A Framework for Analysis and a Review of Knowledge Asset Marketplaces

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Abstract. An increasing number of enterprises are getting interested in exploiting knowledge, tacit or explicit, lying outside their organizational borders and augmenting the knowledge network of their organizations. A first generation of knowledge e-marketplaces has arisen to provide the platforms for knowledge exchange and trading in an inter-organizational level. This paper develops a framework to evaluate the business models, roles, processes, and revenue models of knowledge trading platforms and provides a survey of six existing knowledge marketplaces based on this framework. Finally, a set of conclusions is drawn on what issues should be addressed in a knowledge marketplace in order to eliminate the risks and gain the trust of its targeted customers.

1   Introduction

Electronic marketplaces can be said to represent a second wave in the e-commerce propagation and can be defined as interactive business communities providing a central market space where multiple buyers and suppliers can engage in e-commerce and/or other e-business activities (Bruun et. al., 2002). Their primary aim is to increase market and supply chain efficiency and create new value.

As marketplaces evolved two key elements have arisen: their ability to provide not only transaction capabilities but dynamic, relevant content to trading partners and their embracement of dynamic commerce, which involves the buying and selling of goods and services online through flexible transaction models that change over time based on multiple terms such as price, condition of goods, warranty, and shipping costs.

Nowadays we are witnessing the emergence of complex e-marketplaces that must support existing business processes and systems and facilitate the transactions of complex and context-specific products. The landscape becomes even more vague and complicated by the replacement of the so prominent value chains of entire industries by much more complex value webs embedded in an ecosystem where the growing importance of intangible assets and new technology, the existence of the right connections and alliances and the shift in focus from customer-centric to customer-driven are determinant to success.

As a result a new type of marketplaces has emerged to cope with an important dimension of this new ecology, which is the transaction of knowledge assets, the knowledge marketplace. Aiming to facilitate the flow of knowledge and to increase the efficiency of knowledge exchange and trading in an inter-organizational level the k-marketplace is facing a plethora of challenges.

Content is becoming even more critical for k-marketplaces. Buyers need good content description, namely content about the content, to make informed purchases and valid and appropriate knowledge assets that will satisfy their needs, while sellers need content about transactions and customer feedback as to properly market and differentiate themselves from the competition and address efficiently existing and emerging customer needs. As a result, the accessibility, usability, accuracy, and richness of content directly impacts the value that a marketplace adds on its customers.

Another development, that actually favours k-marketplaces, is the shift towards dynamic commerce, since some unique characteristics of knowledge products, such as being intangible and highly context-dependent making it difficult for the buyer to assess and value them beforehand and for the supplier to price them in a transparent marketplace of multiple buyers, do not allow static pricing.

Furthermore the increased push towards collaboration and knowledge sharing within a dynamic value web calls for powerful mechanisms that will efficiently support these functionalities and also seamlessly integrate them with corporate knowledge management systems.

A first wave of k-marketplaces has already made its appearance shifting existing knowledge markets into the Web. Examples include (Skyrme, 2001): Intellectual property trading, Recruitment agencies, Management consultancies and Research companies.

This paper develops a framework, called Knowledge Trading Framework (KTF), for analysis of knowledge asset marketplaces and provides a survey of existing k-marketplaces based on this framework. The objective of the survey is to gain a deeper understanding of the business models and methods employed by the first generation of knowledge trading initiatives.

The sample for the survey includes six k-marketplaces that were selected with the objective to cover a wide range of types of knowledge assets traded at the present time. The main criteria for the selection were the success and market penetration of the marketplaces as well as the novelty of their business models.

The Knowledge Trading Framework, which provides a holistic approach for the examination of our subject, is presented in chapter 2. The results of the analysis are presented in chapter 3 where a detailed comparison of the marketplaces is illustrated including useful and consistent conclusions we have drawn. The detailed cases of the selected marketplaces as well as an extensive questionnaire, which has been created to further facilitate our analysis effort and follows the structure of the KTF, can be provided upon request by the authors.

