organization. In this manner, evidence which was anonymous could be commented and reflected upon by the affiliate's representative. The interviews had a standard format aiming to provide insights to the two principal constituents of vacation package assembly, namely community formation and practice management. In deriving the interview questions, we recalled the theoretical constructs presented in Section 2 (i.e., type of collaboration, ambient affiliation, boundary artifacts, togetherness and enacted social formations) and were guided by a practice-oriented interviewing technique (Akoumianakis & Alexandraki, 2012). Briefly, the technique distinguishes between pre-requisites for and outcomes of cross-organization collaboration. For our purposes, pre-requisites are features embedded in the vacation package assembly line such as user profiling mechanism, means for expressing opinion, contributing to packages, tools for depositing and sharing information, etc. As for outcomes, the focus has been on recurrent encounters leading to or constraining the formation of enacted social formations (i.e., cross-organizational virtual teams or electronic squads, cliques, thematic communities, etc.), the type of network connections facilitating them, as well as what is revealed by their codified collective outcome. Interview questions were also streamlined according to the evidence embedded in the digital traces, asking the interviewee to clarify statements and decisions (in light of the scheme in Table 2). At times, this turned out to be problematic as interviewees were not always the actual contributors of certain digital traces but another colleague.

In terms of sample, a total of 32 interviews were conducted and cross-checked against digital trace data by organizing thematic visits to participants' organizations. We succeeded to interview representatives of all participant organizations taking part in the ethnographic assessments (n = 11, 7 and 14 for the three packages respectively) covering various types of enterprises such as tour operators, travel agencies and service providers (i.e., business partners) committed to the three squads (irrespective of whether they were chosen by customers). No end user or customer interviews were conducted as this was not possible at the time. At times, end user involvement was simulated by the author to ensure continuity and consistency of activities across the desktop and mobile client of the system. However, this is not reflected in the present analysis. All interview transcripts were deemed as valid and thus analyzed. Analysis was largely based on grounded theory (Strauss & Corbin, 1998). Accordingly, open coding of the text data revealed general and recurrent themes such as:

(a) the different representations used to anchor specific activities or work phases;
(b) the presence or absence of physical referents (i.e., individuals, roles, organizations, etc.) explicitly stated or implied in the interview transcripts;
(c) thematic, technical, functional or social world boundaries established, crossed, re-located or alleviated as a result of collaboration as well as the artifacts through which boundary spanning is realized;
(d) type of connections referenced (i.e., pre-existent ties, neighboring, co-practicing, ad hoc and informal); and finally
(e) recurrent cyber-structure observed or implied (i.e., virtual team, squad formation, cross-sector clique, etc.).

Inductive and iterative coding was then used to extract relationships among these themes and to group lower-level themes into meaningful top-level categories such as type of collaboration, ambient affiliation, boundary artifacts, togetherness and enacted social formations. The final hierarchical template was tested and confirmed by two independent coders who were asked to code a sample of interview transcripts using the same scheme. Finally, each interviewee was asked to complete and return a questionnaire which had been circulated electronically prior to interviews. The questionnaire was a revised version of the IBM Usability Satisfaction Questionnaires (Lewis, 1995) aimed to collect the participants' subjective opinion on the tools usability.

4. Findings

In this section the focus is not so much on findings confirming earlier works, as it is on intrinsic properties of distributed organising and their implications on the social realities of the partners and the alliance as a whole. Thus, we will first summarize the quantitative data of the three experiments and then present a within-case assessment of the type of cross-organizational collaboration observed focusing on what may be deemed as enablers and obstacles.

4.1. Quantitative evidence

Table 3 provides a summary of quantitative data across the three scenarios and the host of the corresponding digital traces. As shown, all vacation packages were completed successfully, though in different time scales. In this context, successful completion of a vacation package implies 'automatic' assembly into an online resource available through the dedicated portlet of the portal. The variation in time taken to complete the packages is due to the different response rates of the corresponding squad members to the moderators' requests. All request-respond posts were asynchronous using the system's functions and no other communication means was implicated at any point in the process.

