

TECHNOLOGY INNOVATION-INDUCED BUSINESS MODEL CHANGE: A CONTINGENCY APPROACH

ABSTRACT

Revising and extending the current business model is acknowledged by organizations as an absolutely necessary practice to leverage investments in technology innovations. Business models that build on or emerge from a technology innovation are typically complex and entail a high level of risk. To handle that, organisations turn to contracting inter-organisational agreements, where each party brings complementary competencies in a collaborative form of service provision. This paper draws on theories of organisational development, scenario planning, and business models to propose a method that identifies scenarios and generates contingencies for building technology-enabled business models through partnerships. The validity and utility of the method are demonstrated via a multinational case study of mobile business innovation in the exhibition industry. Results show that scenarios are powerful tools for business change allowing organisations to identify and explore feasible and desirable co-operation schemes under different firm-specific and industry-related conditions, thus reducing the inherent risk of business model change.

Keywords: business model, mobile business, scenario planning, change method

INTRODUCTION

Under the influence of technology trends, most importantly information and communication technologies (ICT), many current organisational business models are set under question and companies are faced with the challenge of business model change. However, creating a radically new business model is a high-risk strategy, as the probability of getting it right is acknowledged to be low (Kalakota and Robinson, 2001). Companies typically choose to focus on an improvement strategy that is less risky and extends or renews existing strategy and business model.

Even in the case of business model evolution however, the process is not risk-free. Arguably the complexity of the ICT landscape makes it almost infeasible for any single business entity to possess the necessary array of competencies that will allow it to provide an end-to-end solution. Thus, alliance management, revenue sharing, and transparent cooperation become critical factors for success. Those companies with the ability to create business-to-business relationships without conflicts of interest are the ones most likely to succeed (Paavilainen, 2002). A business model must explicitly account for the need of partnership and provide the best possible answers to questions regarding the type of value that each partner will contribute based on its core competence, the distribution of revenues and profits between them, the type of service offerings, and the business structures that will be required to implement the changes (Rulke et al., 2003).

Existing research work on defining structured methodological approaches for business model change is rather fragmented. Most efforts are applicable only under certain business conditions, they are typically dependent on the codification used for business model components, and mostly provide a general framework rather than a stepwise methodology that can guide a business model evolution process. This paper aims to fill this gap by proposing a stepwise methodology allowing companies to design alternative scenarios for business model evolution or extension under the impact of technology innovation. The proposed methodology constitutes

the result of a research that synthesizes and improves existing literature in the area by combining it with insight gained through a real-life case study of multinational setting. The methodology is based on the identification of scenarios that depict possible changes on the current value chain and business model of an industry. Scenario-based business model development is the primary novel characteristic of the methodology, in line with several recent research works that argue in favour of scenarios as an efficient way of strategy design in uncertain and complex business environments (Mylonopoulos et al., 2002; Kulatilaka and Venkatramen, 2000). Further to scenario planning, the proposed method is also complemented by a novel contingency approach that draws on organisational theories to propose firm-specific and industry-related factors that can act as metrics for choosing between scenarios.

Section two provides an analysis and critique on prevailing theoretical approaches to business model changes. Then, section three outlines the proposed methodology for business model evolution under the influence of technology innovation. Section four complements the method by proposing firm-specific and industry-related contingency factors that affect the feasibility and likelihood of success of alternative business models under different industry settings. In section five, the methodology as well as the contingency approach are applied in a case study in the exhibition industry where the introduction of a mobile application, named as Mobile Exhibition Guide, is used to draw scenarios for business model change [1]. Finally, the paper concludes by putting forward implications of our findings for practitioners and future researchers.

BACKGROUND THEORY

While the necessity and complexity of business change have long been documented in the literature, it is only recently that researchers have started focusing their attention on *business model* change and its specificities (Pateli, 2002). For example, Petrovic et al. (2001) have developed a methodology for business model change that is based on the three learning stages

of Senge and Sterman (1994) as well as a number of system theories, such as system dynamics. The methodology includes seven steps, grouped into three stages, for moving from the current to the future business model (see *Table I*).

Take in Table I.

In a similar vein, Kulatilaka and Venkatramen (2001) suggest an options approach for designing an IT strategy and defining business models based on the capabilities of the firm and the evolving market conditions in the marketplace. This approach provides a company with flexibility in adopting new technology and changing its business model. Based on this approach, Kulatilaka and Venkatramen (2000) propose the following three steps to invest in new technology:

1. *Assessment of opportunities* for change and consideration of ways to exploit these opportunities.
2. *Acquisition of options*, which includes mixing options reflecting the likeliest opportunities and the future scenarios for the company and the marketplace.
3. *Acting on options*, which involves deploying additional capabilities, restructuring the company, reassessing its partnerships, and generally making the necessary adjustment to its business model in order to gain advantage of the option's promised opportunities.

Following a different path, Pramataris et al. (2001) employ a set of analytical tools to facilitate business model change under the influence of digital interactive television in the advertising industry. They present their work in the form of a sequence of ten steps, each of which makes reference to both the data collection method and the theoretical/analytical constructs employed (illustrated in *Table II*).

Take in Table II.

Although all these methods provide valid starting points for addressing business model change, they all share a common drawback: they are quite monolithic, in the sense that they provide a

strict linear sequence of steps that an organisation should follow when approaching business model change as a result of a technology innovation. As such, these methods might be more appropriate in relatively stable industry settings where a lower level of risk might be associated with business model change.

However, when considering more turbulent and complex contexts, such as the emerging market of mobile and wireless communications that is dealt with in the case study discussed later in this paper, such methods might not yield satisfactory results. In this paper, we advocate the use of scenarios as a more appropriate means for approaching business model change. Scenario planning (Bloom & Menefee, 1994; Godet, 2001) has long been used in management science and is acknowledged to support more flexible decision-making and less risky strategic positioning against alternative ‘futures’.