2   The Knowledge Trading Framework

In order to evaluate the business models, roles, processes, and revenue models of existing knowledge trading platforms, we have developed a basic framework for

Knowledge Trading (KTF), which identifies the core elements to be talked about. KTF is based on the Business Media Framework (BMF) (Schmid and Lindemann, 1998; Schmid, 1999; Schmid, 1997), which is adopted and enhanced by the addition of the Strategic Orientation and Knowledge Assets elements in order to capture in a holistic manner all the important issues that are related to *knowledge* marketplaces.

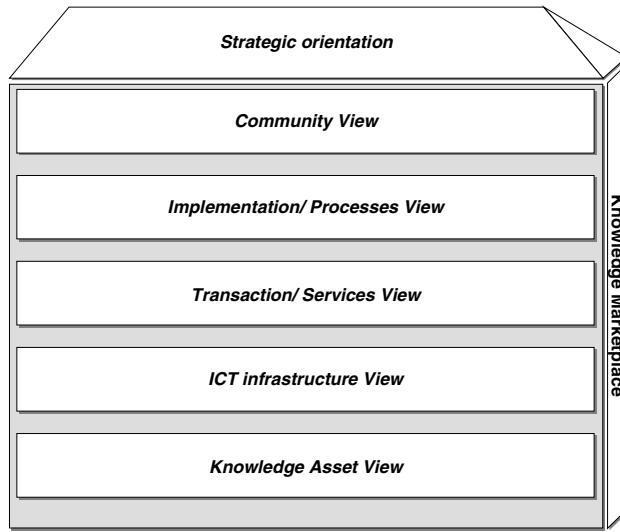The proposed framework is depicted graphically in Figure 1.

Fig. 1. The framework for knowledge trading and sharing

2.1   Strategic Orientation

The cornerstone of a knowledge marketplace positioning is the value that adds on its participants. The value proposition depends on the knowledge product or service that is offered, its uniqueness and the means of delivering it to the targeted segment of customers. A unique value proposition can provide a first mover advantage that is an important factor for success and can lead to premium pricing of the knowledge offerings. This leads to the selection of a specific niche that could be a specific customer segment, a specific knowledge domain, a capability/ expertise niche, a service niche or a focused geographic location.

Having selected a niche, the other main element of the strategic orientation is a viable business model that should carefully consider costs and resources and address issues such as *liquidity*, *trust and risk* and *revenue model*:

− The main struggle of a market maker is to ensure *liquidity* of participants and transactions, especially in neutral marketplaces that face the chicken-egg problem.
− Furthermore, to participate in a marketplace the potential customers need the associated *risks* to be eliminated. The more the risks are tackled efficiently the more their *trust* increases towards the marketplace. A number of risks ranging from

financial ones to risks regarding the quality of products concern participating members and need except for the proper infrastructure, clear policies and rules.

− The right balance between the created value and the imposed fees, namely the *revenue model*, should be achieved in a way that both the viability of the marketplace is ensured and the participants still consider the cost of participation fair. Major hurdles are the intangible nature of knowledge assets and the difficulties in assessing their real value.

2.2   Community View

Participants in any marketplace, no less in k-marketplaces, rarely rely solely on direct information, such as catalogue listings or product sheets in making a purchase decision. Such sources do not reveal possible, common problems of the product, or identify alternative products and vendors. To compete their information, buyers typically turn to other buyers of objective third parties.

One of the best ways to supplement the direct information provided by suppliers is to create opportunities for market participants to interact with one another. Today, many markets are enabling participants to make suggestions, offer comments, or engage in dialogues around products, services and suppliers. By doing so, market makers ensure that buyers can obtain online the information they seek from their peers. Seller benefit as well, by having informal opportunities to respond to buyer questions, and to receive feedback about their products and services. As with offline interactions, this communication has another important by-product over time: the development of trust among participants.