Table 2
Screening criteria.

	Screening criterion
Development Process	• Motivation for developing the package (e.g., past experience, expected or revealed demand, imposed by tour operator, etc.) • Enacted workflow involved and cross-organization negotiations • Choice of representation of vacation package • Ownership of and responsibility for vacation package • Dissemination & marketing channels (email, Blogs, Wikis, TV adverts, etc.)
Prior to vacation	• Flexibility in making a personalized choice (i.e., requesting specialized arrangements in a leg of the vacation package) • Options being negotiating (i.e., requesting discounts and supplementary services) • Transaction clearance (one stop versus multiple separate transactions)
In-vacation	• Changing arrangements while in-vacation • Expressing opinion on service quality • Meeting and socializing with peers in the same vacation package
Post-vacation	• Ranking of services and sharing of experience in external virtual settlements

Table 3
Summary of quantitative evidence.

Characteristics	Cruising vacation	Conference vacation	Cultural excursion	Source				
				●	†	○	∗	×
Mission outcome	Accomplished	Accomplished	Accomplished	✓				
Co-engagement duration	3 (days)	5 (days)	1 (day)		✓			
No. of neighborhoods	• Accommodation • Transportation • Food & beverage	• Conference • Accommodation • Transportation • Social event	• Accommodation • Transportation • Excursion			✓		
Starting squad size	12	7	14			✓		
Final squad size (after withdrawals)	11	7	14			✓		
Total number of requests (by moderator)	17	17	17				✓	
Total number of responses (by moderator)	8	15	7				✓	
Number of clarification requests (by members)	45	29	7				✓	
Members with no reply (other than opting out or expressing commitment)	1	2	0				✓	
Web site hits in a period of 1 month following the package deployment	25	78	150					✓

● Assembly portlet; † XML file of vacation package assembled; × Visitor log data; ○ Portal search engine/electronic neighborhood registration system; ∗ VPA toolkit message board.

The evidence presented in Table 3 reveals additional properties worth noting. Firstly, the three electronic squads were very stable from the start, with one member in the accommodation neighborhood opting out from the cruising package. The reason for this, as posted in the withdrawal request in the squad message board, was 'No vacancy available'. Secondly, the researcher's activities (as moderator) remained consistent across the virtual ethnographies amounting to 17 requests per case, spread throughout the vacation package assembly workflows (i.e., initiation, elaboration, deployment and tailoring). These were general announcements about the organization of collaborative work plans and notifications of vacation package state changes. Other contributions by the moderator represent clarifications to questions posed by individual members. Interestingly, some of these questions were frequently responded by other members of the squad, thus making the moderator's intervention redundant. The only package in which this was not observed is the cultural excursion package where the seven replies by members were all different and distinct corresponding to the moderator's requests. Thirdly, in terms of the members' input to compiling the three vacation packages, our data indicate fair contributions by all members of the corresponding squads. Here, it is worth noting that in the cruising and conference vacation packages were the two cases where we discovered partners with no replies (other than opting out or expressing commitment). As already stated in the cruising vacation, one partner opted out, leaving just this action as digital trace (see Table 3). In the conference vacation, two partners left no digital traces other than their commitment to the package. As discussed later, both partners with minimal contributions reported reservations about vacation package assembly and a 'negative' attitude to collaborating with strangers. The rationale of these partners and the reasons behind their behavior were untangled during the interviews.

4.2. Within-case assessment

As already stated, analysis of interview data combined with the coding scheme in Table 2 and the available digital traces revealed five recurrent themes (top-level categories) critical to cross-organizational collaboration. This section summarizes our findings and presents indicative evidence from interview transcripts.

