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Building ‘Flexible’ vacation packages using collaborative assembly toolkits and dynamic packaging: The Case Study of the eKoNES

Demosthenes Akoumianakis, Nikolas Vidakis, Anargyros Akrivos, Giannis Milolidakis, Dimitrios Kotsalis and George Vellis
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The paper motivates and presents an approach for assembling innovative information-based products and services by virtual cross-organization communities of practice. Using a case study on assembling vacation packages, we describe the cross-organizational virtual partnership, the mechanics allowing it to operate as a virtual community of practice and how collective intelligence of the members is appropriated to ensemble innovative information-based products for tourists. The results provide useful insights into innovating through virtual networking as well as the ICT tools that may be used to foster value-creating networks of practice in boundary spanning domains.

Keywords
collaborative assembly toolkits, dynamic packaging, vacation packages, virtual ethnography

Introduction
Recently, a wide range of technologies have given rise to new business models, such as e-shop, e-mail, e-auction, e-procurement, e-marketplace, e-communities, e-brokers and other commerce-support e-intermediaries (Timmers, 1998), which increasingly catalyze information-based industries. In the majority of the cases, the distinction between these new virtualities is drawn around functional rather than technological characteristics. Moreover, although frequently non-homogeneous and seemingly different, these efforts establish a new context for electronic commerce and practice as they implicate a variety of issues, such as global marketing, 24/7 operations, quick responses, competitive pricing, interactive search and navigation facilities, personalized and customized services, push and pull marketing mechanisms, etc. Inevitably, the travel and tourism industries have also faced new challenges that pushed them to adopt more innovative internet-based strategies and technologies (Connell and Reynolds, 1999; Hjalager, 2002; Palmer and McCole, 2000; Stockdale and Borovicka, 2006; Walsh and Gwinner, 2009; Werthner and Ricci, 2004; Yu, 2002).

One trend standing out very promptly builds on the concept of communities of practice (Wenger and Snyder, 2000) and seeks to provide unified collaborative spaces and information infrastructures for distributed collective practices (Turner et al., 2006). The present work investigates how these efforts can provide new opportunities for

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assembling and marketing regional vacation packages by cross-organization virtual communities of practice. Such vacation packages are ‘plastic’ information-based (intangible) products whose competitive advantage results primarily from their flexibility and increased capacity to cope with heterogeneous user demand. To this end, they exhibit distinct and characteristic properties. First, they have a ‘local’ character in the sense that they are regionally bound and can be assembled and offered by locals. Second, they tend to have short life cycles (i.e., a few days). Third, they are targeted to specific customer groups (i.e., visitors of a specific destination within a particular age group). Finally, such packages are orthogonal to other services (i.e., tourist destination packages) offered by established mainstream tourism actors. The rationale for creating such services is often based on purely circumstantial factors depending on foreseen or unforeseen events taking place in the wider social environment. Consequently, assembling and packaging such services (on-demand) yields added-value for all parties concerned including the end user. A necessary precondition for effective and efficient compilation of such services is that they need to be dynamically created through the collaboration between members who appreciate the value of virtual networking, participation and collaboration in virtual community settings. In turn, such services are owned by the coalition for as long as the service is offered. Nevertheless, participation in the coalition is discretionary.

The focus of this paper is to demonstrate a design case in which collective intelligence of a boundary spanning alliance of regional tourism service providers is codified to support distributed collective practices for assembling families of vacation packages for tourists. This is achieved by elaborating on a case study conducted recently in the frame of a collaborative R&D project. The project is currently in its pilot phase where basic concepts have been formed and evaluated and an operational system is available (http://www.e-kones.teiher.gr). The approach followed to build the system is rooted in the design science paradigm for information systems research (Hevner et al., 2004). The underlying premise is to provide a novel virtual practice of vacation package assembly fostering virtualization of the operations of boundary-spanning alliances (Akoumianakis, 2009). It turns out that the innovative character of the products assembled through this practice is due not only to the way in which they are compiled (i.e., factory-based assembly line), but also to their plasticity which allows them to exhibit both locality and boundary function.

