INNOVATIVE TRADE FAIRS FOR INCUBATING VIRTUAL ENTERPRISES

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FairsNet is a research project offering innovative on-line services to support trade fair activities, as well as the activities of a possibly unlimited number of exhibitors, organized in Web-based virtual fairs, in order to improve the efficiency of establishing business contacts. This paper is envisioning innovative services the FairsNet system should deliver to become an environment suitable for the development of virtual organizations. In particular, combining real and virtual fair, FairsNet seems able to overcome problems usually related to temporary business partnerships (e.g. trust, loyalty, confidentiality).

1. INTRODUCTION

Contemporary competitive markets are increasingly becoming more and more complex and dynamic, thus undermining the efficiency and the effectiveness of the traditional way of doing business. Hence, almost every business should face new and interconnected competitive challenges:

- Global competitive markets, high pace of innovation, time-based competition;
- The added value is generated by the “knowledge” conveyed into the product;
- Stakeholders’ needs have to be deemed strategic for succeeding in the market.

In such a turbulent environment, enterprises must behave as proactive system instead of being reactive as usual. The success of a business not only relies on the capacity to foresee the market trends, but also on the capability to drive such trends toward an advantageous direction.

Our enterprises should then engage a continuous process of organizational change in order to remain consistent with their environments: the only way to positively meet the forces imposing organizational change is to create and institutionalise in the firm strong change capabilities. Management should not try to design organizations able to predict the future, but to develop organizations able to grow up and to compete in an *unforeseeable* future. Such goal could be achieved by means of a strategic approach based on the focalization on core business and the simultaneous externalization of other activities of the value chain to temporary

collaborations with other enterprises. Focalization is necessary because, to succeed on the market, it is generally preferable to master a limited section of the value chain (thus becoming a center of excellence on the field) instead of being "one of the many" in many fields. Obviously, focalization imposes to constantly look for partners able to perform the remaining activities of the value chain.

The temporality of the collaboration is a key factor for achieving a certain level of organizational flexibility: the focalized enterprise should be able to provide its expertise in many different ventures, choosing time to time the cooperation more suitable for meeting the market's needs.

It is self-evident that our enterprises, given their present competitive strategies and organizational configurations, are not able to cooperate in such a flexible and simple way. For these reasons, we need to deeply rethink the way our SMEs (Small and Medium Enterprises) are organized (Coyne, 1998).

A virtual enterprise configuration may represent an efficient and effective answer to the competitive challenges the European SMEs are currently facing. A virtual enterprise is a temporary network of autonomous enterprises based on the "plug and run" rule: single enterprises connect themselves stimulated and driven by the market - the network is configured as an efficient medium to exploit a specific business opportunity arising on the market (Mowshovitz, 1997) (D'Atri, 2001).

In the European context, the virtual enterprise configuration may result in a large number of prolific applications. Small and medium enterprises represent the building block of European economy. Traditionally, SMEs are used to match environmental complexity by connecting themselves in industrial districts, i.e. networks of enterprises located in a narrowed geographical area and performing complementary or homogeneous activities. Within an industrial district, SMEs develop a complete suite of horizontal and vertical inter-relationships. Industrial districts are geographically localized organizations, hence they are able to take advantage of their proximity to start tight and extensive communication processes.

On the one hand, geographical proximity allows enterprise to join on the basis of common culture, understanding and behavior, and, in general, of a solid trust among partners. On the other hand, the significant geographical characterization of industrial districts may in the long run represent a threat: the possibility to integrate firms having specific competencies necessary in the supply chain is subordinate to the availability of such enterprises in the geographical area the district belongs to. In addition, the existence of strong and long-lasting relationships among SMEs within an industrial cluster may end-up in situations of rigid specialization; in such cases the industrial district becomes very similar to a traditional hierarchy.

Virtual enterprise may be one of the more desirable paths of development European SMEs. This opportunity is pushing the need for reliable on-line environments acting as incubators. Indeed, enterprises from all over the EU need to find on-line aggregation points where to meet each other, interact, find partners, and set up virtual enterprises. Trust, reliability and highly personalized added value services are the essential keywords for such environments.