4.2.1. Qualifying cross-organizational collaboration

One area in which disconnections with available scholarship (see for example Gulati, 1998) were very prominent relates to the conceptions of cross-organization collaboration reported by our subjects. Specifically, participants were requested to qualify the type of collaboration experienced in terms of type of participation (voluntary versus non-voluntary), scope of cooperation (exchange of goods, sharing knowledge, co-development of products or services) and strength of bonds established (weak/strong, symmetric/asymmetric). The overwhelming response representing the collective wisdom of the participants is summarized as follows: '*cross-organizational collaboration entails voluntary cooperation between an unpredictable set of actors/firms who are brought together by weak and asymmetric connections established using a computer-mediated environment*'. Key qualifiers in this definition were elaborated though follow-up questions. This, voluntary cooperation was justified by statements such as:

> 'The decision to join the squad and contribute was entirely mine – there was nothing in the process that made my participation obligatory'

In the cruising vacation scenario, where one partner opted out, the explanation presented in the digital trace of the withdrawal request (i.e., 'No vacancy available') was further qualified during the interview as follows:

> 'I never considered that withdrawing would create negative connotation to partners or influence our organisation's future participation in other agendas'

With regards to the unpredictable set of actors involved in vacation packages, something which is evidenced by counting the different actors creating digital traces, respondents offered several different interpretations:

> 'I was aware of my neighbours (i.e., partners in the same service category) and peers in other neighbourhoods but I could never tell who is going to be ultimately implicated until customers decide on the specific arrangements'
> 'Our squad did not change during the experiment, but this does not imply that next time it will remain the same; there could be other partners who simply did not commit resources to this package for their own reasons'
> 'In my account, the important decision is to be part of the game, not who else may be committing resources; after all the decision is with the customer'

Turning into the connections established, all respondents confirmed weak and asymmetric connections. A connection is deemed as weak when there is no guarantee or provision that it will be sustained in the future. The overwhelming remark was that:

> 'Connections represent temporal configurations to be rearranged and effected by customers' choices rather than the partners' will'

'There is no way that a particular choice of accommodation has reciprocal influence on a choice of food and beverage'

4.2.2. Ambient affiliations

In trying to further assess network connections, how they are brought about and what makes them recurrent, participants were asked to reflect on their perception of others within and across practice agendas. In all cases, we observed reservations of partners to assess what other do in a squad. These reservations were emphatically stated by remarks such as the following:

'I am not familiar with the way they run their business and therefore it is not fair for me to assess or comment ...'
'It is not easy to say because one never knows who is representing the organization; for me this is important and reveals level of commitment'
'We have never in the past done any business with them'

The ambient affiliation of partners came out very strongly when we attempted to assess the participants' conception of the collaborating partners in terms of physical referents. All respondents confirmed that

'... there is no way to discern the individual who may be contributing on behalf of a partner; it may be a single person or several people.'
'All contributions in the virtual space are associated to the organization rather than a specific individual'

It was also interesting to note that such an ambient affiliation was regarded by participants as inscribed into the technology:

'There is a strong feeling of anonymity in all interactions and communication acts using the system. It seems that interacting parties are not individuals but enterprises'

Further analysis aimed to discern implications of ambient affiliation on the distributed practices of collaborators. Of particular interest are the findings related to how members of online squads appear to cope with 'strangers' and unknown contexts of work. We found that co-engagement in vacation package assembly did not appear to be hindered by the fact that partners are different organizations with non-uniform cultural value systems and material environments. Most participants responded that:

'... [We] don't mind collaborating with strangers as long as their undertakings do not interfere with ours and as long as they meet the commitments made'
'... a neighbour's work does not interfere with mine and this is a good think'
'... [We] could see no strong dependency links between my work and that of others; it seems that we all stand to benefit from cooperating'

However, in the conference vacation package, two partners reported reservations about working with strangers to such an extent that it influenced their contribution to the package. The explanations given during interviews are the following:

'[We] are very concerned with 'collective artefacts' and 'collective ownership of virtual assets' as we cannot control the operational details of the final services to ensure certain quality standards'.
'At present, vacation package assembly is seen as a complementary line of business to what is already established in our organization. ..We could easily adopt this model to re-organize our established business allies, but not to foster new alliances with people we do not know.'