In the following section, we discuss a method for incorporating scenarios in business model change design efforts.

A SCENARIO-BASED METHOD FOR BUSINESS MODEL CHANGE

This section outlines the proposed methodology for business model evolution under the influence of a technology innovation. The discussion of the proposed methodology is made through a description of the primary steps and their contribution towards the final goal, which is the design of a set of alternative future business models in the form of scenarios. Having resulted from a systematic work on synthesising existing literature, the proposed methodology combines the following features:

- a) It is based on the 3-phase model advocated by Auer and Follack (2002) and Petrovic et al. (2001).
- b) It follows the approach of Kulatilaka and Venkatramen (2000) for defining scenarios as an intermediate step between the design of current and future business models.

- c) It uses and revises several steps of the iMEDIA methodology for the design of a future business model (Pramataris et al. 2001).

However, the proposed methodology also extends existing research in the field by incorporating two novel features. First, the design of future business models is based on the identification of a set of scenarios for alternative cooperation schemes among the involved parties. Second, the methodology includes an analysis of the resulting business models in terms of components, following the business model framework proposed by Pateli and Giaglis (2003).

The methodology consists of three phases, which are further decomposed into six steps. *Figure 1* illustrates the steps of the methodology in correspondence with the three key phases identified in the business model evolution process. In what follows, we briefly discuss the primary mission and anticipated result of each phase and describe the steps included in it.

Take in Figure 1.

Phase I: Understand

The first phase is concerned with a detailed analysis and documentation of the existing business model. Such analysis is required to gain an in-depth understanding of the current situation and establish benchmarks against which technology innovation impacts can be assessed. The need to anchor business change efforts on carefully documented models of the existing situation is well grounded in change management literature (for example, Davenport and Stoddard 1994).

Step 1. Document the Current Business Model

The initial step of the method includes depicting the current business environment with the aid of a business model analysis framework, such as those proposed by many researchers in the field (for example, Gordijn et al., 2001; Weill and Vitale, 2001; Osterwalder and Pigneur, 2002; Hamel, 2000; Pateli and Giaglis, 2003). The final outcome is a business model construct that can be used for *understanding* the key elements of a specific business model and their relationships, *communicating* and sharing the understanding of the business

among business and technology stakeholders, *specifying valid requirements* for technology innovation, and identifying options for *changing and extending* the current business model.

Phase II: Identify Technology's Influence

This phase is concerned with assessing the impact of technology innovation on the current business model. The anticipated result is the identification of possibilities for evolution or extension of the current business model. This phase includes the following steps:

Step 2. Assess the influence of technology innovation

This step includes an identification of the benefits and impacts that a given technological solution brings to key elements of the business model and a specification of the changes imposed on the current business model's structure. Such analysis is important so that changes can be better planned to fully exploit the capabilities of the proposed technology innovation.

Step 3. Identify missing roles.

This step includes an identification of the requirement for one or more new roles that accomplish new business functions and a description of the activities and the functions of these roles. As argued earlier, no organisation is expected to have the necessary competencies to provide end-to-end services on its own. Therefore, organisations will need to enter into co-operations and alliances, typically with hi-tech firms that bring in the necessary competencies in managing and exploiting the technology components of the future business model. This step calls for a systematic approach towards identifying the missing competencies so that the right partnerships can be formed.

Phase III: Change

This phase is concerned with the design and description of the future business models. This phase ends at visualising the new business model through the design of the transformed value network. The steps included in this phase are:

Step 4. Define scenarios

Having identified and justified the need for one or more new roles, this step includes defining a set of scenarios, each of which proposes a different cooperation scheme and way of distributing responsibilities between new and existing players in the new business environment. This step is key to the method as it enables organisations to ‘experiment’ with alternative business model propositions, explore their implications, and proceed cautiously towards the design of the future business models. Minimising the risk associated with partnership management, for example, is hypothesised to lead to less risky and more successful business model change.

Step 5. Describe the new business models

Based on the scenarios identified at the previous step, this step revisits the current business situation, as this was illustrated in the current business model (step 1). This step aims at describing one or more business models by indicating the value provided by each player in the future model, as well as defining financial and communication flows among players.

Step 6. Evaluate the impact of changes

This step is not included in prior works in the area. However, it is considered necessary to conclude the proposed business model description by estimating the impact of the transformed business model on the structure and dynamics of the markets concerned. This step effectively links the method to subsequent change implementation programmes (which are outside the scope of this paper) as it defines the metrics by which alternative business models will be evaluated.

Although the aforementioned steps define a well-grounded method for business model change under the impact of technology innovation, they are by no means sufficient on their own to guide the business model design effort. Effectively, what is missing is an analysis of how organisations should pick and choose out of the scenarios developed the one that will become

the future business model. To this end, the method needs to be complemented by a contingency approach allowing for comparative evaluation of scenarios based on firm-specific and industry-related factors.

A CONTINGENCY APPROACH FOR ASSESSING SCENARIOS

In this paper we have proposed a methodology for business model evolution based on the identification of scenarios. Each scenario is a description of a different way of allocating responsibilities and contracting partnerships among existing but also new actors of one or more industries. Although the methodology has been found beneficial for sketching likely avenues for business model change under the impact of technology innovation, it does not, in itself, provide metrics by which interested organisations can assess scenarios, under which they are supposed to develop their business models.

It is of course expected that, in practice, more than one business models for the exploitation of a technology innovation will be applicable in different markets depending on their unique characteristics. In this section, we contend that the final scenario that will guide the development of future business models will be determined by a number of factors regarding both *external* (industry-related) and *internal* (firm-specific) environment of organizations.