However, for these interactions to work successfully we need to describe and structure the *business community* of primary interest beforehand. Therefore, within the community view the *roles* of the participating market member are defined. Based on these roles the interaction of the market members is structured by the necessary *protocols*. Protocols model the admissible interactions among agents providing a set of clear rules and instructions. Apart from specifying the flow of actions they specify the way the marketplace evolves as well. Finally a common language and understanding between the market participants needs to be reached.

2.3   Implementation View

In this view the roles and protocols are realised based on the underlying services in term of specific *processes*.

There are three types of *processes* relevant to e-marketplaces. First of all, the on-line processes that allow the participants to accomplish specific tasks and activities with regard to their assigned role and the relevant protocols. These processes are either strict and pre-defined or may derive on the fly during the interaction of the members with the platform.

The second type concerns marketplace supportive processes that are associated with the support of the normal operation of the marketplace and the delivery of all the offered services in an efficient way.

Finally, the integration of on-line services with back office operations of participating companies benefits both companies and market makers, since seamless flow of knowledge increases the efficiency of interaction.

2.4 Transaction/ Service View

A market transaction can be understood by means of a phase model following the logical flow of actions. This includes the following phases:

The *Knowledge Phase* deals with providing the market participants with the necessary information about the offered products and services. Electronic product catalogues, push- and pull- services or intermediaries, can provide this information. Especially when dealing with complex products like knowledge assets are, satisfying results of this knowledge phase can only be expected, when there is a commonly agreed on logical space, for example in form of an agreed on vocabulary with a shared semantics.

In the *Intention Phase* the market agent develop concrete intentions of exchanging goods and services. The results are precise demands and offers. The primary medium to make offers public is the electronic product catalogue. The description of offers must be precise in a way that it is a sufficient basis for signing a contract.

In the *Contracting Phase* the negotiation takes place, which in case of success is finalized in a valid and secure electronic contract, possibly by integrating trusted-third parties. These contracts are based on the results intention phase.

The services needed during the *Settlement Phase* concern the settlement of the electronic contract. This includes the delivery of services, transport of goods as well as the transfer of payments, insurance and other related services.

2.5 ICT Infrastructure View

This view contains the communication-, transaction- and transport-infrastructure respectively the interfaces to the latter ones. They are used within the service view to implement the services. In general, we evaluate the infrastructure details only if they seem to have a special impact on a certain knowledge trading scenario.

2.6 Knowledge Assets

The starting point for a knowledge trading and sharing scenario is to consider what knowledge assets to commercialise. Skyrme (2001) distinguishes between two main types of exploitable knowledge assets: those that are primarily people-based and those that are object- or information-based.

Some of the most valuable knowledge-intensive services are those relying on personal knowledge. Specialist expertise associated with deep tacit knowledge, insights and experiences may be "productised" and be put on a knowledge marketplace.

Object-based knowledge assets are typically the result of synthesising many different elements of knowledge and applying a design and development process. The resulting object-based knowledge assets are most commonly packaged into two main

types of media: compute-based and paper-based. The former include databases, Web pages, software (e.g. expert systems). The latter includes documents and many other types of publication – reports, books, articles, etc. The same knowledge is often packaged in different ways to meet the needs of different consumers and the different ways in which they will use it

3   Comparative Analysis

The comparative analysis presented in this section follows the same structure as the KTF. The various aspects of knowledge trading that we focused on are classified into the six components of the proposed framework and a relevant table presenting a synthesis of the results is introduced at the end of this section.