It turns out that the partners expressing these reservations represent competitive multi-function vacation establishments offering services in all neighborhoods of the designated package. Moreover, due to their pre-established networking patterns with co-partners they appear to prefer adoption of technical solutions such as the vacation package assembly for reinforcing business liaisons rather than appropriating the value of networking with strangers.

The above confirm that in cross-organizational settings virtual groups are not so much concerned with socio-emotional attitudes or the individual members' work practices as they are concerned with the process of organizing (and making sense of) the distributed work itself. Obviously, there are different pre-conceptions of quality and risks associated with 'strangers' which may influence the partners' willingness to collaborate. More importantly, however, these responses suggest an ambient affiliation of participants in the sense that users may not have interacted directly and likely do not know each other, and may not interact again. Thus, co-engagement amounts to affiliating with a virtually co-present and impermanent community and by bonding around a shared agenda or a joint venture that evolves in practice.

4.2.3. Co-engagements with boundary objects

Inspired by the concept of ambient affiliation, we sought to assess its implications on practice-specific properties and the means through which distributed organizing is attained. This necessitated a focus into intrinsic properties of the shared practice, the way in which it is anchored and reified through artefacts, but also the way the shared and boundary is transformed into the 'local' realities of different organizations. The questions posed to participants covered specific artefacts assumed by vacation package assembly such as elastic buttons, tailorable activity panels, flexible templates and other technicalities described elsewhere (Akoumianakis, 2010b). Furthermore, participants were asked to scrutinize each of those artefacts from an affordance perspective requesting them to comment on how each artefact enables or constrains online discourse i.e., the extent to which designated artefacts afford making sense of a collective agenda, understanding what others are doing, affiliation with others following or adopting similar courses of action, etc. Participants across all three cases confirmed that they could immediately identify themselves (as representatives of their organizations) with the meaning of artefacts of practice. Representative remarks are as follows:

'... by reviewing the activity panel of a vacation package I could immediately identify its category (i.e., cruising package, conference vacation, cultural excursion) and my contribution in its accomplishment'

'... such meaning does not result from the communications facilities available, but it resides solely with the artefacts that constitute the vacation package assembly i.e., the elastic buttons and the tailorable activity panels'

'... these artefacts act as social proxies of collaborative engagements; they do not only unpack the package in terms of structure, service categories and temporal arrangements, but also convey third-party intentions in each category or service neighborhood. In this account they serve the purpose of structuring unknown contexts and/or actions and assigning them with meaning'

As these responses come from representatives of different social worlds who have worked with same artifacts, they point to a boundary function of these artifacts in the sense of Star and Griesemer (1989). Within this category, one response ascribed a particular connotation to boundary objects in cross-organizational settings emphasizing the cultural context of collaboration:

'... elastic buttons and tailorable activity panels serve to anchor the virtual practice of vacation package assembly and to make its intermediate and final results tangible by enabling implicit mapping of abstract reality to concrete localities of individual partners and prospective customers. In so doing, tailorable activity panels are useful not only for summarizing vacation packages but also for clarifying boundaries (i.e., neighbourhoods involved) and reinforcing the identity of members of the supporting communities of practice'

The response was not intended to undermine the role of organizational settings, which are known to influence sense making (Weick, 2001). Rather, it points certain conditions where boundary artefacts are mostly beneficial. This is when artefacts through their cultural binding, not only foster making of sense of the shared information space, but also afford translation of what happens online to the 'local' socio-material realities across organizational boundaries. This is farther confirmed by the statement:

'...[the vacation package assembly] is orthogonal to how different partners organize and conduct business; this is achieved by using symbols or signs and social proxies to convey intentions in the virtual setting, while locally we all remain autonomous'

As for the socio-material properties of vacation package assembly, participants concluded that:

'the remains of the electronic squads comprise on the one hand 'packaged' information-based artefacts codified in popular formats (i.e., XML), and on the other hand, the dynamics of collaboration giving rise to these artefacts. Notably, the former type can be easily reconstructed using tools of the current technological paradigm (i.e., browsers), while the former type remains bytes of code until such time that it is reconstructed using only the practice toolkit through which it was initially constructed.'

