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Recommended Citation
Bolisani, Ettore; Di Biagi, Matteo; and Scarso, Enrico, "Knowledge Intermediation: New Business Models in the Digital Economy" (2003). *BLED 2003 Proceedings*. 37.
http://aisel.aisnet.org/bled2003/37

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16th Bled eCommerce Conference

eTransformation

Bled, Slovenia, June 9 – 11, 2003

Knowledge Intermediation: New Business Models in the Digital Economy

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Abstract

The upsurge of Internet and e-commerce strengthens the idea that knowledge is the key resource for competitive advantage, because such technologies offer opportunities to acquire and share knowledge with no geographical or temporal limits. Nevertheless, the experience shows that the practical implementation of new business strategies, grounded on the deliberate exploitation of knowledge though the Internet, is a complex issue that requires new managerial tools and roles. This paper examines and discusses emerging business roles that can be referred to as "knowledge intermediaries" online, whose aim is to provide services for retrieving, acquiring, and managing external knowledge resources. After characterising the conceptual features of such business model, based on the analysis of the literature on Knowledge Management and e-commerce, the findings of preliminary case-study research are discussed.

1. Introduction

Though the enthusiasm of the early days for e-commerce has been replaced by a more depressing atmosphere, many observers believe that we are just at the beginning of a new phase. Web technologies are undoubtedly capable of connecting people and organisations all around the world, thus enabling the instantaneous exchange of data in different formats. The real point is that we still need to learn how to fully exploit such potential.

In the recent past, e-commerce has been primarily seen in relation to its potential for improving the efficiency of communication, i.e. as a mean for re-allocating informational contents that are already available and explicit. Nevertheless, this viewpoint can't explain the success and failures of many e-commerce projects, and new perspectives are required to analyse the creation of value from new content and new ways to exchange it.

The current literature tends to put a cognitive interpretation on the phenomenon, in line with the latest thinking in the economic and managerial disciplines which consider knowledge the key source of competitive advantage and regard Internet and e-commerce as powerful tools to acquire, elaborate, and distribute knowledge with no spatial or temporal limits. However, the academic analysis and the practical experience have pointed out that numerous managerial and technological problems still hinder the realisation of a real knowledge-based economy.

In particular, the flourishing field of study known as Knowledge Management (KM) deals with issues such as the mechanisms for knowledge generation, transfer, and exploitation for business purpose. Originally developed for intra-organisational contexts (Nonaka and Takeuchi, 1995), KM is now being extended to inter-organisational relations (Holsapple and Singh, 2001; Warkentin *et al.*, 2001). So far, useful insights have been given into approaches to a deliberate and systematic management of knowledge, but further work is necessary to convert the conceptual elaboration and the practical hints into established managerial models and tools. Also, numerous studies and projects have dealt with the design and development of technical equipment and methods for supporting KM, ranging from "smart" data mining systems to intelligent agents, to broader projects aimed to fix semantic tags to the Web (Berners-Lee *et al*., 2001). Such initiatives have so far clearly denoted the difficulties in trying to completely bypass the human involvement in knowledge manipulation.

In such a picture, there is room for the upsurge and development of innovative services for a knowledge-based use of the Internet. This paper focuses on the emerging business services related to the management of knowledge flows between organisations. We examine the role of "knowledge intermediation", i.e. services, provided via the Internet, that support inter-organisational KM. The purpose here is: to explore the possible development of new business models that combine the use of e-commerce tools with a KM capability; to suggest preliminary classifications; to highlight potential business opportunities, and problems as well. In addition, the findings of a exploratory analysis of services and operators are also presented, with the aim to validate the utility of the suggested definitions and classifications, and to set a research agenda.