A short description of the selected knowledge e-marketplaces is presented next, while the more detailed studies of these cases can be provided upon request by the authors:

− Experts Exchange: ExpertsExchange.com has pioneered the IT Professional Collaboration Network marketplace since 1996 with the aim of bringing together professionals in the field of information technology and promoting collaboration among them, in order to provide specific solutions to specific problems.
− Knexa: Knexa.com created in 1999 the world's first person-to-person as well as business to business knowledge auction, a patent pending e-commerce application that applies dynamic pricing to digital goods such as codified knowledge, software, and multimedia content.
− Yet2.com: yet2.com founded in February 1999, aimed at being the first global marketplace for buying, selling and licensing intellectual property on the Internet with the use of an anonymous, confidential and secure process.
− HotDispatch: Hotdispatch.com, founded in 1999, provides a marketplace for IT/IS professionals, systems integrators, and channel partners to buy and sell knowledge services such as questions and answers, project outsourcing, and software exchange.
− Community of Science: CoS.com is the leading Internet site for the global R&D community. Community of Science brings together scientists and researchers at more than 1,300 universities, corporations and government agencies worldwide and provides tools and services that enable these professionals to communicate, exchange information and find the people and technologies that are important to their work.
− eWork: eWork.com operates one of the largest talent marketplaces on the Web with over 300,000 registered users. eWork is headquartered in San Francisco with additional offices throughout the United States and in Europe.

3.1   Strategic Orientation

Most knowledge e-marketplaces tend to position as neutral, playing the role of an independent intermediary who matches knowledge seekers with relevant knowledge sources without favouring any specific side. Yet, in some cases the operation of a

marketplace is determined to a certain degree by participating partners intending to serve their own interests better. These partners, that may be large buyers or sellers, banks and consulting firms, often partially fund the endeavour and have a specific interest in it. For example Caterpillar, which is backing up yet2.com, wants to influence the architecture, processes and value-added services of yet2.com to suit the technology transfer needs of its industry.

One of the major advantages that knowledge marketplaces offer is the increased market reach for knowledge sellers who can have access to a broader set of potential buyers around the world and vice versa. Yet, the range of potential customers in a marketplace depends on the strategy followed by the market maker to attract participants. In parallel a strategy that focuses on building the transaction volume, which in some cases is more important than the number of members, should be formed and applied. Players who trade the most should be targeted and actively helped by the market maker to migrate their transactions on-line.

In addition to these a good brand name can be a determinant for the success of a marketplace. The name of a marketplace depends on the best part on the companies that back it up, either by investing on it or forming partnerships with it or participating as buyers or sellers. Furthermore, marketing techniques can enhance the marketplace's image.

Finally, the revenue model of a marketplace is an important strategic decision since the profits and consequently the viability of the marketplace depend on its suitability and effectiveness. It was not surprising to find out that most marketplaces prefer their revenue model to rest on a combination of fees (see Table 1) in order to become less vulnerable to competition and tie their revenue model more accurately to the value being created as perceived by the different types of customers.

Table 1. Sources of revenue selected by the k-marketplaces

Sources of Revenue	Hot-Dispatch	Knexa	yet2.com	Experts Exchange	Community of Science	eWork
Transaction fees	√	√	√			
Sales fees	√			√		√
Fees for VAS			√			√
Subscription fees				√		
Membership Fees			√		√	
Advertising fees				√	√	√

3.2   Community View

In every marketplace we examined there existed at least two clear and distinct roles:
− the knowledge seeker or buyer who has a need for knowledge, which need may vary from specific and crystallized to vague and immature,
− the knowledge provider or seller who owns a knowledge asset, which may be explicit, such as a best practices document, or tacit, like consultancy time.

Other intermediaries, like brokers or trusted third parties or service providers, were included depending on the business model. For example, Knexa houses companies, called Knowledge Agents, which carry expertise in specific business areas.

Protocols serve the model described in the community view and especially the relevant business community. Besides, the marketplaces have to adhere to general law of their country or region and to follow legal obligations given by the arising Internet law and standards, like Netiquette.

Regarding probable disputes the increased complexity to assess a knowledge asset value, which is connected to its relevancy and applicability to each specific case, may lead to several kinds of disputes. A marketplace needs clear rules and a dispute mechanism as to avoid trouble, like disappointment from the usefulness of an asset, refusal to payment etc, resulting in the loss of trust or even worse in the withdrawal of participants. Resorting to arbitration schemata within the marketplace or by independent third parties should also be stated clearly in user agreement. In most marketplaces in the survey disputes are solved on an individual basis, which is the easier way. The other mean is to call an independent arbitrator to settle the dispute under the specific country's arbitration rules, which happens in HotDispatch.