In line with this, it was also noticed that decoding the tailoring requests for a vacation package reveals patterns in the end user communities, which may provide useful insight to end user preferences, purchasing behavior and consumption patterns:

'In our case, vacation packages were significant as a learning resource; specifically, they communicate to participants what is important, what appears to be popular amongst user communities, what seems to work well and what turns out to be problematic'

4.2.4. Togetherness through co-engagement in linguistic domains

Turning to the issue of togetherness, respondents refrained from making explicit statements about community, shared interests or common values. On the contrary, it was evident that pre-existent sense of togetherness was absent. Instead, participants referred to togetherness as an 'emergent social accomplishment' which is enacted in practice and through the recurrent co-practicing and co-engagement with artefacts that convey an agenda using 'linguistic codes' and 'cultural markers'. The term 'linguistic codes' was proposed by one participant in the conference vacation package:

'My overall experience with the system resembles a 5-day discussion between seven partners (this is the number of squad members in this package) in a strange language which is sign-based and these signs act as linguistic codes designating service offerings and options, duration, temporal arrangements, cost, etc. All of these codes are inscribed in technology through arti-factual properties such as colour.'

On the other hand, the term 'cultural markers' is used to summarize responses of participants that qualify vacation packages as cultural artefacts:

'Vacation packages embody cultural choices such as type of vacation undertaken, origin and cultural background of the consumer, involvement with travelling, perceived risks of taking the holiday or undertaking a particular activity, knowledge about the destination, time available for selecting and planning the holiday or a determined activity, cost of the holiday or activity, difference between the possible holidays or activity to choose from, and involvement with the destination or a certain activity, as for example a particular sport or cultural activity, etc.

'... choice of vacation package is strongly influenced by the way prospective tourists perceive their hosts and their culture. It seems that sometimes, previous established ideas and stereotypes, prevalent views on economic stability, safety and accessibility act as blinkers that determine tourists' choice of destination'

'... choice of vacations reveals cultural identity in so far as it entails conscious decisions on specific type of packages (such as urban, green tourism, cruising vacation, short-break vacation, etc.), which may be further qualified by individualized travel plans'

'... culture may also govern the type of service requested and consumed irrespective of destination decisions'

Combining the above, it stands to argue that vacation package assembly represents a linguistic domain (in the sense of Maturana & Varela, 1992) in which togetherness is brought about by members' co-engagement with cultural artefacts that form the basic vocabulary of the linguistic domain. It is therefore important for information-based vacation packages, such as those considered in our study, to exhibit the flexibility and plasticity required to allow customers to request and negotiate personalized arrangements and individualized package instances. Notably, such as linguistic domain is expanded as customers become engaged in micro-negotiations of service offerings. It is precisely the ability to support such micro-negotiations between members of the alliance as well as between customers and the alliance that acts as the primary incentive for both, recurrent participation in squads across different vacation package agendas and repeated customer requests for different vacation arrangements.

4.2.5. Enacted cyber-formations

The final set of questions aimed to address what emerges through cross-organizational collaboration. Here again the responses were very interesting and somewhat unexpected. In summary, three types of distinct social structures were reported as emergent through recurrent engagement in vacation package assembly, all attributed to customer choices: (a) 'hidden' communities resulting from similarities in customers' requests and decisions, (b) cross-sector 'cliques' between partners undertaking recurrently to commit resources across vacation packages and (c) 'virtual' gatherings in networking sites such as Myspace or Facebook to reflect on post vacation materials (i.e., sharing photographs, videos and positive or negative experiences). Interestingly, none of these emergent social structures our foreseen or design in our system. We can therefore conclude that in our case, enactment brings about a variety of network relations between the involved actors, which cannot be conceived as embodied in the practice toolkit. Rather, these network relations emerge through recurrent interaction patterns between actors engaging in deliberations with the intention to shape and deliver a product offering that meets designated requirements. In this endeavor, members expose own capacities to the entire squad, negotiate intrinsic properties of the final product and disclose responsibilities they are willing to undertake. As customers become involved, enactment surfaces additional network relations revealed through

implicit formation of 'cliques' within the squad and/or 'hidden' communities amongst customers. Both result from the actors' history of co-engagement in socio-material practices of vacation package assembly and imply a degree of social connectivity, which however, cannot be attributed to designated inscriptions in the technology.