Recent research work on strategy theory has recognized three primary types of effects on firm performance. These include *strategy*, *industry*, and *firm-asset* (or *resource-based*) effects. This three-dimensional framework, tested under empirical data (Spanos and Lioukas, 2001), results in supporting arguments that consider both industry-related and internal (combining strategy and firm-asset) influences as significant determinants of performance (Henderson and Mitchell, 1997). Researchers have recently started to address the link between business models and strategy theories. Hedman and Kalling (2003) propose integrating the three aforementioned strategic perspectives in the definition of a conceptual business model that includes: customers and competitors (industry), the offering (generic strategy), activities and organization (the value

chain), the resource-base (resources) and the source of resources and production input (factor markets and sourcing) as well as the process by which a business model evolves (in longitudinal processes affected by cognitive limitations and norms and values).

Based on this analysis, we have developed a series of factors favouring scenarios for business models development by the combination of industry-related and firm-specific factors. These factors include:

Industry-related factors

- a) *Industry Structure*. This factor addresses whether the market in which the redesigned business model will be introduced is either monopolistic/oligopolistic or highly competitive.
- b) *Balance between Transaction Costs and Costs of Internal Development*. This factor addresses the costs of contracting partnerships with third parties to provide the technology innovation in comparison with the costs incurred in case of internal development of the required capabilities and resources (Li and Whalley, 2002).
- c) *Type of Players*. This factor examines whether private or public organizations dominate the market. This distinction may be declarative of the participants' motivation and strategic incentives for applying a technology innovation and thus differentiating themselves from competition.

Firm-specific factors

- a) *Strategic Objectives*. This factor concerns the firm's strategic focus and the alignment between internal strategic goals and the expectations for the impact of the technology innovation.
- b) *Firm Capabilities and Assets*. This factor contributes to the assessment of the firm's position in the market and the identification of the roles that it assembles. Current capabilities and future intentions for capability development will dictate the degree to

which the firm is prepared to internalise or outsource certain technology-dependent activities.

In order to increase understanding on the use and utility of such a contingency approach as well as validating and extending the proposed method for business model evolution, the next section discusses a real-life case study, involving the commercialization of a mobile application, named Mobile Exhibition Guide, by actors in the exhibition and information technology industries.

CASE STUDY: EFFECTS OF MOBILE BUSINESS IN THE EXHIBITION

INDUSTRY

Description of the Mobile Exhibition Guide

The validity and utility of the proposed method, as well as the implications of scenario planning for business model change, have been tested through a multinational case study conducted simultaneously in Greece and Finland. The study was part of a research project supported by the European Commission that aimed at exploiting the technological opportunities arising from evolution in the areas of wireless networks and indoor positioning technologies to support the professional exhibition industry in a context-aware manner. The project has aimed at: enhancing visitors' experience in terms of interaction and functionality in an information-rich environment such as an exhibition show; improving business communications and promotions within the exhibition; extending promotional effectiveness after the exhibition, and; assisting and supporting exhibition management by offering real-time location information of people inside the exhibition area. To this end, the project has developed a mediation software platform, namely a mobile exhibition guide, running currently on PDA devices but later on smart-phone devices as well.

Based on a number of user behavioural requirements, drawn from visitors, exhibitors, and organizers, (which are documented in more detail in Fouskas et al., 2002), the mobile exhibition

guide is designed to provide the following services (illustrated in *Table III*), listed per type of user.

Take in Table III.

The introduction of such technological capabilities is bound to fundamentally transform the prevailing today business model in the exhibition industry. Hence, the industry stakeholders (most notably, the exhibition organisers) have initiated a debate regarding the changes to be introduced in the current *modus operandi* of the industry and the partnerships that need to be developed in order to exploit the benefits of the mobile exhibition guide. To this, the method discussed in the previous section has been employed to guide the business model evolution design effort.

Application of the Proposed Method

Step 1: Document the Current Business Model

The first step was to document the current business situation in order to define realistic business requirements for the design of the mobile application and to outline the business environment in which it will be introduced. This analysis included a detailed description of industry norms, types of stakeholders involved, partnerships, revenue sharing agreements, and so on. Due to space limitations, only the analysis of roles is presented herein.

The key roles identified in the exhibition business environment include: a) *Hall Owners*, who provide the physical infrastructure, b) *Organisers* that provide the service platform for efficient interaction between exhibitors and visitors, c) *Exhibitors* and *parallel event organisers*, who use exhibition events as marketing tools, d) *Visitors* and *participants of events*, who receive the services of exhibitors and organisers, e) *Support service providers*, who provide various services to organisers, including security, cleaning, and electronic equipment, f) *Media Partners* providing media coverage of the event and publicity to organisers and exhibitors, and g) *Sponsors* providing capital in return of leveraging their brand. The primary business

relationships of this model are illustrated in *Figure 2* (the numbers indicate types of flows between roles, the analysis of which goes beyond the scope of this paper).

Take in Figure 2.

Step 2: Assess the influence of technology innovation

This step included a definition of the benefits that arose from the introduction of the mobile application to the concerned actors and a discussion of the elements of the current business model that are volatile to change due to technology innovation (mEXPRESS D6.1, 2003). A list of potential benefits of using the mobile exhibition guide to the primary stakeholders of the exhibition industry is presented in *Table IV*.

Take in Table IV.

This step also aims at identifying these variables of the current business model which are mostly influenced by the technology innovation. Based on an intensive desk study and continuous discussions with the stakeholders, mainly the exhibition organisers participating in the project, several effects of this technology innovation on the current business model's elements have been specified and are briefly described in *Table V*.

Take in Table V.

Step 3: Identify missing roles

The roles identified in step 1 have been found inadequate to support the competencies implied by the new activities needed to support the mobile application. More specifically, the need for one or more new player(s) accomplishing the following groups of activities was recognised.