The fulfillment of an order or the support of the full transaction cycle on-line represents an important advantage for the marketplaces that provide them. Especially knowledge assets being intangible and, often, in digital format simplifies the delivery process to a certain degree. On the whole, in knowledge industry both services and products can be delivered on-line depending on the infrastructure of the marketplace. In all the marketplaces examined in the survey, apart from yet2.com and Community of Science, the business transaction cycle is completed on-line. This is because the assets traded in yet2.com (IP, technology) are very complex to transfer and hard to negotiate on-line. In the case of Community of Science, the service restricts itself to matching scientists and funding organizations and initiating a contact.

Protocols regarding the facilitation of collaboration and creation of new knowledge businesses through a virtual organization structure or a looser team formation can accelerate knowledge creation and development within a marketplace. For example, e-Work provides a secure virtual space and the appropriate collaboration and project management tools, which are the main enablers for the development of on-line synergies. The various aspects of knowledge co-creation include infrastructure, project management, legal arrangements, equity and intellectual rights etc.

Lastly, knowledge marketplaces have a two-fold role; besides enabling knowledge transactions they provide a venue for people to socialize. This venue is defined by a set of values and norms which are set by the market maker and are usually very strict regarding what is not allowed to be said or done by the participants. When relationships between members develop new groups and sub-communities can be created and evolve following the unwritten rules imposed by the specific group's mentality. A space for the social interaction of the members of the marketplace is nurtured in two cases, Experts Exchange and HotDispatch. In Knexa self-evolving, autonomous communities may grow under the wings of the Knowledge Agencies.

3.3   Transaction/ Service View

The functionality of a marketplace is based on the services that are employed to support the transaction cycle. Services should efficiently deal with all the issues regarding commerce, collaboration and content in order to enable a customer to carry out a satisfactory transaction and enjoy a pleasant on-line experience.

Therefore, the selected services should address the key inefficiencies in the specific market space and they need to be coordinated to yield synergistic effects and to create new value. Their mix should be dynamic and reflect the on-going changes in the marketplace environment. For example Experts Exchange enriched their services, both in the commercial and the content area, by providing an organized library of well-structured previously answered questions accompanied with advanced search tools. A subscription fee is charged for unlimited access to the knowledge assets of the library. By this service Experts Exchange exploits the previously untapped resource of three million answered questions.

Specifically, the commerce model is more or less specified by the selection of the trading mechanism(s) (catalogue, auction etc) and various factors have to be considered before the final selection; product complexity, available liquidity and maturity of trading participants are the most important. HotDispatch provides a reverse auction mechanism since there is the analogous liquidity to ensure the mechanism appropriate operation. An interesting case is Experts Exchange that operates a patented recognition system to induce its members to participate actively in the marketplace, whose notion is based more upon voluntary participation and reciprocity than on making profit. In the following table the pricing mechanisms employed by the marketplaces of the survey are presented.

Table 2. Pricing mechanisms employed by the k-marketplaces

Pricing Mechanisms	Hot-Dispatch	Knexa	yet2.com	Experts Exchange	Community of Science	eWork
Fixed Price	√	√		√		
Direct Negotiation [1]	√	√	√		√	√
Auction		√				
Reverse Auction	√	√				

The appropriateness of pricing mechanisms ensures that knowledge assets are priced in accordance to their market value at the specific time of the transaction. Although different kinds of mechanisms match better with different types of assets, the availability of a set of pricing mechanisms can establish trust and help to better depict the value of an asset as perceived by its potential buyer.