From the above it follows that a vacation package is assembled dynamically as a collective offering by appropriating tools of the community-based toolkit, but there is no way to foresee how it is going to be used, shaped or implicated in practice. As a result, it is possible that contributors of a certain profile (i.e., service type, location, price range, etc.) although registered and eligible, never get selected due to various reasons. Consequently, despite the fact that the vacation package, at least initially, is the result of appropriating structures inscribed in technology (i.e., assembly components), it progressively becomes a technology-in-practice, enacting a variety of network relations not foreseen or prescribed in technology. In fact, each vacation package may lead to several such technologies-in-practice, each representing a particular configuration of end users/customers, alliance members and network relations.

5. Discussion

One of the most intriguing findings of our case study relates to the frequently ambient affiliation of partners in cross-organizational virtual alliances, which in the absence of pre-existent social ties, makes practice the glue that brings together different configurations of people, artifacts and social relations. The importance of this finding can be traced in the implications it bares upon the theoretical and engineering underpinnings of boundary spanning cyber-formations. Specifically, it suggests that in virtual settings social formations emerge not only as a result of pre-existent togetherness that is simply enacted through a new (social) medium, but also as a result of remediated practices that progressively lead ambient affiliates to establish social bonds and sense of community. Then, the systems designed to facilitate such bonding need to cater for the specificities of practice and the means through which it is manifested, shared, re-constructed and extended on line. In what follows, these implications are briefly discussed and critically appraised in the light of current and on-going theoretical debates about the constitution of online communities, the means for establishing social bonds in cross-organizational settings and the tools facilitating community cultivation.

5.1. Ambient communities and the 'practice – community' debate

Gherardi (2009, p. 121) states the essence of this debate by posing the question '... is it community that constitutes the container of knowledge ... since communities pre-exist their activities or is it the activities themselves that generate a community .... as they form the 'glue' which holds together a configuration of people, artefacts and social relations'. It is hard to imagine ambient communities of the sort discussed in this paper emerging as a result of pre-existent togetherness between the members. The ambient affiliation of the members does not allow for prior arrangements that would constitute any form togetherness. Consequently, ambient communities emerge in practice and as result of recurrent co-engagement of ambient affiliates in joint agendas. Our results show that such agendas may be formed around practice-oriented domains (such as tourism vacations) by recruiting appropriate linguistic vocabularies (i.e., representations of domain-specific objects and artefacts) that foster practice-specific interaction and collaborative exchanges between partners of an online ensemble so as to transform abstract and temporarily unknown vacation contexts to concrete arrangements. The 'linguistic' nature of these vocabularies surfaces as learnable communicative patterns bound to designated cultural artefacts whose intrinsic properties are constituted by their boundary role (in the sense of Star & Griesemer, 1989) and their capability to span boundaries – both thematic (i.e., neighborhood) and organizational (i.e., physical contexts of affiliated partners) – until they become embedded in the material realities of partners. Then, through recurrent co-engagement in such linguistic vocabularies, partners with ambient affiliation attain togetherness and social accomplishments from which they stand to benefit. Nevertheless, these communities, through the ambient affiliation of their members, constitute a separate cyberspace specimen which in not always comparable to conventional virtual communities.