1. *Infrastructure installation and maintenance*, including functions for defining the requirements for, installing, and maintaining the networking, positioning infrastructure, as well as any other hardware unit required to support the mobile mediation platform.

2. *Software configuration and support*, including functions for configuring and administrating the mobile software application.
3. *Content syndication, management and delivery*. Syndication refers to “selling the *same* information to many *different* customers, packaging it with other offerings in uniquely valuable ways, and then redistributing it” (Werbach, 2000). In our case, syndication concerns packaging the information produced, such as statistics reports, with other offerings, such as visitors’ profile, and then customising it to the requirements of different users, such as exhibitors and organisers.

Step 4: Define scenarios for alternative business model configurations

Based on a diverse distribution of responsibilities and roles between existing or/and new players, a number of change-options, considered hereinafter as scenarios, were generated. Simply defined, a scenario is a description of a possible or probable future for either an organization or a whole industry (Bloom and Menefee, 1994). Scenarios can be quite broad in scope, thus describing actors, market trends, pricing strategies, and aim at guiding future organizational strategies, policies and activities. Scenarios are not forecasts or predictions. They are only possibilities of the future (Van der Heijden, 1996). Based on scenarios, decision- and strategy- makers are able to better formulate their innovative business ideas in future environments.

The scenarios that are described hereinafter concern alternative configurations of players belonging in the exhibition but also in Information and Communication Technology (ICT) industry for commercialising the mobile exhibition guide in the future. These scenarios have been defined in a number of brainstorming sessions with the participation of all project’s participants and structured interviews with key actors and domain experts of the exhibition industry. Based on this analysis, two final scenarios were developed for further consideration.

- a) The *Market Maker (MM)* scenario. This scenario concerns the development of a partnership between an independent body – a third party – and one or more hall owners, playing in common the role of the *mobile Exhibition Service Provider (m-ESP)*. These two bodies make some sort of partnership (most likely an outsourcing agreement) to jointly provide mobile exhibition services. They then provide the service to exhibitions. Organisers, in turn, can provide the service to exhibitors that typically pay an increased booth rental price and are able to provide added value services to visitors.
- b) The *Full Service Provider (FSP)* scenario. According to this scenario, the overall responsibility for both technology infrastructure support and service provision and management belongs to the hall owner, who usually also acts as exhibition organiser. Hall owners acquire the service package of the mobile exhibition guide (including technology infrastructure and software) from its developer, however they do not enter a formal partnership with them.

Drawing on the firm and industry-specific factors that were identified in the discussion of the contingency approach in the previous section, *Table VI* outlines contingencies for the dominance of each scenario.

Take in Table VI.

Step 5: Analyse the key elements of alternative business models

The above scenarios describe alternative configurations (players and relationships) that could support the commercialization of mobile services in the exhibition industry. As such, they lay the groundwork for exhibition players, mainly exhibition centre owners and organizers, to think on alternative business ideas (models), under the conditions of each scenario, of how to achieve their strategic objectives. Each scenario can lead to the development of one or more alternative business models by assigning real-world organizations to the scenario's actors and discussing in detail issues regarding the value proposition of each actor, the partnerships developed between

all actors, the key resources contributed by each, their revenue sharing agreement, etc. Hereinafter, due to space limitations for analysing a set of alternative business models implementing each scenario, the paper has focused on collating two general but representative business models, taking the name of the scenario that they implement. Only the major differentiation points of these business models are described in the paper. Nevertheless, *Table VII* summarises a quite complete list of attributes, considered as differentiation points, which were analysed when describing the two alternative business models in the mobile case study (see also mEXPRESS D6.1, 2003).

Take in Table VII.

Exhibitors' and visitors' roles remain the same in both business models. However, the two business models imply different roles, and hence different competencies, regarding hall owners and exhibition organisers. Specifically, the *Market Maker (MM)* business model includes a new third party that enters the exhibition industry value system through a partnership with a hall owner. In this business model, the concerned hall owner does not have the competence required to provide the mobile exhibition guide on its own, and thus the whole business model is based on a strategic alliance signed between the third party and the hall owner under the purpose for delivering value-added mobile services to the hall owners' clientele. Conversely, the *Full Service Provider (FSP)* business model involves a hall owner of dominant strategic position, which either possesses, or is willing to obtain and develop, the resources and capabilities required for providing the mobile exhibition guide on its own.

The cost factors characterising both business models are identical and involve a once-only implementation cost for the wireless networking and positioning infrastructure, as well as a once-only purchase cost for the software, including costs for administration and support services. However, while the MM business model is based on a *revenue sharing agreement* between the third party and the hall owner, who jointly act the new roles of the mobile Exhibition Service Provider (m-ESP), the FSP business model is financially dependent on an

investment made by hall owners for providing value-added services. Each financial regime has of course different implications for the level of investment required, the impact on final prices for exhibitors, the time required to provide the service, and the risk involved with implementation and market success.

Step 6: Estimate the impact of technology innovation on the external environment

The impact of the proposed business models for the commercialization of the mobile exhibition application was specified in terms of a number of direct or indirect effects brought about on the exhibition industry and mobile emerging market based on the Porter's five forces model (Porter, 1985). Thus, the following changes on the exhibition industry structure were notified: introduction of technology firms in the role of advanced exhibition service providers, enhancement of exhibition services with innovative features, thus increasing barriers to entry by new players, increase of organisers' bargaining power over exhibitors, raise of interest by players in the horizontal value chain (complementors or competitors) for offering complementary services (e.g. access to Internet provided by Wireless Internet Service Providers, on-request access to historical data about the exhibition industry provided by an Exhibition Association). The implementation and use of a Mobile Exhibition Guide is also expected to contribute to the growth of the mobile market by favouring the public's familiarisation with wireless and mobile technologies and applications, encouraging development of more advanced mobile applications targeted to public, and enforcing the role of service and technology providers over the dominant mobile network operators.