The rest of the paper is structured as follows. The next section motivates the problem at hand, develops the required theoretical lens and identifies key challenges and focus of the present work. The following section describes the research setting and key findings of a case study on collaborative assembly of vacation packages in the tourism sector. The paper is wrapped up with a summary of key contributions and some concluding remarks.

Related work and theoretical base

Trends in the tourism sector

Tourism is a networked industry containing a set of interrelated businesses such as travel companies, accommodation facilities, catering enterprises, tour operators, travel agents, providers of recreation and leisure facilities, to name a few. It represents a highly fragmented reality with a large number of actors – with different culture and background – operating according to different business models. Accordingly, there are a variety of information systems, keeping their services and data in different formats, thus creating an interoperability gap across actors and services. In the past, there have been various initiatives aiming to bridge this gap by enhancing cooperation. One path explores solutions based on standards and common interchange formats (i.e., United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport – Travel Tourism & Leisure, the Hospitality Industry Technology Integration Standards – HITIS, omnis-online, International Air Transport Association – IATA, Travel Technology Initiative – TTI). More recent efforts explore emerging technologies driving the evolution to social semantic web (Antoniou et al., 2005; Dell’Erba et al., 2005). These trends progressively transform tourism from a leading application in B2C e-commerce into an information business (Rayman Bacchus and Molina, 2001).

Vacation packages are a typical example of such an information-based product. Since customers (i.e. tourists), in the vast majority of cases, are not able to test the product in advance, available information is likely to catalyze purchasing behavior. Consequently, customers’
improved capacity for searching for information, in combination with new practices (i.e., online socializing, blogging and social networking) and changing habits (i.e., customers increasingly prefer to compile their own packages) push tourism service providers to explore new business models for improved quality of services. The above have stimulated a variety of developments leading to new technologies as well as novel e-business models.

Dynamic packaging technology (Cardoso and Lange, 2007) helps online travel customers to build and book vacation packages by bundling trip components. The range of products and services to be bundled varies widely from guided tours, entertainment, social events, shopping activities, accommodation, transportation, food and beverage, etc. The basic idea of dynamic packaging solutions is to allow customers to put together elements of vacation so as to assemble the mostly preferred package, given the customer’s requirements and preferences. Traditionally, packages of this type are put together by tour operators. New technology offers a more engaging and interactive medium for assembling a customizable reservation. Through component assembly lines, individual services are handled seamlessly as one transaction requiring a single payment from the consumer. Nevertheless, dynamic packaging may also constrain customers’ choices as options and prices are always based on current availability of subsuming services. Despite its early promises, dynamic packaging tends to offer a solution to the interoperability challenge, rather than an economically feasible business model. Specifically, as currently practiced, dynamic packaging amounts to interfacing across various systems, allowing interoperability of decentralized, autonomous, and heterogeneous tourism information systems (Cardoso and Lange, 2007). Although success stories have been reported in the relevant literature, the whole concept seems to fall short from the intended target of catalyzing customized package development.

Ontologies, web services and Service-oriented architectures (SOA) are critical to dynamic packaging engines, although they represent alternative philosophies. Ontologies are important because they provide a shared and common understanding of tourism data and services, allowing interoperability and integration of information systems (Feilmayr et al., 2009). In recent years a variety of efforts have been devoted to attaining some sort of harmonization using tourism ontologies. The Harmonise project (http://www.harmonise.org) is an EU Tourism Harmonisation Network promoting an ontology-based mediation and harmonization tool for establishing bridges between existing and emerging online marketplaces (Fodor and Werthner, 2004). The approach followed allows participating tourism organizations to keep their proprietary data format and use ontology mediation while exchanging information (Missikoff et al., 2003). In the Satine project, a secure semantic-based interoperability framework was developed for exploiting web service platforms in conjunction with P2P networks in the tourist industry (Dogac et al., 2004). Semantic Web methodologies and tools for intra-European sustainable tourism were also developed in the Hi-Touch project (Hi-Touch Working Group, 2003). A common characteristic across these projects is the availability of tools to store and structure knowledge on customers’ expectations and tourism products.