5.2. Ambient communities and user toolkits for innovation

Can ambient communities be formed with user toolkits for innovation? Our current assessment is that user toolkits as proposed in the relevant literature do not scale up to meet the conditions for ambient communities. Firstly, toolkits are insufficient to service cross-organizational settings and inter-organizational virtual communities of practice. Indeed, all examples and showcases found in the literature explore the use of toolkits as marketing instruments within a single organization offering cost effective access to consumer requirements and/or preferences. Perhaps the only exception, depicting an alternate use of toolkits in cross-organization or boundary spanning domains of practice, is free and open source software development. However, even in this domain the toolkit is not aimed at streamlining cross-organizational practice but rather it provides a medium for appropriating the benefit of reuse and open access. Secondly, toolkits were conceived and theorized as tools for user-driven innovation. It stands to argue that ambient communities are in themselves a kind of settlement for innovation, thus a meta-toolkit through which ambient affiliates deposit and negotiate knowledge. Thirdly, toolkits support a weak notion of plasticity. In other words, although the object of design needs to be communicated to the end user so that s/he can articulate proposals, the way this is done is fixed and recognizable by those knowledgeable of the fabrics of the design artifacts. With ambient communities the object of design should be presented in such a way so as to serve as boundary artifact having different meanings in different social worlds but common enough structure to make it recognizable across the different social worlds. Finally, user toolkits for innovation serve as the interface between innovative end users and the design organization, without however exposing the design knowledge and processes to the users. This conception contrast ambient communities as the latter provide the 'interface' for making sense of the virtual space defined by the network and inhabited by ambient affiliates.

5.3. Implications

The present research confirms earlier works claiming that virtual teams can be nurtured inter-organizationally, but within a particular context, different configurations of characteristics may be more or less conducive to success (Roberts, 2006). Our study concentrates on a highly fragmented reality such as the tourism industry and suggests that technologies fostering online collaboration and virtual partnerships need to exhibit *flexible routines* to accommodate the variety of service offerings by different partners and *plasticity in use* so as to enable their assemblage into aggregate product lines. Our findings raise several implications for travel agents and regional travel communities.

Firstly, the technological setting of virtual partnerships should be designed to span the boundaries of the local information

systems employed by partners. This necessitates a departure from the tradition of adopting a 'best-practice' solution in favor of a commitment towards common information spaces as boundary artifacts. This approach points to a perspective on distributed organizing which is grounded on architecting plasticity. At core, such a perspective relies on identifying appropriate boundary artifacts meaningful to different social worlds and devising virtual practices to coordinate work on, with and through such artifacts across boundaries.

Secondly, virtual cross-organizational partnerships constitute an emergent cyber-structure enacted in practice through the recurrent co-engagement of partners in a designated linguistic domain. In virtual settings, such linguistic domains are disclosed through an appropriate interactive vocabulary, flexible processes and shared artifacts. Available scholarship confirms that in the tourism industry, vacation packages, interactive maps, flexible schedules, interactive guides and cultural objects can act as boundary artifacts affording the construction of novel linguistic vocabularies for new virtual collaboration practices (Akoumianakis, 2010b; Osti et al., 2009; Sigala, 2012). By designing and adopting such practices travel agents and institutions stand to gain multiple benefits, both tacit and tangible. Tacit benefits may be experienced by members as new competence and improvements in both products and processes. Tangible results are typically codified as new products of high added-value resulting from the fact that none of the individual members can, by themselves, build and offer the product effectively and efficiently. Moreover, as these products are assembled within the scope of a product family, they are easily customizable to address diverse customer requirements, thus broadening the range of potential beneficiaries.

Thirdly, it is important to emphasize that irrespective of the chosen technology mix, sustainable partnerships depend on cultural and organizational affordances. The increasingly ambient affiliation of partners, the unforeseeable role of customers and the variety of evolving requirements and alternative product offerings necessitate a cultural fit between the partners and dynamic capabilities to effectively re-establish the partnership with each new agenda and re-confirm organizational ties and connectivity. Such organizational affordances need to be reflected not only in the underlying technology set up, but also in the cultural frame of the partners. As already pointed out, in the absence of shared cultural values certain enacted behaviors (i.e., cliques) may hinder the alliance. Consequently, it is not only important to establish clear norms for engagement, but also to moderate online behavior to assure fairness.