CONCLUSIONS AND IMPLICATIONS FOR MANAGERS

This research has presented a methodology for business model change under the light of commercialising a mobile technology innovation targeted to the players of the exhibition industry. The methodology has been greatly based on the identification of scenarios prescribing alternative configurations for business model development. The methodology is complemented by a contingency approach that guides the selection of the scenario that better suits to the internal and external environment of a company. The methodology continues to the detailed description of one or more business models, corresponding to innovative business ideas, in terms of specifying real-world players for the defined structure (scenario) and analysing the dynamic elements of their relationships (e.g. value proposition, revenue flows, negotiation power).

The research on business model evolution, further to its internal contribution in the business model research area, and more specifically to the area of changing methodologies, has also yielded considerable implications for practitioners in the business field. The proposed business model methodology targets operating managers who activate in sectors facing increased challenges of technology innovation. The ultimate utility of this methodology is being used as roadmap for leading change in the value creation logic of a firm taking advantage of an advanced technology solution. By continuously changing their business model, and identifying new ways to deliver value to their customers, firms aspire to obtain and sustain a competitive advantage. Managers that can better specify their business model evolution can also assure a better competitive position for their firms in high velocity environments.

Apart from using the proposed methodology for leading change, and keeping the firm ahead of competition, the suggested scenario-based methodology can be used by managers as strategic tool in their decision making process. In highly dynamic and volatile environment, managers are frequently faced with the need to take quick but prudent decisions regarding their company's

actions in the short or even long-term time horizon. In such organizational settings, managers can use the methodology for building and assessing scenarios, which reveal opportunities and threats for firms' performance, fostered by evolutions in the business model map of their sector.

FUTURE RESEARCH

On the theoretical side, there is of course ample space for more elaboration of the findings of this paper as well as further research in business models' correlation with other scientific disciplines. Research on business models has lately started to fuse with research in related disciplines, most notably theories of strategy and organisational development. We expect that related theories, such as the theory of industrial organizations and the theory of network economics also need to be examined under the light of business model change to identify and cross-validate factors that contribute to the design and assessment of business models.

On the practical side, further research could be directed towards extending and enriching the results presented in this paper with a financial analysis made on each scenario. Although such analysis will have limited theoretical utility, as it is of course expected that cost-benefit analyses will be heavily dependent on the unique characteristics of each case and cannot be easily generalized, it is important to note the relationship between theoretical strategic perspectives and organisational financial concerns. As already mentioned, the case study discussed in this paper is being concurrently developed in Greece and Finland. One of the imminent steps of the case study is to explore the scenarios developed under the peculiarities of the exhibition industry in each country. The findings are expected to yield important further validation data on the contingency model presented earlier.

NOTES

- [1] The empirical work described in this paper has been performed in the framework of the IST project mEXPRESS (IST -2001-33432), which is funded in part by the European Commission. The authors would like to acknowledge the contributions of their colleagues from Intracom Hellenic Telecommunications and Electronics Industry S.A, L.M. Ericsson A/S, Elisa Communications Corporation, Pouliadis Associates Corporation, Space Systems Finland Ltd., Research Centre of Athens University of Economics and Business, Helsinki University of Technology, The Finnish Fair Corporation, and ROTA Ltd. The authors are solely responsible for this document; it does not represent the opinion of the European Commission, and the European Commission is not responsible for any use that might be made of data appearing therein. An earlier version of this work has appeared in the proceedings of the Second International Conference on Mobile Business, Vienna, Austria, 23-24 June 2003.

REFERENCES

- Auer, C. and Follack, M. (2002), "Using Action Research for Gaining Competitive Advantage out of the Internet's Impact on Existing Business Models", in C. Loebbecke, R.T. Wigard, J. Gricar, A. Pucihar, G. Lenart (eds.), Fifteenth Bled Electronic Commerce Conference - e-Reality: Constructing the eEconomy, Bled, Slovenia, June 17-19, Proceedings, Vol.1: Research, pp. 767-784.
- Bloom M.J. and Menefee M.K. (1994), "Scenario Planning and Contingency Planning", *Public Productivity and Management Review*, vol. 17, no. 3, pp. 223-230.
- Davenport, T.H. and Stoddard, D.B. (1994), "Reengineering: Business Change of Mythic Proportions?", *MIS Quarterly*, vol.18, no.2, pp.121-127.
- Fouskas K., Pateli A., Spinellis D., Virola H. (2002), "Applying Contextual Inquiry for Capturing End-Users Behaviour Requirements for Mobile Exhibition Services", in *Proceedings of the First International Conference on Mobile Business*, Athens, Greece, July 8-9 (CD-ROM – Proceedings).
- Godet M. (2001), *Creating Futures: Scenario Planning as a Strategic Management Tool*, Economica Ltd, London.
- Gordijn, J. & Akkermans, J.M. (2001), "Designing and Evaluating E-Business Models", *IEEE Intelligent Systems*, vol. 16, no. 4, pp. 11-17.
- Hamel, G. (2000), *Leading the Revolution*, Harvard Business School Press, Boston.
- Hedman, J. and Kalling, T. (2003), "The business model concept: theoretical underpinnings and empirical illustrations", *European Journal of Information Systems*, vol. 12, pp. 49-59.
- Henderson, R., & Mitchell, W. (1997), "The interactions of organizational and competitive influences on strategy and performance", *Strategic Management Journal*, Summer Special Issue, vol. 18, pp. 5-14.