Credit and payment mechanisms comprise another crucial service for gaining the trust of the potential members of the marketplace. Payment mechanisms should make it easy for the customer to do business with and reduce the buyer's risk. Of course clear terms of trading go hand in hand with trust. Regarding security the technologies that are broadly used are SSL and digital certificates. Another arising issue especially for marketplaces that handle low cost transactions is dealing with micropayments. Knexa provides a mechanism for dealing efficiently with this type of payments. The payment mechanisms that have been selected by the marketplaces are presented in the following table.

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[1] In the cases of CoS and yet2.com direct negotiation takes place off-line while in eWork it can take place either on-line or by traditional communication mechanisms

Table 3. Types of Payment Mechanisms employed by the k-marketplaces

Payment Mechs	Hot-Dispatch	Knexa	yet2.com	Experts Exchange	Community of Science	eWork
Credit Card	√	√		√		√
Wire Transfer	√					
Off-line	√		√		√	√
Other [2]	√					
Micropayments		√				

Moreover, value is added and trust towards the marketplace is further established by the provision of a range of payment mechanisms so that the member can choose the one fitting his needs can. For example, HotDispatch offers four different payment mechanisms, satisfying customers' various needs and establishing a strong trust relationship at first sight.

Another element that enhances the reliability of the marketplace and reduces risks for the buyer is proof of the credibility of the participant as well as the provision of a payment guarantee that shifts the risk of the transaction from the customer to the market maker. Loyalty is further enhanced by the provision of financial and other value-added services such as invoicing. e-Work provides billing and payroll services and also guarantees the professional services provider's payment regardless her client's payment attitude.

It also seems essential for the smooth interaction of the customers with the knowledge marketplace a personal account and repository to be provided to them, which will facilitate them to easily handle their knowledge assets and personal information as well as completing administrative tasks. eWork provides its users an account with which they can audit and handle all their interactions in the marketplace.

3.4   ICT Infrastructure View

In terms of the underlying infrastructure, our notices conclude to a set of characteristics that the selected technologies have to carry. First of all the platform has to be scalable as to cope with the increased volume of transactions or the number of participants. Secondly, it has to be flexible in order to adapt to possible focus shifts and increased demand. Thirdly, it should ensure security as to establish trust. Fourth, the platform must offer the possibility of frictionless integration with back-office systems of participating members and support the migration of intimate supplier networks. For example HotDispatch facilitates the migration of existing communities in the internal of companies onto the platform with the use of corporate accounts. Fifth, the platform should enable connectivity to other marketplaces as to offer to members a one-stop experience providing them with the capability to buy all relevant products and services through one marketplace. Community of Science provides this opportunity to its members by connecting them with a broad set of databases and marketplaces relevant to their needs. Finally, an important element is ease to use that is achieved by user-friendly interfaces.

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[2] PayPal® is an email-based service created by HotDispatch to enable individuals and organizations to add a financial reward to any email request they send

With regard to the collaboration part, trading participants and / or third parties should be easily connected with collaboration tools that satisfy their specific needs for communication and team working. QuestionReader, a patented mechanism available in HotDsipatch, deals with collaboration issues with success enabling threaded discussion between participants using a mailreader style interface.

3.5   Implementation View

A successful value proposition should rely on processes that streamline and transform the traditional processes in the knowledge supply chain. ”How” to conduct business can be a differentiating factor by itself obtaining competitive advantage for the marketplace, both against traditional businesses and direct competitors. For example yet2.com creates value for its participants by providing them with an anonymous, confidential and secure process for technology transfer and licensing. The proposed process reduces drastically the needed time for locating a buyer or a provider of a specific licensed technology.

Furthermore, integrating the marketplace functionalities with back office systems of the participants, e.g. knowledge management systems, content management systems or workflow management systems, increases value delivered to the user. It also increases switching costs of the customer to competitors.

3.6   Knowledge Asset View

A marketplace may be focused on a specific industry and its needs for knowledge or it may cater for a variety of industries with a similar knowledge need. In both cases, it is not only the quality of content that matters but also the quantity of knowledge assets plays an important role. A marketplace that doesn't have a plethora of items available, even if it is a niche market, cannot meet and fulfill customer broad range of needs, leading to frustration and lose of trust.