Ontology-based approaches are often contrasted with service-oriented architectures (SOA). The argument is that whereas the ontology enforces a common global view upon content and its interoperability, the SOA approach does not enforce a global view, but rather it makes use of web services and languages (i.e., WSDL, SOAP, etc) to provide an environment for dynamic discovery and use of loosely independent component services (Najdawi, 2009). Services in SOA represent coarsely-grained expertise from an application (business) domain. In many cases, the two technologies are used synergistically (Tsai et al., 2007) with ontology engineering complementing service discovery and management in a SOA. For instance, considering composition from a software-architecture standpoint, a common ontology enables the identification of the common characteristics of services that fall into a particular category. These characteristics affect the architecture and design of the SOA-based solution from the individual service level up to the entire composite-application. Categorization supports compositability by clarifying the roles of the different components, thus helping reason about component interrelationships. Categorization also assists with the discoverability of services (for example, searching for existing services by using a service repository), which can further promote reuse.

Another important trend, catalyzing several industries including travel and tourism, is the business-sponsored online community model
Tourism actors have exploited online tourism communities quite successfully. There are several such travel communities now evident on the web (e.g. Travelocity.com, Lonely Planet and Fodors.com) and few studies examining their underlying model and philosophy. Specifically, Hagel (1999) used the online travel community developed by Travelocity to illustrate his arguments for the adoption of the virtual community as a business model. Stockdale and Borovicka (2006) studied the adoption of this model by Lonely Planet to establish one of the most successful online travel communities.

### Theoretical development

The present work utilizes concepts and themes described above, but in terms of basic ground, it follows an alternative research path. Specifically, it explores innovative information-based product development by a cross-organization virtual tourism alliance. The design of the alliance and the process through which new vacation packages are assembled is a representative case of distributed collective practicing (Turner et al., 2006). The theoretical footings of the work build on two prominent concepts, namely virtual communities of practice and innovation management in community settings. The former brings to the forefront long-standing debates on what are communities of practice, the intrinsic of their function online, as well as the more recent issue of appropriating suitable information infrastructures and tools. The latter, is a more recent challenge approached mainly by management scholars interested in the fabrics of knowledge management and user-driven innovation in community settings. This section attempts a brief but representative review of these two concepts to set the focus of the present research and motivate the subsequent discussion on innovative information-based product development in cross-organizational virtual communities of practice.

In the original formulation of the concept, communities of practice (CoP) were introduced as a practice-oriented theory of learning (Brown and Duguid, 1991; Lave and Wenger, 1991). In subsequent efforts, the focus increasingly shifts from learning to social construction of knowledge and knowledge management (Brown and Duguid, 2000; Kimble and Hildreth, 2005; Wenger et al., 2002; Wenger and Snyder, 2000). In this vein, another active area of research considers the catalytic implications of innovative information technologies on the virtualization of the operations of communities of practice. Advocates of this perspective frequently stand critically against the CoP concept and formulate proposals for networks of practice (Brown and Duguid, 2000), knowledge communities (Lindkvist, 2005) and value-creating networks (Buchel and Raub, 2002). In terms of empirical ground, the focus is also moving away from craft to knowledge-intensive domains such as open source software development (Scacchi et al., 2006), the automobile and airspace sectors (Wenger et al., 2002), consumer electronics (Enkel et al., 2000), service industries such as insurance (Dignum and van Eeden, 2005).