2. TRADITIONAL E-MARKETPLACES: ENABLERS OR INHIBITORS?

On-line intermediation in general, and the development and management of digital

marketplaces in particular, are generally considered as potentially profitable businesses. Hence, there have been many attempts to establish interorganizational cooperation enabling environments: in the short past, we have witnessed waves of vertical portals, electronic malls, e-marketplaces, virtual communities, but no one succeeded in developing a true *killer application*. Among such waves of enabling environment, the most promising seems to be the one triggered by e-marketplaces.

An e-marketplace is a meeting point where a large number of buyer and sellers (suppliers) get in touch and interact to carry out business relationships. E-marketplaces are usually managed by a trustworthy intermediary that regulates and encourages the transactions (Ice, 2002).

The services offered by an e-marketplace to its members may vary from the possibility to access the catalogue of the products to the payment support. In addition to such services, usually members are allowed to exchange requests for proposals, requests for quotations and offers. Bids are also becoming widely adopted systems for stimulating transactions.

However, a recent survey (Mate, 2002) has highlighted that the 88% of the European e-marketplaces are not profitable. In addition, it is shown that the ROI generated by the 25 most important European e-marketplaces has been lower than 2%. A parallel survey on Italian e-marketplaces (Associazione Impresa Politecnico, 2002) has pointed out that the most widespread services made available by e-marketplaces are (1) on-line presentation of member enterprises and (2) logistics-support services. Quite common are also information services (newsletters, bulletins, information filtering and distribution) and community services (on-line forums, messaging systems). A considerable amount of e-marketplaces is also making available consultancy services to members.

Even though surveys may be partial or too generic, it is unobjectionable that the business model adopted by e-marketplaces is not generally satisfactory. The intermediary seems to be more concerned in supporting spot transactions among members instead of enabling the development of long-lasting business relationships. In addition, a lack of added value services delivered to member enterprises is usually inhibiting rich cooperation forms.

3. THE FAIRSNET PROJECT: VIRTUAL TRADE FAIRS FOR SUPPORTING INTERORGANIZATIONAL COOPERATION

Fairs have always been events allowing people to meet, to know each other, to share information and knowledge, and to plan and develop new ventures. In European modern history (since 13th century), fairs represented a powerful forum for disseminating innovations and setting-up business partnership. Fairs were hosted in every town and were organized many times every year.

With time, fairs lost much of their commercial importance, increasing instead a higher social significance. By 20th century, fairs became expositions, aiming at attracting general public and thus their partnership-enabling power declined.

Today, FairsNet (On-line Solutions for Trade Fairs, IST-2001-34290) is trying to revitalize, by means of most recent Information and Communication Technologies advancements, the traditional fair model.

FairsNet is based on two integrated modules: 1) a supporting system for trade fair events, called Real Exhibition System (RES), which manages the real event 2)

Virtual Exhibition System (VES), supporting and managing a permanent on-line virtual trade fair, which is a permanent on-line system, accessible via Internet (Buono, 2001).

By enhancing trade fair information systems, the project allows comprehensive and focused visibility of SMEs within the market, without the need to make large investments into advertising, thus improving the economical European development.

The FairsNet approach extends the duration of a fair and increases the number of people and organisations that can visit the fair. In a larger context, the FairsNet project will give a technological support that facilitates and speed up contacts among companies. Indeed, the virtual fair will provide a means for allowing visibility of SMEs within the market, without the need to make large investments in advertising, thus increasing their competitiveness and improving the overall economical European development. In the long run, FairsNet is expected to become an added-value integrator for SMEs over the Internet. Indeed, FairsNet could create the right environment to sustain the development of a new kind of organization: the virtual enterprise.

An expected evolution of services supplied by FairsNet is the on-line dynamic cooperation support. This would mean a restoration of fairs' traditional role: a marketplace where supply and demand could meet and knowledge be shared.

The FairsNet integrator would be applied to specialized fairs having an audience of many homogeneous SMEs. This homogeneity is essential to characterize the virtual district and to assure that provided services fit the needs of the community. In addition, the correlation with real fairs would allow people to physically meet in at least once per year. The participation in both real and virtual fairs is a key feature in creating a trustworthy environment in which close and long-lasting inter-firm relationships may be developed

The positive psychological impact (mainly in terms of trust) of being part of a fair long-lasting community and the sense of physical proximity with potential partners are important benefits that FairsNet will deliver.