- Kalakota, R. and Robinson, M. (2001), *mBusiness: The Race to Mobility*, McGraw-Hill Publishing Company, New York.
- Kulatilaka, N. and Venkatraman, N. (2001), "Strategic Options in the Digital Era", *Business Strategy Review*, vol. 12, no. 4, pp. 7-15.
- Li, F. and Whalley, J. (2002), "Deconstruction of the Telecommunications industry: from Value Chains to Value Networks", *Telecommunications Policy*, vol. 26, nos. 9-10, pp. 451-472.
- Linder, J.C. and Cantrell, S. (2000) "Changing Business Models: Surveying the Landscape, White Paper, Institute for Strategic Change", Accenture, Retrieved: October 12, 2003, from: http://www.accenture.com/xd/xd.asp?it=enweb&xd=ins%5Cprojectmore_4.xml
- mEXPRESS (IST-2001-33432) Deliverable D1.1 "Actors Requirements Framework and Realistic Application Scenario", mEXPRESS Consortium, Retrieved: May 10, 2003, from: <http://mexpress.intranet.gr/>.
- mEXPRESS (IST-2001-33432) Deliverable D6.1 "Dissemination and Use Plan – Midterm", mEXPRESS Consortium, Retrieved: May 10, 2003, from: <http://mexpress.intranet.gr/>.
- Mylonopoulos, N., Sideris, I., Fouskas, K., Pateli, A. (2002) "Emerging Market Dynamics in the Mobile Services Industry", ELTRUN White Paper. Retrieved: October 29, 2003, from <http://www.eltrun.gr/>.
- Osterwalder, A. and Pigneur, Y. (2002), "An eBusiness Model Ontology for Modeling eBusiness", in C. Loebbecke, R.T. Wigard, J. Gricar, A. Pucihar, G. Lenart (eds), *Fifteenth Bled Electronic Commerce Conference - e-Reality: Constructing the eEconomy*, Bled, Slovenia, June 17-19, Proceedings, Vol.1: Research, pp.75-91.
- Paavilainen, J. (2002), *Mobile Business Strategies: Understanding the Technologies and Opportunities*, Wireless Press, London.

- Pateli, A. (2002), "A Domain Area Report on Business Models", ELTRUN White Paper, Retrieved: October 29, 2003, from: <http://www.eltrun.gr/>.
- Pateli, A. and Giaglis, G. (2003), "A Framework for Understanding and Analysing e-Business Models", in Proceedings of the 16th Bled Electronic Commerce Conference – eTransformation, Bled, Slovenia, June 9–11 (CD-ROM – Proceedings).
- Petrovic, O., Kittl, C. and Teksten, R.D. (2001) "Developing Business Models for eBusiness", In Proceedings of the International Conference on Electronic Commerce 2001, October 31 – November 4, Vienna, Austria, Retrieved: January 10, 2004, from http://www.evolaris.net/index_en.php/article/articleview/356/1/59/.
- Porter, M. (1985), *Competitive Advantage: Creating and Sustaining Superior Performance*, Free Press, New York
- Pramataris K., Papakiriakopoulos D., Lekakos G., Mylonopoulos, N. (2001), "Personalized Interactive TV Advertising: The IMEDIA Business Model", *Journal of Electronic Markets*, vol. 11, no. 1, pp. 17-25.
- Rulke, A., Iyer, A. and Chiasson, G. (2003), "The Ecology of Mobile Commerce: Charting a Course for Success Using Value Chain Analysis", in B.E. Mennecke, and E.J. Strader (eds), *Mobile Commerce: Technology Theory and Applications*, Idea Group Publishing, pp. 122-144.
- Senge, P.M. and Sterman, J.D. (1994), "System Thinking and Organizational Learning: Acting Locally and Thinking Globally in the Organization of the Future", in J.D. Morecroft and J.D. Sterman (eds), *Modeling for Learning Organizations*, Productivity Press, Portland, pp. 195-216.
- Spanos, Y.E. and Lioukas, S. (2001), "An Examination into the Causal Logic of Rent Generation: Contrasting Porter's Competitive Strategy Framework and the Resource-based Perspective", *Strategic Management Journal*, vol. 22, no. 10, pp. 907-934.

Van der Heijden K. (1996) *Scenarios: The Art of Strategic Conversation*, Wiley, Chichester.

Weill, P. and Vitale, M.R. (2001), *Place to Space: Migrating to eBusiness Models*, Harvard Business School Press, Boston.

Werbach, K. (2000), "Syndication: The Emerging Model for Business in the Internet Era", *Harvard Business Review*, vol. 78, no.3, pp. 85-93.