2. Inter-organisational KM

2.1 Knowledge and KM

Clearly, we will not discuss the philosophical implications of the concept of knowledge. We will just adopt a working definition, where knowledge is regarded as *actionable information*, that is the capability of using information to make business decisions or take actions (Malhotra, 2000; Tiwana, 2000; Roberts, 2000). This definition highlights two important aspects, and namely: a) knowledge differs from pure information or simple data, meaning that the bits processed by computers or transferred through the Internet do not represent knowledge; and b) knowledge is built on data and information, but it is the active involvement of the individual that transforms them into knowledge and hence decisions. In KM studies, an important qualification of knowledge regards the distinction among its different forms. A well-known classification is based on the fundamental contribution of Polanyi (1967), underlining the difference between the *explicit* (that should be relatively easy to formalise, transfer, or store) and the *implicit* component (pertaining to ideas, feelings, and individual experience, and therefore much more complex to share). Other classifications are based on the content of knowledge (Alavi and Leidner, 2001; Zack, 2001), and distinguish among: declarative/descriptive knowledge (know-about), procedural knowledge (know-how); casual/relational knowledge (know-why); knowledge of the "sources of knowledge" (know-who); and relational knowledge (know-with). Finally, there may be a distinction between individual and organisational knowledge, where the latter is produced and shared within a group of individuals having common goals (Bhatt, 2001).

Such elements are generally used by KM scholars to define the approaches to the systematic management of knowledge within organisations, and specify the fundamental

KM processes or activities, namely (Alavi and Leidner, 2001; Holsapple and Singh, 2001; Shin *et al*., 2001): a) knowledge creation/acquisition; b) storage and retrieval; c) transfer, distribution, sharing; and d) application or exploitation. It must be underlined that different capabilities and organisational roles are required or involved in each process, as well as specific managerial problems are raised by the different types of knowledge treated.

2.2 From KM to Knowledge Network Management

Since it is unlikely that single organisations can have or be able to internally generate all the knowledge base needed for its business (Quintas *et al.*, 1997), they have to continuously tap into external knowledge sources. This is the reason why the present economy increasingly rests on *knowledge networks*, i.e. inter-organisational agreement to share knowledge among network members (Millar *at al*., 1997; Pyka, 1997, 2001; Warkentin *et al*., 2001; Peña, 2002).

Consequently, the principles and contents elaborated in "traditional" KM have to be re-framed to perform knowledge network management (Seufert *et al*., 1999). This clearly rises new problems, since each member of a network may have specific goals, languages, values, mental schemes, competencies, etc. In addition, managing a knowledge network implies the subdivision of "cognitive tasks" and KM competencies among the participants, and can require new roles within knowledge chains.

2.3 Technologies for KM

The development of computer systems are deemed to facilitate the elaboration and sharing of knowledge, and thus knowledge and network knowledge management. Information systems and technologies designed for KM, usually called *knowledge management systems* (KMS), can include both "old" software concepts rearranged for KM (e.g. data mining technologies), and new tools (i.e. software agents, etc.). In particular, Internet technologies can be considered "pervasive" tools, in that they underpin most of the current KMS (Binney, 2001).

It is the opinion of many scholars that technology is, by nature, a key component of KM (Alavi and Leidner, 2001), but the technology itself, despite its unquestionable potential, is not enough to solve the problem of managing knowledge (McDermott, 1999; Johannessen *et al*., 2001; Walsham, 2001). On the contrary, focussing on the technology alone can lead to negative and unwilling effects (Hendricks and Vriens, 1999). The effectiveness of a KMS clearly depends on the way the trade-off between high automation and flexibility to exceptions is resolved; this is a well known dilemma of information systems (Gebauer and Scharl, 1999). In general, any function of a KMS should be designed considering the specific kind of knowledge, exchange processes, and interconnecting players (Bolisani and Scarso, 1999; Marwick, 2001).

3. Knowledgemediary: Discussing a Definition

As said, this work aims to investigate the role played by an operator who may assist the inter-organisational knowledge transfer process: such operator can be regarded as a sort of *knowledge intermediary*, or *knowledgemediary*. Before defining the meaning of this term in more detail, it is first useful to briefly refer to the notions, analysis, and evidence that more closely recall the *raison d'être* and the functions carried out by these economic agents.

3.1 Knowledge Intensive Business Services (KIBS)

KIBS have been studied as particular services concerning the collection, analysis, generation and/or distribution of knowledge. Miles (1996) proposes an useful distinction between "traditional" KIBS (e.g. classical consulting services) and T-KIBS (i.e. services that concern or are based on the use of information and communication technologies including Internet-based applications).

There is a growing number of studies that underline the relevant contribution of KIBS in the present economies (OECD, 1997; Roberts *et al.*, 2000; Tomlison, 2000), as well as their special characters, i.e.: an enabling role in innovation transfer (Den Hertog, 2000), and the function of "cognitive interface" between different business partners (Hauknes and Antonelli, 1999). Clearly, the concept of knowledge intermediation has its roots inside the T-KIBS category, although a more thorough analysis of the intermediation aspect is necessary.