Despite the intensity of the efforts and the scientific rigor followed by researchers, these studies do not provide comparable experiences and as a result the evidence available is not sufficient to consolidate and establish common ground. Prominent gaps in theoretical thinking result from a number of observations, with two standing out very promptly. First, the vast majority of studies analyze community management in single organizations, either public or private (Juríád and Gustafsson, 2007). Community formation across organizational boundaries – either through inter-organizational partnerships or external communities of practice – is seldom addressed (Dewhurst and Cegarra Navarro, 2004; Kern and Kersten, 2007; Majchrzak et al., 2000). Second, in most of the cases, the elements of ‘practice’ are restricted both in type and form. The majority of the studies report on practices embodied in computer-mediated communication, taking the form of document-based information sharing, exchanging messages, expressing opinion, offering feedback, etc. In exceptional cases and only recently (Fuller et al., 2006), practice is also framed in manipulating virtual prototypes of products so as to trigger creative users’ reaction or to enable tailoring and adapting of the product’s features to individual preferences.
In search for theories for practice-based innovation in community settings, management and organization scientists recognize the value and benefit of virtual communities (of various sorts) as means for facilitating incremental (user-driven) innovation. Toolkits of user innovation, initially introduced by von Hippel (2001) and followed up by Franke and Shah (2001), Franke and von Hippel (2003), Franke and Piller (2004), and von Hippel and Katz (2002), provide innovative users with a means for articulating, expressing and codifying design capabilities. Such toolkits bring closer to the product/service development the needs, requirements and preferences of the target user base. Specifically, by allowing prospective consumers to manipulate virtual prototypes or engage in design contests and simulations, toolkits can act as interactive media for feeding through original knowledge and perhaps, new design ideas. The approach is arguably applicable to essentially all types of products and services where heterogeneity of user demand makes customizing, ‘precisely right’ solutions valuable to buyers. Nevertheless, as noted by von Hippel and Katz (2002), toolkits for user innovation are especially suited and are becoming more attractive in such fields as computerized design and computerized production technologies as they reduce the fixed costs associated with the design and production (Franke and von Hippel, 2003; Franke and Shah, 2001; Franke and Piller, 2004; von Hippel, 2001; von Hippel and Katz, 2002). In a similar vein, recent research investigates the mechanics of community-based innovation from various perspectives. Easterby-Smith et al. (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 et al. (2008) introduce the notion of transformation networks and discuss how such structures may foster networked innovation, demonstrating their results through a case study in the automobile industry.

**Issues, challenges and research focus**

Although the lines of research briefly reviewed above share common ground (e.g., in their reliance upon users to contribute to innovation), they are not fully interoperable in terms of orientation and basic units of analysis. This creates a gap in theoretical and engineering thinking related to innovative practice in boundary-spanning cross-organizational contexts. Amongst these gaps, the most prominent and relevant to the present work relate to establishing and operating boundary spanning virtual communities of practice. Open challenges pending empirical insight include: (a) how far, if at all, can communities of practice be nurtured inter-organizationally, especially when external parties such as customers, competing allies and other suppliers are involved (b) how can communities of practice be designed and built as part of specific cross-organizational development contexts and (c) how can social relationships be built up and maintained as a means of enabling knowledge exchange and communication, when community members are cross-functional and geographically dispersed.

Guided by the need to understand boundary spanning processes in vacation package development, the present work focuses on the mechanics of a cross-organizational virtual partnership and how collective intelligence of the members can be appropriated to ensemble innovative information-based products for tourists.

**The research setting**

Our case study is designed to investigate means and procedures for assembling innovative vacation packages defined within the scope of a vacation package family. Details of the technical features of the assembly line and the structure of vacation package product families are presented elsewhere (Akoumianakis, 2009). Traditionally, vacation packages of this sort, are compiled by travel agencies in an ad hoc manner by exploiting seasonal events (i.e., Christmas period) or circumstantial incidents taking place in a region (e.g., concert or a cultural event). Due to this periodic and ad hoc character, overheads are high and the returns may not always be as expected. Furthermore, prospective customers may be reluctant to consume as tailoring and customizing parts of or the entire vacation package is not an option.

eKoNES is a collaborative research and development project which was funded to setup and operate a pilot on vacation package assembly exploiting dynamic packaging in cross-organization virtual community settings. The idea was to enable virtualization of the distributed collective practice of cross-organization tourism alliances so as to enable them to appropriate the benefits of networking and collective intelligence
to ensemble innovative information-based product families. A vacation package family is considered as a codified abstract representation, which is progressively transformed to concrete offerings through computer-mediated engagement in a virtual setting. Such a package family should be capable of assembling a variety of concrete packages, while also being reused, extended and modified as experience grows or as requirements evolve.