Fourthly, virtual partnerships should not limit their online presence to the strict boundaries of a technical setting. Rather, they should strive to appropriate alternative social media as well as gathering business intelligence which will increase their visibility and make them more responsive to end user demand. These targets can be attained by maintaining online presence across multiple sites and appropriating sharing widgets to make use of user-generated contents. Notwithstanding the technical challenges, it is also evident that social, cultural and organizational factors are likely to determine the quality of the partnership. Consequently, non-functional considerations such as trust, reliability, loyalty, response times, networking patterns and regional norms are likely to influence actual and perceived quality.

Finally, the present work suggests that there is added value to be gained from a more targeted and involved consideration of the artifacts embedded in technology, their information processing properties, the manipulative actions they invite and the traces these actions leave behind. In turn, non-functional qualities (or design affordances) become primary design targets both at the level of artefacts as well as the computer-mediated environment. It is also claimed that it is the presence or absence of certain design affordances such as abstraction, social translucence and plasticity that make these artefacts flexible, intelligible across social worlds and capable of boundary negotiations. In a similar vein, the environment's capability to retain use, acting as data collector amongst other things, necessitates provisions for traceability and interoperability. Collectively these features enable collaborative technologies to acquire a material agency that shapes the options presented to users and leads to dynamic socio-material assemblages. More importantly, they allow research inquiries that ascribe meaning to otherwise banal activities such as keystroke level tasks and activity logs, thus guiding the analysis of interpretive case studies.

5.4. Limitations and future research

Limitations in a study often point to avenues for future research and in this regard, our study is no exception. Specifically, the present work derives its empirical baseline from techniques relying on digital trace data and interview-based qualitative findings. Although these provide a useful mix of quantitative and qualitative methods allowing us to anchor cross-organizational virtual collaboration to constructs such as boundary artifacts, togetherness in practice, ambient affiliation and type of enacted social cyber-formations, they do not suffice to qualify the constructs themselves. Consequently, further work is needed to gain better insight on the mechanics of ambient affiliation in different settings, the way in which different social practices enable or constraint distributed organizing and the implications these have on computer-mediated boundary spanning collaboration. Secondly, the study is grounded on data covering three vacation packages and 35 interviews. At first glance this may seem a limitation which can be addressed through future within-case assessments and more interviews. Nevertheless, as these should rely on the version of the tools used in this study, we should not expect substantial variations in the findings unless targeted to another regional setting or vacation package family. This is a valid course for future work which is currently being pursued. Finally, studies of occupational settings beyond the tourism sector, and indeed different virtual settlements such as social networking services, are likely to add to the findings of the present work.

6. Concluding remark

In this paper we have been concerned with a particular type of collaborative activities targeted to new product/service development in an information-based industry. Our approach deviates from prior research in the sense that we did not seek to assess the implications of an established 'best-practice' package, such as ERPs, intranets or other types of collaboration technology, across organizational settings and practices. Nor did we try to test a specific model for e-collaboration such as business-sponsored online communities or e-intermediaries. Instead, our intention has been to remediate a practice and assess the extent to which it creates new momentum for virtual alliances amongst ambient affiliates in a regional tourism industry. It turns out that the fabrics of such collaboration are different from those encountered in traditional inter-organizational settings such as supply-chains, virtual networks and partnerships. Specifically, whereas supply chains and virtual partnerships reply primarily on the adoption of a standard or a specific technical solution that inscribes how a practice is to be instituted, in virtual alliances that emerge in practice collaboration is more of an enacted social accomplishment that is attained through recurrent co-engagement in a designated practice through 'linguistic' vocabularies that bridge across the boundary (shared) and local settings of collaborators. Through this lens, it is possible

to re-conceptualize many recent research developments that exploit new media to foster novel social formations in cyber-space (for instance user toolkits for innovation, social networking services and social games) as incremental steps in the direction of a 'practice turn' that shifts the focus away from a pre-conceived ideology of online communities towards an more dynamic and emergent perspective of social and material (i.e., technological) entanglements that under certain conditions may grow to develop their own collective agency. Our case study reflects this turn by illustrating how a remediated practice, namely vacation package assembly, may foster and facilitate social bonding of ambient affiliates.

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