Appendix A: Figures

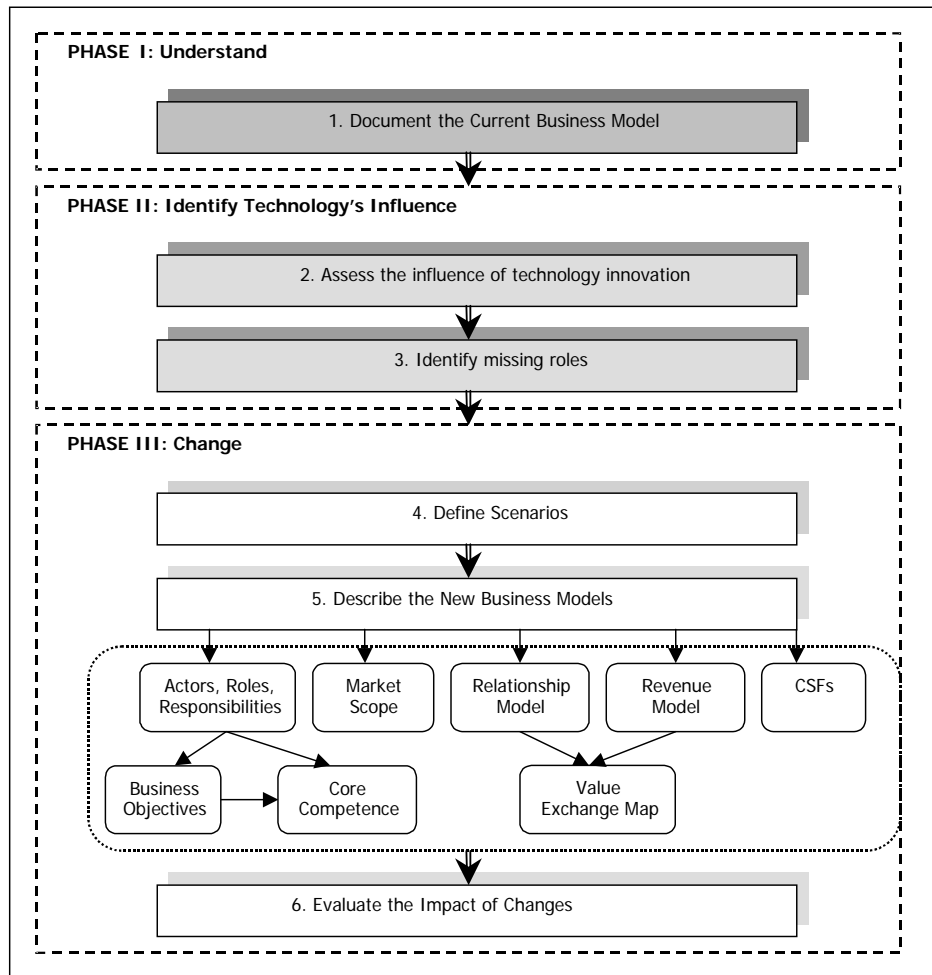


Figure 1: A Scenario-based Method for Business Model Change

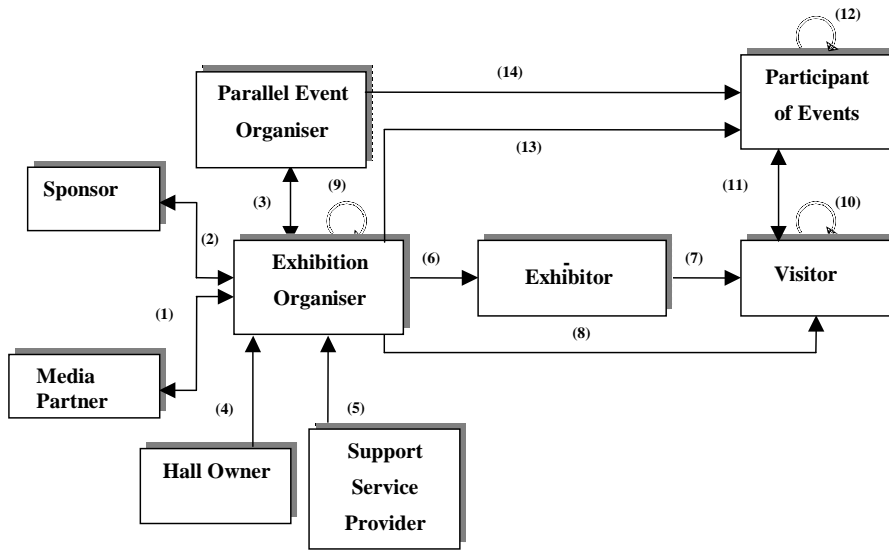


Figure 2: Current Business Model in the Exhibition Industry

Appendix B: Tables

Stage	Steps
<i>Understand</i>	a. Identify the business model (BM) from different angles
	b. Identify the key factors of the BM.
	c. Model the core reinforcing and balancing feedback loops
	d. Expand the BM to the full network.
<i>Identify Technology's Influence</i>	e. Identify the influence of the Internet on the BM's variables
<i>Change</i>	f. Recognize and interpret possibilities for changing the problem situation
	g. Develop an action plan

Table I. Stages and Steps of improving Business Models (Auer and Follack, 2002)

Ten Steps for the derivation of a New Business Model
1. Examining the relationships developed by key players currently in the market.
2. Defining current business objectives for each key player.
3. Identification of current value flows in the marketplace.
4. Identification of key competitive drivers in the market.
5. Synthesis of the current business model.
6. Embedding the innovative technology framework into the current business model.
7. Defining requirements for technological capability development for existing key players.
8. Defining the mediating functions performed by the service provider.
9. Developing a new co-operation scheme in the marketplace: exploiting the existence of the new service provider.
10. Synthesis of the proposed business model.

Table II. The iMEDIA Methodology

Visitor Services	Exhibitor Services	Organizer Services
<ul style="list-style-type: none"> ▪ Online and Onsite Registration ▪ Personalized and Location-aware Navigation Plan ▪ Routing advice ▪ Exchange of “virtual business cards” with Exhibitors ▪ “Bookmark” stands and exhibits for receiving more information ▪ Interaction within a user group ▪ Receiving Targeted Messages (Offers, Announcements) from Exhibitors and Organizers ▪ Message Board for communication with other visitors 	<ul style="list-style-type: none"> ▪ Online Content Management (products, stands) ▪ Exchange of “virtual business cards” with visitors ▪ Real-time information and history statistics on visitor behaviour ▪ Promotion of their exhibits via targeted spots ▪ Notifications to organizers in emergency cases 	<ul style="list-style-type: none"> ▪ Information on profile and preferences of visitors ▪ Online Content Management of information (profile, exhibition info) ▪ Common and Targeted Announcements to Exhibitors and Visitors ▪ Real-time information on visitors position ▪ History statistics on visitor flows and behaviour ▪ Online feedback from visitors