It is important to note that packages assembled within the scope of a family constitute a different type of offering from the typical vacation packages offered by tour operators and destination management systems. In effect, they are 'local' in-vacation arrangements lasting for a few days and being independent of pre-packaged travel plans. As such, most of the times, they are conceived as supplements to a chosen vacation plan since they offer specialized and highly customizable local services to customers. Nevertheless, in certain cases, they may also act as catalysts for choosing or stimulating demand for destination sites.

**Overview of the research site**

To provide concrete insights on assembling vacation packages, eKoNES – Tourism (http://www.e-kones.teiher.gr/) was designed so as to comprise two functional constituents, namely the community environment and the practice management component. The community environment makes use of the notion of electronic neighborhoods representing service sectors of the regional tourism industry. Each neighborhood maintains its own registration policies, content management strategy and directory services. All neighborhoods share the same communications infrastructure comprising facilities such as thread discussion forums, email, SMS and GroupSMS. Electronic registration to neighborhoods is a dedicated service through which candidate neighbors create their profile in stages, update it as required and declare their competencies. Upon successful registration, neighbors are presented in the neighborhood’s directory and obtain access to downloadable software components required to take part in vacation package assembly. Registered neighbors may use a range of custom information templates to present their service offerings as maintained and marketed in their own institutional setting.

The practice management component is the suite of tools allowing neighbors to engage in distributed vacation package assembly. This is a moderated virtual practice carried out by an eKoNES squad. eKoNES squads are the cross-organization virtual alliances undertaking to negotiate a vacation package. A typical vacation package undergoes distinct development stages (or workflows). In each of those the package changes visual view so as to summarize the squad’s collective agreement.

Package initiation entails designation of a suitable package family and is always carried out by the squad’s moderator. This automatically reserves a collaboration space devoted to the package’s workroom where the members can work to negotiate the package details. The instantiated package inherits general properties/mandatory fields from the package family such as name, creation date, duration and identification of the relevant neighborhoods. Once a package is initiated, the corresponding squad is formed dynamically by the system, comprising all registered neighbors in the package’s neighborhoods. Squad members may engage in electronic exchanges to assess requirements of the new package against own available resources and accordingly declare either commitment of participation or withdrawal from the package. Members committed to a package form the ultimate squad.

Package elaboration proceeds immediately after a package is initiated. In this stage the objective is to populate a package in terms of specific neighborhood services. Typically, the squad’s moderator will propose an initial elaboration for a package and invite contributions by squad members. Figure 1 presents an example of a vacation package in the elaboration stage. The visual schedule on the top summarizes the package’s activities and neighborhood offerings in the chosen coloring scheme. The bottom dialogue summarizes the partner’s pending assignments as well as commitments to the package as contributed thus far using the functionality of the tabpane. Members’ contributions and negotiation takes place in the shared message board, which is preserved for each vacation package in development.

In the deployment stage the package is transformed into a concrete offering with clear illustration of package options, alternatives and offers per activity as well as price range. Package publication entails selection and authoring of a designated template. Once the details of the package are finalized and agreed, all its components are assembled (from XML) and published as a new resource in a portlet context (see upper left component in Figure 2) through the eKoNES portal. Moreover, all registered villagers having expressed an interest in the package are notified through the eKoNES
Figure 1. Partner’s overview of contribution in a vacation package

Figure 2. Package articulation in the tailoring phase
notification service and are prompted to make a reservation or request further adjustments. The ultimate assignment of the package’s options is to be finalized during the tailoring phase to reflect a customer’s detailed requirements and preferences. During tailoring, users request further modifications to the package by submitting requests. This causes the squad to re-consider specific issues. In such cases the package re-enters the elaboration and deployment phase for customization. This process may be iterated until a personalized package is created to suit specific user needs and preferences. Accordingly, a vacation package may be constructed, negotiated and re-constructed several times during its lifecycle.