3.2 Intermediation in the Internet Era

Traditionally, intermediaries act as interface between supply and demand for making relations and transactions between parties more efficient (Alderson, 1954; Stanton, 1967; Coyle and Andraski, 1990). It can be noted that many functions supplied by intermediaries (e.g.: identification of needs; information on products and suppliers; comparisons; market intelligence; distribution of information on products; customer targeting and demand orientation, etc.) exhibit a marked cognitive content (Sarkar *et al*., 1995). In substance, the value added by intermediaries consists in bridging over a cognitive gap between demand and supply, and thus facilitating the exchange of knowledge for settling transactions.

The fundamental economic theories also consider the cognitive implications of intermediation. For instance, according to the transaction costs theory, the choice between in-house direct sale and external intermediaries is based on the complexity, specificity, and uncertainty (that is cognitive features) of such activity (Rangan *et al*., 1992). In the *principal-agent* theory the agents are delegated to assist the principals with their economic counterparts in order to reduce their decisional complexity due to knowledge shortages (Pratt and Zeckhauser, 1985). Also, the quality of information exchanged by trading partners, and the signalling mechanisms employed for this are of importance (Akerlof, 1970; Choi *et al*., 1997): again, intermediation is crucial in this.

The cognitive implications of intermediation rises key issues for Internet-based business activities. Firstly, although the huge amount of information available on the Web extends the cognitive capabilities of the users, the growing complexity of the cyberspace makes its exploitation even more difficult. This is the reason why "knowledge brokers" are needed, capable of assisting the users in the management of online knowledge sources (Hargadon and Sutton, 2000). Another issue is the structural effect of the diffusion of e-commerce on intermediation (Benjamin and Wigand, 1995). As it is well known, theoretical arguments and empirical observations show that the "disintermediation" effect is not a foregone consequence of the diffusion of e-commerce; instead, different scenarios can take place (Sarkar *et al*., 1995; Giaglis *et al*., 2002), including the development of new forms of intermediaries. Examples are the so-called *infomediaries* (online firms specialising in online customer profiling and analysis of navigation traces), and *cybermediaries* (online companies that specialise in online transactions, as web malls, comparison sites, credit card clearing services, etc.). In many cases the restructuring effects on value chains induced by e-commerce lead to new intermediaries establishing connections inside virtually-glued value chains (Upton and McAfee, 1999; Selz, 1999; Lefebvre and Lefebvre, 2000).

3.3 Intermediation in KM Processes

The KM literature draws attention to the role of brokers between knowledge sources and recipients. For instance, experts specialising in a particular field can be used to guide the design and maintenance of a Web portal, and thus act as a bridge between sources of knowledge and users (Mack *et al*., 2001). The presence of a knowledge broker is needed also inside a single organisation, since it can be considered as an internal knowledge market made up by different individuals, project teams or business units (Markus, 2001). Generally speaking, the broker assists sources and recipients to match their different interpretative contexts, translate meanings and values, and assist the transfer process.