This hybrid system (real and virtual) can function as an incubator for new virtual organizations and to generally allow an environment based on mutual trust and common values by combining "human contact" and Internet technologies. However, this may not be sufficient for incubating virtual organizations, hence FairsNet has to supply a full range of high value services to support the creation, management and dissolution of the cooperation venture (Porter, 2001), these services are discussed next.

4. ADDED VALUE SERVICES FROM FAIRSNET

The trade fair business model adopted by FairsNet is potentially able to create an appropriate environment (it would be better to say FairsNet may create many different environments, i.e. every specialized fair, having particular characteristics, need to have its own enabling environment) for developing virtual enterprises. However, to impose it on the market, it is necessary to make available to member enterprises a meaningful number of added value services.

In addition to the services usually delivered by traditional e-marketplaces, FairsNet would put a particular emphasis on five main enabling services:

4.1 Relationships building support

One of the main tasks to be performed by a virtual fair system is to allow people and organizations to get in touch. Hence, FairsNet is making available many visualization techniques (each user may navigate the fair in his own way) and a data mining system to develop precise user profiles.

In addition to 2D and 3D fair visualizations and to user profiling modules, FairsNet is making available search engines, directories and indexes about fair participants. By accessing this database, it is possible to find suppliers or partners.

Once selected possible partners, communication is fundamental to any organization, but it is preeminent in virtual organizations: since information is the “glue” linking together dispersed members, electronic communication is necessary for achieving integration. The main feature characterizing electronic communication in virtual organizations is that both links and contents are likely to be temporary, as relationships between members are formed and dissolved over time (DeSanctis, 1999).

FairsNet is already employing state-of-the-art visualization techniques and multimedia environments. To maintain effectiveness, the system has to be continuously updated in order to enhance the richness (overall quality) of information shared and to increase audience that it can reach (Evans, 2000). Information delivered by FairsNet would be customisable, interactive, reliable, secure, and up-to-date. In addition, FairsNet communication system would benefit from the close integration of the information systems that it is enabling.

4.2. Information systems integration support

Effective, reliable and efficient information systems integration is an essential prerequisite for starting a virtual enterprise. Since virtual enterprises are temporary and unstable, the data integration solution should be as flexible as possible. In addition, every virtual member should be allowed to maintain full control on his own data, hiding from the rest of the network his confidential, critical information.

FairsNet, by suggesting a standard XML semantics for each fair, could allow a closer integration of participant's databases, opening the way to a closer cooperation. By taking advantage of a common semantics, enterprises joining a virtual organization within FairsNet would gain:

- good degree of data standardization without modifying existing local db;
- platform independence;
- low development and management cost;
- openness toward new partnerships.

In addition, in order to perform on-line Business-to-Business transactions, virtual enterprises' members need to adopt a standard format for encoding messages with meaningful structure and semantics, as well as domain ontology that others may readily exchange and interpret.

Domain ontology provides a set of concepts, or meta-data describing agents, tasks, processes, and transaction items.

FairsNet could adopt a standard ontology for each fair, e.g. by specifying what the root element is for a document type, what elements may occur in the document type, what relationships are permitted among these elements, what attributes are allowed on each element, and what values these attributes may take. Thanks to the

standard ontology, the members of a virtual organization arising from a FairsNet fair could communicate effectively and efficiently.

4.3. Domain construction support

Any virtual enterprise being a unique combination of resources, people and knowledge, it is necessary to provide a service to adapt the depicted services to the specific domain of the single virtual enterprise. The need for meta-design is also based on the observation that design problems in the real world require *open systems* that users can modify and evolve.

Using the authoring tools, which would constitute the interface of the design environment within the computational system, the users will (Muscogiuri, 2002):

- Define and manage elements representing entities from the virtual organization domain. The stakeholder-designer can manage virtual enterprise domain entities.
- Define and manage elements representing entities from the Web application design domain (static and dynamic Web pages, forms, pages, navigation elements, system's users profiles).
- Exploit and define relationships between elements across the original domains.