Research methods

eKoNES was released as an operational pilot in 2008 and was thoroughly evaluated across

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<th>Table 1. Summary of quantitative evidence</th>
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<td>Characteristics</td>
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<td>Total number of responses (by moderator)</td>
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<td>Number of clarification requests (by members)</td>
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<td>Members with no reply (other than opting out or expressing commitment)</td>
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<td>Web site hits in a period of one month following the package deployment</td>
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- ■ Assembly portlet
- XML file of vacation package assembled
- ○ Portal search engine/Electronic neighborhood registration system
- * Message board
- x Visitor log data
different settings. This section presents a discussion of key findings as revealed by virtual ethnographic studies of electronic squads followed up by workshops over a period of six months. Ethnographic analysis of online behavior revealed useful insights to the networking ‘culture’ of the local industry. The workshops provided subjective evidence to clarify online behavior and to understand non-technological determinants of distributed collective practicing.

Virtual ethnography was used to analyze electronic squads engaged in different vacation package assembly agendas. The outcomes are listed as the top three options in the vacation package assembly portlet in the left hand side of Figure 2. The types of vacation package were intentionally different to ensure engagement of different cross-functional virtual squads. As a result, the members of the corresponding electronic squads were business partners from the tourism industries of three different Greek regions, namely the islands of Crete and Santorini and Peloponnese. In all three cases, the researcher was involved as moderator of the electronic squads, while the starting point for all vacation packages was the same location in the island of Crete. Thus, the three vacation packages can be conceived as presenting 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.

**Findings**

**Virtual ‘tells’ of electronic squads.** Table 1 provides a summary of objective quantitative data across the three scenarios and the source through which the data have been obtained. Notably, such data were directly derived from the eKoNES tools, which confirmed their usefulness for virtual ethnographic analysis. However, for some of them the follow up interviews and workshops provided useful clarifications.

As shown in the table, 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 carried out asynchronously through eKoNES and no other communication means was used at any point of the process. In terms of underlying type, the three vacation packages represent instances of the same package family with variation in focus. Phaistos vacation package is an example of cultural excursion. Santorini nights represents a case of conference participation combined with vacation. Pelloponissos round trip is a cruising package around one of the Pelloponnissos legs. All three electronic squads were very stable from the start, with one member in the accommodation neighborhood opting out from the Pelloponnissos round trip. The reason for this, as posted in the withdrawal request in the message board, was ‘No vacancy available’. 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. These were general announcements about 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 Phaistos vacation package where the seven posts by members were all different and distinct resulting in corresponding number of responses by the moderator. In terms of the members’ input to compiling the three vacation packages, our data indicate fair contributions by all members to the corresponding squads. Finally, it was also observed that, once deployed the three vacation packages attracted attention by third parties.

**Thematic workshops and lessons learnt**

As virtual ethnographies were designed to assess vacation package assembly as a virtual collaborative practice, rather than customer perceptions and opinion, they were followed up by workshops to facilitate detailed insight and additional explanatory evidence. Each workshop was organized in two stages. In the first stage the research team reported the consolidated experience of the virtual ethnography and then workshop members could respond and justify their online behavior, express comments and discuss issues. At the end of the workshop each member completed a questionnaire. On the grounds of these experiences several conclusions were drawn with some being particularly interesting.
One key conclusion of these workshops was the flexibility of the assembly line and the perception that it does present an alternative operational model of work complementary to the partners’ existing lines of business activity. It was also noted that computer-mediated boundary spanning collaboration of the kind assumed by vacation package assembly requires additional coordination and articulation work on behalf of the members. The existence of a ‘virtual other’ moderating vacation package assembly was received very favorably. In fact, ‘trusted’ moderation was conceived as facilitator of the group’s coherence, focus and timely contribution. As the majority of the participants were new comers to eKoNES, they suggested reinforcement of strict registration policies specifying the liabilities of neighbors and the implications of acceptable/unacceptable behavior. Although, our virtual ethnographic studies did not reveal inappropriate behavior, in practice it is possible for members to withhold the proceedings of a squad (by not responding in a timely fashion) or deviate from the common mission through antagonistic behaviors. The reason why this was not observed is probably due to the fact that eKoNES toolkit does not allow for private arrangements not complying with the neighbor’s declared business strategy. For instance, although last minute offers or price changes are possible these are realized as public announcements in the squad’s shared message board with all members being explicitly notified.