Additionally, the confidence and trust of buyers is increased when the sellers have been validated before they are accepted in the marketplace by the market maker or better by third parties, e.g. commercial chambers. Yet, customer feedback and ratings on products and sellers professional behaviour can help buyers gain confidence towards specific suppliers. Knexa uses a three-star rating system for buyers to grade the quality of a knowledge asset, while HotDispatch and Experts Exchange employ a similar system for grading experts' performance.

It seems to be a common ground for most of the examined marketplaces that structuring their knowledge assets catalogue is not an underestimated operation, diminishing this way the risk of frustrated customers unable to locate a proper category suiting their needs or offers. A logical and rich structure of the classification scheme available on a marketplace in parallel to good computer searching algorithms, that make catalogues easily searchable, and items accurately described so they can be easily compared, can provide satisfactory and quick results to customers searching for specific knowledge. The customers who approximately or not very clearly know what could be helpful for their case may initiate a dialogue with knowledge providers and conversely (for example in RFQs), so that needs and offers can be refined.

Marketplaces for experts or project outsourcing provide this type of facilities, e.g. Experts Exchange and HotDispatch. Moreover, in complex knowledge assets knowledgeable human brokers can make the most accurate matchmaking giving the marketplace a distinctive advantage. A good paradigm is yet2.com, where although the patented format for describing a technology is adequate for most of the cases, a human infomediary sometimes is needed to make the proper matches.

4   Conclusions

The objective of this survey was to gain a deeper understanding of the business models and methods employed by existing knowledge marketplaces, based upon the Knowledge Trading Framework, which captures in a holistic manner all the elements that are useful for understanding and analyzing the structure and strategy of knowledge marketplaces. It becomes clear from the analysis of the selected marketplaces the fact that an increasing number of enterprise are getting interested in exploiting knowledge, tacit or explicit, lying outside the organizational borders in parallel to harnessing the internal knowledge resources. The arising need for augmenting the knowledge network of their organizations has led to the participation in various types of the first generation of knowledge e-marketplaces.

Our analysis of six of these marketplaces has helped us draw a first set of conclusions on what are the main trends in knowledge trading and how typical e-commerce issues are addressed by the existing knowledge marketplaces.

First of all, the trend of knowledge marketplaces to position as neutral business communities playing the role of an independent intermediary, achieving the increased trust of customers towards the marketplace, became clear. On a second level, regarding content, it appears that most marketplaces tend to target a niche market when launching, providing a narrow assets portfolio that is expanded aggressively as soon as a firm market share has been established in the particular focus segment. Moreover, liquidity of quality content and participants, especially in expert-based communities, are vital for survival and development and directly associated to the marketplace's potential of revenue generating.

Secondly, the two main roles in all knowledge marketplaces are these of knowledge seeker and knowledge provider, supported during their transactions by a group of agents, like brokers, certification authorities, services providers, escrow agents etc. These roles act within a business community governed by specific protocols and rules. Yet, sub-communities or socialization venues are also provided in most cases, aiming at further increasing participants' loyalty via their emotional involvement.

Thirdly, it seems to be a necessity for the marketplace in order to be accepted to support the full transaction cycle on-line. Information and intention phases are supported by category lists, search engines, requests for quotation, recommendation services and intelligent matching mechanisms. In the contracting phase negotiation occurs either off-line, in some cases for projects, or more often on-line via pricing mechanisms such as auctions and reverse auctions or direct negotiation and on-line communication tools. Finally, in the settlement phase secure payment services are always available and in general rating services allow buyers to grade the quality of content delivered.

It is certain that some of the existing knowledge marketplaces will not prove to be viable while on the other hand a number of new and innovative ones will arise as the need for knowledge from outside the boundaries of organizations increases and the relevant business domains expand. Comprehending these needs as well as the peculiarities of knowledge trading in contrast to traditional e-commerce are the main enablers to creating viable and profitable business communities that add real value on their customers.

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