Table III. Mobile Exhibition Guide’s Services per User

Exhibition Players	Benefits
<i>Hall Owner</i>	<ul style="list-style-type: none"> ▪ New value-added service offered through their premises ▪ Ability to use the installed technology infrastructure for offering other wireless services
<i>Organiser</i>	<ul style="list-style-type: none"> ▪ Online collection of feedback from visitors ▪ Ability to collect online data on visitors profile and behaviour in the form of anonymous statistics ▪ Dynamic segmentation of visitors based on their profile and behaviour ▪ Ability to collect data on exhibitors' performance ▪ Better management of exhibition space and people ▪ Effective marketing and management of exhibitions using the statistical data produced by mEXPRESS
<i>Exhibitor</i>	<ul style="list-style-type: none"> ▪ Access to anonymous data on visitors' profile, preferences and behaviour in order to improve their understanding of their customers ▪ Effective targeting and promotions ▪ New channel for promotions and offer making ▪ Possibility of applying dynamic pricing mechanisms based on real-time statistics
<i>Visitor</i>	<ul style="list-style-type: none"> ▪ Effective spotting of suppliers/ products of interest ▪ Efficient navigation in the exhibition hall space ▪ Load-saving from transferring material in digital rather than paper format ▪ Increased convenience in the overall visiting experience

Table IV: Expected Benefits for the Key Players of the Exhibition Industry

<i>Major Effects of the Mobile Application</i>	<i>Description of Changes on Business Model Elements</i>
<i>Enhanced Value Proposition</i>	Enhanced value for organisers is expressed in terms of facilitation in exhibition management and collection of value-added data, such as the location data for persons within the exhibition. The added value for exhibitors is their capability of extending promotional effectiveness during and after the exhibition by targeting their customers, as well as their ability to collect anonymous data from organisers on visitors' behaviour. Value for visitors is raised from their ability to control the pushing of information and advertising material as well as receiving contextual information based on their location and their interests.
<i>Re-definition of Market Scope</i>	At least for the first period of its commercialization, the services offered by the mobile application are anticipated to target more technology-familiar visitors as well as exhibitors belonging to high-tech industries.
<i>New actors/ roles and re-distribution of responsibilities</i>	The installation and operation of the mobile software and infrastructure requires some special capabilities that none of the existing players of the exhibition marketplace already has. Therefore, there is a need for new roles that will be responsible for the technical and operational management and support of the mobile platform. The new roles can be assigned to either existing stakeholders (e.g. Organisers, Hall Owners) or to a totally new player (e.g. a Wireless Operator or a Mobile Service Provider).
<i>Re-definition of relationships</i>	As the roles and responsibilities are re-distributed among existing and new players, belonging to the exhibition or the Information and Communications Technology (ICT) industry, new type of partnerships, or set more general inter-organizational relationships, are expected to develop.
<i>Increase of actors' capabilities and assets</i>	Hall Owners obtain an advanced infrastructure to be used for the provision not only of the mobile exhibition services but also of other location-based services. Organisers acquire access to a pool of anonymous data regarding visitors (profile and behaviour) and exhibitors (no of visitors in their stand, no of bookmark requests to their products). Exhibitors can request and gain access to a segment of this data, which is useful for assessing their performance in exhibition and improve their future appearance and behaviour in forthcoming shows. Visitors acquire an additional capability for managing their tour, so that it is short but effective.

<p><i>New cost structures and revenue streams</i></p>	<p>The cost of providing the mobile application is initially paid by the actor that will finally buy the technology and service platform and will provide it either directly to its customers or, acting as intermediary, will rent it to other potential service providers. The main parameters of this cost are: a) the cost of software development and support, and b) the cost of hardware purchase, installation and maintenance. Further cost parameters include the cost of providing the service and supporting the actors that will use it. To balance this cost, new revenue sources appear, such as increase of fixed price paid by exhibitors for the booth rental, increase of ticket price paid by visitors, sponsorships, price for special mobile advertising services for exhibitors, and price for renting information and statistical packages to exhibitors or third parties.</p>
<p><i>New way of conducting key activities</i></p>	<p>Several key activities and market processes of the current business model are subject to change as a result of their delivery through the mobile platform. Specifically, the pre-registration and registration processes will be made via laptop or PDA from anywhere at anytime. Customer requests will be sent in real-time through either visitors' PDA or exhibitors' laptop. Promotions and advertising will be also made online and in real-time, while the online collection of data and feedback will replace the time-saving process of market research during and after the exhibition.</p>

Table V. Effects of the Mobile Application on the Business Model of the Exhibition Industry

Conditions favouring the MM Scenario	Conditions favouring the FSP Scenario
a) High degree of <i>competition</i>	a) <i>Monopolistic or oligopolistic</i> markets
b) <i>Transaction costs are lower</i> than the costs of providing the service based on internal skills/resources	b) <i>Transaction costs are higher</i> than the costs of providing the service based on internal skills/resources
c) Large number of <i>private</i> exhibition organisers	c) <i>Few private or public</i> exhibition organisers
d) Organisers follow a <i>differentiation strategy</i> through the provision of value-added services	d) Organisers follow a <i>cost-leadership strategy</i> under the concern of providing low-priced services
e) Organisers are <i>separate entities</i> from hall owners, hence they lack infrastructure assets	e) Organisers <i>own their own exhibition centre</i> , hence possessing additional assets

Table VI. A Contingency Approach for the New Business Model of the Exhibition Industry

Differentiation Points of Alternative Business Model Solutions
▪ <i>Key players and distribution of roles and responsibilities</i>
▪ <i>Core competence of each player in terms of valuable resources and capabilities</i>
▪ <i>Value network depicting the key players' relationships in terms of revenue and communication flows</i>
▪ <i>Value proposition of each player to the network as well as to the end user</i>
▪ <i>Revenue Model in terms of main revenue sources and the revenue sharing agreements among the key players</i>
▪ <i>Critical Success Factors (CSFs) for the business model implementation</i>

Table VII. Attributes under Analysis in New Business Model Description