Another key finding was the catalytic influence of non-technological factors in the uptake of vacation package assembly. Our initial assumption was that business partners (i.e., members of electronic squads) would appreciate eKoNES as a complementary line of business to what they are already doing and a medium for building cross-organizational virtual alliances for appropriating the benefits of virtual networking. However, this was only partially supported. The respondents’ reflections revealed that this may be valid for non-market institutions (i.e., chamber of commerce, local government agencies and some union representatives) and very small and medium sized enterprises offering specific type of services such as accommodation or food and beverage. Representatives of these sectors considered that eKoNES is ideal as a regional information service provided that it is actively supported and maintained. Respondents representing transportation unions and multifunction vacation establishments such as luxury hotels, expressed the opinion that they would like eKoNES as their own model of operation, empowering liaisons and links with their own existing partners in various sectors of the industry. This opinion was largely attributed to the negative connotation assigned to ‘collective artifacts’ and ‘collective ownership of virtual assets’. Participants in this category considered that such artifacts are associated with high risks and cannot be operationally controlled and managed. Considering whether they would be willing to introduce an eKoNES-like operational model in their own organization all of them responded positively and rated highly both the technical approach adopted by the eKONES toolkit and the new opportunities it offers.

Discussion and implications

This paper has briefly sketched an approach for assembling vacation products that combines dynamic packaging with the distributed collective practices of a cross-organizational virtual community/alliance. The main contribution of this approach is that it fosters co-engagement of partners in a virtual and boundary spanning vacation package assembly practice. Accordingly, the compilation of a vacation package is no longer a matter of packaging components (as in the case of dynamic packaging), but rather a collaborative exercise that entails repetitive cycles of ‘constructing, negotiating and reconstrucing’ a solution so as to meet the user’s requirements. It turns out that such an approach brings added value to all parties involved. End users and customers benefit from an increased capacity to plan vacation details in a timely and cost-effective fashion. Business allies improve their own competencies, exploit alternative marketing channels and streamline efforts as a result of ascribing to a shared boundary practice for virtual networking.

In terms of engineering ground, the approach described in this paper encapsulates the notion of collaborative assembly toolkits. These are computer-based collaborative environments that combine community management with the management of an engineering practice (i.e., vacation package product line engineering). The distinct feature of collaborative assembly toolkits is that they encapsulate the required qualities, such as abstraction, plasticity and extensibility, which allow an ensemble of partners to make sense of a shared information space. It is claimed that this line of research
offers a new conceptualization of virtual practicing with implications on both the engineering base of cross-organization virtual communities of practice and the type of innovation facilitated. The rest of this section briefly elaborates on these two points in the light of the findings of the eKoNES case study.

**Collaborative assembly toolkits for engaging in community practice**

eKoNES as an example of design science postulates that the systems needed to form, maintain and sustain the virtual community of practice as a system of innovation should provide the ‘place’ for engaging in the practice the community is about. This view challenges prevalent theoretical perspectives and engineering conceptions on virtual communities of practice at several levels. First of all, the vast majority of research on virtual communities of practice focuses on discovering, building and maintaining community, dismissing or under servicing the elements of practice. Indeed, very few from the existing pool of studies claim and/or provide convincing evidence that the systems built/studied provided a ‘place’ to actually engage in the practice that the community is about. Second, current thinking on how practice is interactively manifested in virtual settings over-emphasizes the use of social interaction tools, thus implicitly assuming that practice is textually mediated. This view, although sufficient to understand certain types of online communities, undermines professional community practices which are encapsulated into shared artifacts, tools and workflows.

Collaborative assembly toolkits as revealed through the eKoNES case study adopt the view that it is this latter form of practice, which defines the mechanics of innovation and creates value in cross-organizational collaboration. This is increasingly supported by recent empirical evidence on the use of collaborative technologies by organizations (Merono-Cerdan et al., 2008). It is important to note that the present work does not dispute the value of social interaction for framing practice. Indeed, language has long been the medium for documenting, communicating and sharing professional knowledge and practice. Rather, it postulates and supports the argument that practice is also framed in artifacts (such as sketches, diagrams and visual notations), tools and workflows through which the virtual world is made sense of.