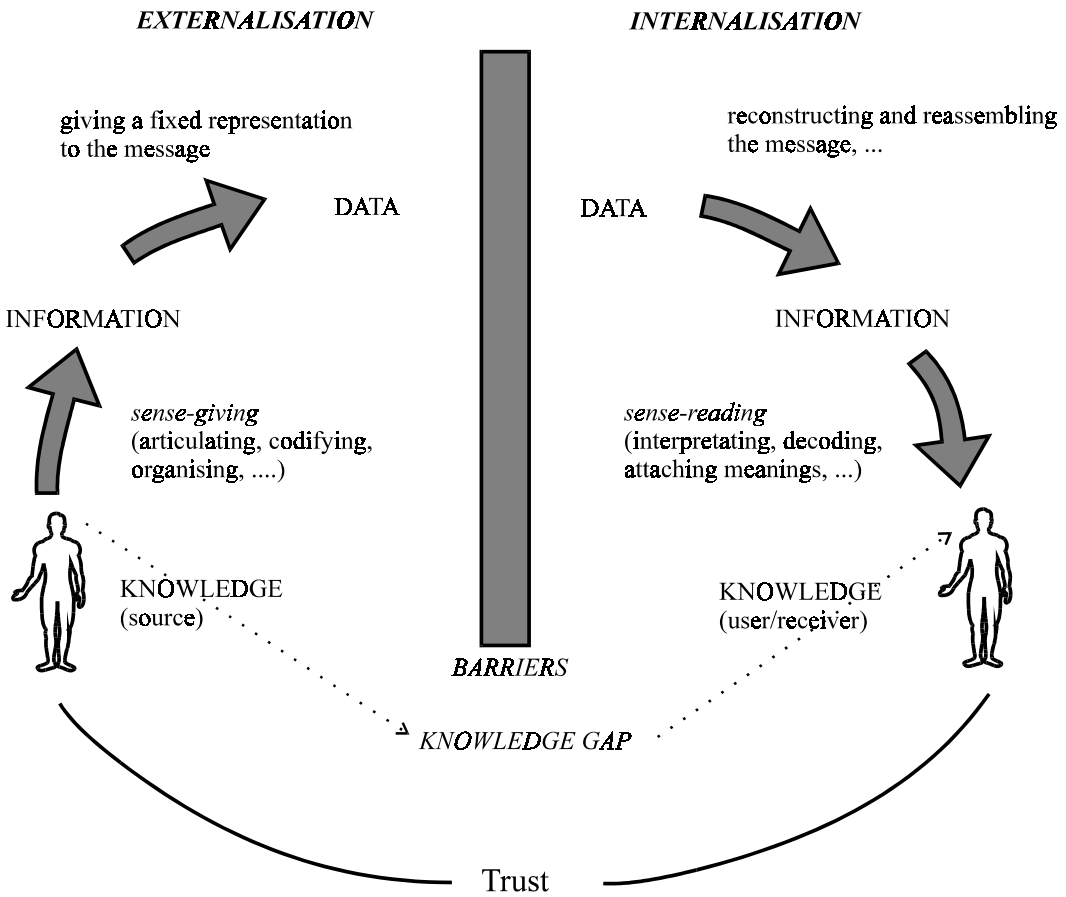

Figure 1: *The Process of Knowledge Transfer (adapted from Hendriks and Vriens, 1999)*

A schematisation of the *knowledge transfer* process may help in understanding the role of a knowledge broker (Hendriks and Vriens, 1999; Tuomi, 2000; Garavelli *et al*., 2002). In short (see fig. 1), a particular kind of knowledge content may require extraction, selection, codification and de-codification (e.g. conversion in the appropriate format, language, etc.) in order to be transferred. To be successful, this process needs: the sharing of a common interpretative context or background, a mutual interest in the transfer, and established "trust" (i.e. the parties should not doubt the quality of the knowledge transferred). Clearly, an intermediary, by performing one or more of the previous tasks, may contribute to reduce the barriers between source and receiver.

3.4 Toward a Definition of Knowledgemediary

Based on what previously affirmed, we now propose the definition of a new category, named *knowledgemediary* (KMY). Such operation is not original in itself, and it can always be questioned whether it is really necessary to add a new term. However, the effective transition of the Internet from a "network for sharing data" to a " knowledge network " requires services explicitly devoted to the transfer of knowledge, and their analysis.

Thus, the attempt here is to directly explore the nature and features of this specific "unit of analysis": a new business model that can be seen as the combination of the elements illustrated above. Namely:

- capability of managing *inter-organisational* KM processes;
- *intermediation*, i.e. acting as interface between sources of knowledge and users, and helping transactions whose object is knowledge;
- capability of designing and/or using information technologies as a fundamental support of such activities.

More precisely, the practical exploitation of the business model can be associated to the following issues:

- the business value of KMYs derives from the existence of a *cognitive gap* between sources and users;
- their core competencies concern the management of knowledge transfer between organisations, consisting of identifying knowledge needs of the users, researching and selecting sources and knowledge contents, performing codification/de-codification processes, etc.;
- in addition, KMYs imply the capability of selecting the most adequate solution for settling a knowledge transaction in accordance to the specific circumstances (namely: nature of players involved, kind of knowledge exchanged, property rights, legal implications, payments, etc.);
- finally, an integral part of the KMY model is technology, or better the capability of using and integrating computer applications into the KM processes.