4.4. Business processes integration support

When joining a virtual organization, every partner agrees to share a certain amount of his resources, but this is not sufficient: it is necessary to integrate processes, not just resources. In addition, this integration needs to be achieved in short time (as time to market is critical for exploiting the business opportunities while they exist). Workflow management systems (WfMS) are useful in integrating and synchronizing processes and in assigning authorities and responsibilities. WfMS for a virtual organization, unlike normal ones, has to deal with parallel processes and to efficiently handle exceptions.

The development of a workflow schema for each virtual enterprise must be economically convenient because of the virtual enterprise temporal limitation that inhibits the investment payoff (in particular for SMEs). Due to the high polymorphism of virtual enterprises, it is also ineffective to develop a well defined workflow schema. Hence, the application of workflow systems to the virtual enterprise is hampered by some inhibitors, e.g. the risk of opportunistic behaviors of the partners; non-determinism of the virtual process and unpredictability of the task sequence; need for a tight and continuous control on the virtual process; high probability of exceptions and the difficulty in handling them; etc.

While traditional Workflow Management Systems are usually deterministic and inflexible (Ludwig, 1999), FairsNet would integrate members' processes by:

- developing a workflow schema which, at different levels of detail, allows organizations to integrate themselves and, at the same time, prevent proprietary core processes from being accessed by partners;
- suggesting the use of workflow communication standard protocols (e.g. the ones adopted by WfMC (Workflow Management Coalition));

- determining the division of the Workflow in each organization, deciding how information is to be shared, and defining the work procedures (Hayami, 2000).

4.5. Knowledge management support

Participants join a virtual enterprise not only for integrating their expertise in particular sub- processes, but also for the opportunity to share inter-organizational knowledge.

Knowledge management in such environments, while necessary, is more difficult to implement than in traditional ones, because of additional challenges:

- since the virtual organization is dynamic and of short-life, today's partners may become tomorrow's competitors;
- the negotiation phase should be as short as possible (to serve the business opportunity in the market while it exists), hence there is no additional time available to design and establish an ad-hoc knowledge management system.

In any case, inter-organizational cooperation implies a certain amount of knowledge sharing among partners, but by sharing critical knowledge firms risk losing their competitive advantage sources. Then, enterprises joining a virtual organization would manage this trade-off by allowing a certain level of knowledge transfer while keeping classified and not accessible their core competences.

FairsNet would act as a knowledge broker, managing and integrating knowledge flows and regulate and optimise the access to the knowledge base of the virtual organization. Furthermore, it should monitor cooperative processes and gather and formalize potentially explicit knowledge arising. Hence, every partner shares part of its own knowledge and accesses the cooperative knowledge identified, organized and distributed by the system. FairsNet should be able to handle knowledge created in cooperative tasks and arising from interactions between the virtual organization and its external stakeholders, it will also provide members with on-line forums, newsgroup and videoconferencing tools.

5. CONCLUSIONS AND FURTHER RESEARCH

Virtual Trade Fairs environment seems to be suitable for supporting and stimulating the interorganizational cooperation. Unlike traditional e-marketplaces, trade fairs based on the FairsNet system would be powerful meeting points for enterprises willing to cooperate, allowing the development of long-lasting business relationships among members and delivering a whole suite of added value services.

The paper introduced the FairsNet system and described how it could stimulate and enable the development of virtual organizations. The hybrid (real and virtual) fair approach seems to overcome psychological and social partnership problems, which are often inhibitors for virtual organizations. Expected ICT evolutions will enable unstructured, high quality communications among geographically dispersed partners.

Nevertheless, many organizational and technical problems still need to be addressed (Chesbrough, 1996). In particular, logistics-related activities need to gain in efficiency in order to support the cooperation among geographically dispersed

organizations (there is a high risk of inefficiency because of bottlenecks and delays triggered by the necessity to move physical goods from a place to another).

In addition, all the envisioned added value services have to be studied in depth to isolate their critical features and suitable developing strategies.

It is also necessary to integrate these services with already envisioned FairsNet evolutions, in particular with the ones related to on-line training support (D'Atri, 2002).

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