**Collaborative assembly toolkits versus user toolkits for innovation**

In order to gain a more detailed insight into collaborative assembly toolkits, such as the eKoNES toolkit, it is useful to compare them with user toolkits for incremental innovation (Franke and Piller, 2004; Franke and Shah, 2001; von Hippel, 2001; von Hippel and Katz, 2002). Such a comparison will bring about a better understanding of the new challenges addressed by collaborative assembly toolkits, while it will also reveal some of the reasons why user toolkits for innovation do not scale up to cope with some of these challenges. First, toolkits for user innovation are typically designed to depict individual practices adopted by and valid for a single organization. As such, they are insufficient to service cross-organizational virtual design groups or boundary-spanning 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 boundary spanning domains of practice, is free and open source software development. Nevertheless, even in this domain the toolkit is not aimed at streamlining cross-organizational practice but rather it provides a medium for reusing or appropriating the benefits of collective experience and wisdom.

Second, toolkits were conceived and theorized as tools for user-driven innovation. On the other hand, communities of practice and in particular those formed across organizational boundaries hold a great potential for fostering network-based innovation. The mechanics of this form of innovation rely heavily on making sense and appropriating shared assets, collective practices and specialized knowledge, which are the constituting structures of the practice toolkit. These structures when enacted by collaborating partners create a new virtuality meaningful to and accountable by different social worlds.

Third, toolkits for user innovation 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. In cross-organization virtual communities of practice design culture, practice and engineering mechanics across
organizational boundaries may differ. Thus, the object of design in collaborative assembly toolkits should be presented in such a way so as to serve as boundary artifact, having common enough structure to make it recognizable across different social worlds, while maintaining distinct meanings in each of those social worlds. In the eKoNES case study, such boundary function characterizes the entire lifecycle of vacation packages. Specifically, while in negotiation vacation packages maintain a shared abstract representation common to all neighbors (see Figure 1) irrespective of neighborhood type. As a package crosses over the boundary of the alliance and enters the customers’ social world (see Figure 2), it becomes a polymorphic and plastic resource meaning different things to different people and implicating different ‘local’ arrangements and services.

Finally, user toolkits for innovation serve as the interface between innovative end users and the design organization, without however exposing the details of the design process to the users. Once more, this is insufficient in cross-organization virtual communities of practice. In contrast, collaborative assembly toolkits focus on providing an ‘interface’ to the virtual space defined by the network and inhabited by cross-functional virtual team members, including the customer. This implies provisions for social awareness mechanisms not commonly found in user toolkits for innovation. Furthermore, design becomes synonymous to articulation work which is transparent to all participants, though through different media and modalities.

Conclusion

This paper has described an approach for assembling innovative information-based products by virtual cross-organization communities of practice. Using a case study on assembling vacation packages in a regional travel and tourism industry, the present work provides useful insights into innovating through virtual networking as well as the ICT tools that may be used to foster value-creating networks of practice in boundary spanning domains. Two main conclusions may be drawn from the results presented. The first is that new technologies, such as collaborative assembly toolkits, combined with community management systems, dynamic packaging, web services and Social Web can provide not only an alternative channel for vacation marketing but also a plastic medium for distributed collective practices in the travel and tourism industry. eKoNES provides a useful example and test bed indicating the relevant issues and how they have been addressed in a regional setting. Secondly, technical sufficiency of collaborative assembly toolkits, although a necessary condition, may not be sufficient to guarantee success. Virtual ethnographic studies of eKoNES squads revealed that factors such as organizational size and type, social environment and local culture may have a catalytic role in establishing and maintaining sustainable networks of practice. Finally, further research is needed to shed light into a variety of pending issues which stand out very promptly. To this end, on-going work concentrates on longer-term virtual ethnographic studies of operating squads to reveal behavioral patterns resulting from recurrent co-engagement as well as the degree to which emergent structures such cliques, clusters and hidden communities are implicated in practice.

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