4. KMY Services: Contents and Articulation

We intend to use the definition of KMY to explore the nature, potential, and limitations of new knowledge-intensive business services. To do that, it is firstly important to describe in more detail the possible articulation of KMY services. With this purpose, and according to the analysis performed in the previous sections, we identified six fundamental dimensions that can be of use to outline the general framework of KMY services, and suggest criteria for a reference taxonomy. We referred to a simple situation characterised by the presence of: one or many *users* (typically business users: firms, professionals, etc.); one or many knowledge *sources* (other firms, university departments, research centres, etc.); and a *KMY*.

a. Knowledge flows:

- knowledge asked or researched by the users;
- knowledge delivered by the source (not necessarily on demand);

- knowledge that represents an additional (and original) contribution of the KMY.

b. Type of exchanged knowledge:

- tacit vs. explicit. Although fascinating, this distinction is less useful on a practical basis. It is possible to refer to tacit/explicit components based on the transfer process, since the explicit one, referring to more "universal" interpretations, can be more easily "de-contextualised" and transferred in formal modes (e.g.: the price of a stock, a chemical formula, etc.), while the tacit component is tightly connected to the originating interpretative framework;
- range and scope, e.g.: multidisciplinary vs. specialised knowledge;
- object, e.g.: know-about, know-how, know-why, know-who, know-with (see section 2.1).

c . KM process implied in the KMY service:

- acquisition (i.e.: identifying and cataloguing sources, analysing nature and formats of knowledge, etc.);
- selection (choice of the specific knowledge to be transferred in relation to the specific uses);
- internalisation (assistance to users in the assimilation of knowledge);
- externalisation and distribution (assistance to sources in the delivery of knowledge).

d. Technical infrastructure and competencies:

- organisational-managerial component. KM competencies (see point c.), knowledge of the sector/market where the KMY operates, capability of managing inter-organisational network relations, and intermediation skills;
- technical components. Tools used to support inter-organisational KM processes in an Internet environment, as well as the skills to select, configure, and use them.

e. Mechanisms for knowledge transactions:

When knowledge is the object of an economic exchange, the transaction rises specific issues in relation to (Boisot, 1999) the transfer, protection, and replication of the property rights. It should also be analysed what service is really paid for. More generally, the issues involved are:

- mechanisms used for the economic exchange (formats, times, contracts, etc.);
- mechanisms used for payments;
- duration of the transactional relations (e.g.: spot, repetitive, or project-based relation).

f. Structure of business relations:

- bilateral relations with a single user or source (i.e.: a sort of "private consultant");
- relations with multiple and indistinct sources and users;
- relations with players belonging to a specific industry, value chain, or business community.

It should be noted that the structure of business relations of a KMY with its clients can be different from the structure of knowledge flows that are activated more broadly. Both the users and the sources can be "the clients" of a KMY, depending on the particular

circumstance, i.e. on the player that is mainly interested in the intermediated KM process, and intends to pay for this service.

5. KMY Business Models: Preliminary Validation

At this stage, the purpose of the empirical investigation was just to verify the usefulness of the concepts proposed. The unit of analysis consisted of projects and/or firms of KMY services. Given the descriptive/exploratory purpose, the method adopted was a multi-case study for drawing a larger picture of this emerging sector, by monitoring a range of situations, and building essential classifications of business models. After a broad exploration conducted through various resources (literature, press, Internet, experts, etc.), a number of potentially "interesting" cases of operators was selected (for the most part in Italy, for reasons of convenience), whose activity matches with the notion of KMY previously stated. The effort was (when possible) to focus on services that are not just the online transposition of traditional activities. The analysis allowed us to make a preliminary identification of some essential categories of KMYs (table 1 - also see Friso, 2002), whose distinctive characteristics are analysed using the dimensions described in section 4.

KMY analysed	Field and service content	KMY model
WSGN.COM	market and industry research (clothing sector)	aggregator
YODLEE.COM	integrated management of administrative data	facilitator
ACRIB.IT	NPD assistance (footwear industry)	manager
MEDIAZIENDA.IT	mergers & acquisitions	facilitator
101PROFESSIONISTI.IT	legal/fiscal consulting	mediator
THEMATIC OBSERVATORY ("NETVANTAGE")	research and pre-classification of WWW sources	aggregator
WEBIR.IT	investors relations	facilitator
PROFINDER.IT	human-assisted Web search	mediator

Table 1: *Selected Case-Studies*

Mediator: its role is to activate knowledge flows from sources to users. *101professionisti.it* mediates between a network of qualified professionals and their customers interacting through the Web. The customers ask legal/fiscal questions in a natural language. The KMY interprets the questions, selects the professional, and takes care of the correct transmission of the answer as well as payment execution etc. *Profinder.it* is a human-based search engine for Italian-speaking users. The service provides assistance for Web search to users that are not able or have no time to navigate. Users can formulate queries in natural language: the KMY operators interpret them, search on the Net, and propose possible solutions (in the form of Web addresses). Both the cases examined focus on a "know-who" knowledge, i.e. knowledge of the possible sources and of their "quality" or reliability. Thus, the reputation that the KMY builds is crucial. Another key issue is the KM process of interpretation/decontextualisation of

queries, that is vital especially considering that the entire relation occurs on the Net with no face-to-face interactions.

Facilitator. its function is to build appropriate environments for knowledge transfer, by identifying the optimal mechanisms or technology (i.e.: a Web portal, a document exchange, etc.), by processing codification/de-codification, etc. *Yodlee.com* collects various administrative data of a user (e.g. different bank accounts) and synthesises them in a common format through a single interface. *Mediazienda.it* operates in the field of *merger and acquisitions* of small businesses. The service operates a pre-selection of qualified advertisements, and then supplies online information of business opportunities to registered potential buyers. *Webir.it* assists the firms in the investors relation management, helping them to select and publicise financial information on the *Lycos'* financial channel. In this case the KMY service is centred on the delivery of knowledge to the public. Beside the high specificity of each single case, similar characteristics and issues are also evident. Facilitators need to activate a "standard" process of collection, decontextualisation, and presentation of knowledge contents from heterogeneous sources to undifferentiated users. All this rises peculiar problems, such as the selection, explicitation, and standardisation of knowledge contents to be presented through a common interface (e.g. a Web portal). While knowledge from sources can be the "know-about" type, the added contribution of the KMY service is essentially a "know-with" component (i.e.: how to connect different contents).

Aggregator: this KMY service performs preliminary recognition and mapping of knowledge sources for a specific business community or market; such knowledge contents are then made available to the users on demand. *Wsgn.com* is a thematic portal offering updated and qualified information on fashion, markets, and technologies for the apparel industry. Other examples are projects (e.g. Telecom Italia's "Netvantage") aimed to develop applications for generating semi-automatic thematic portals: a semi-automatic software agent would be used to scan the Web and extract updated knowledge in accordance to the guidelines defined by a human expert. In both cases, the "aggregator" model refers to a common situation: a multiplicity of heterogeneous sources, and several potential users belonging to the same business community. The highly specific knowledge contents, that can also have heterogeneous formats, have to be aggregated and collected for the community. The added service of the aggregator rests on the capability of selecting and reformulating contents that "may be" of interest for the users, which requires high competence of the business sector. In addition, the contents collected have to be converted and proposed in the appropriate form.

Manager: this is the most complex model of KMY, combining many of the services described above. The only example examined here is that of *Acrib.it*, an original initiative of a local association of footwear manufacturers in Italy. A platform for "knowledge sharing" is provided to all the firms and professionals involved in the design of a new product. The portal, reserved to registered users, is based on a "flexible" system for sharing all the documents and contents needed (ranging from stylistic themes to technical characteristics of raw materials). Since the mediating role of the KMY and the business relations between the using firms are closely intertwined, the kind of knowledge that the KMY has to manage is highly specific, but at the same time requires extreme flexibility to manage exceptions and innovations.

6. Conclusions; Limitations of the Study

The background assumption of this study is that the transition from a model of Internet as a "network of data" to a knowledge network" can be a difficult but crucial step in the

further development of the Digital Economy. To analyse such issue, we attempted to introduce new approaches to the analysis of online business models, by integrating "classical" themes of e-commerce (i.e. the characteristics of online transactions and the role of intermediation) with the emerging studies of KM. The definition of KMY is strictly functional to this purpose, and is used to analyse emerging businesses of online intermediation by considering their role in KM processes in an explicit and direct way.

The preliminary findings presented here show that this approach could be promising. Nevertheless, several steps should be still made to overcome the present limitations of this study, and transform the classifications and points examined here into managerial guidelines or research topics. For instance, the transactional nature of KMY services should be analysed more thoroughly, with direct reference of knowledge as the object of economic exchange. A second important issue is that of the practical implementation of an online strategy for a KMY service. In other words, there is the need to integrate a descriptive or analytical approach (that can be useful to make classifications or illustrate problems) to more normative guidelines for business.

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