

Electronic Business Models Design for Public–Private Partnerships

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INTRODUCTION

Public-private partnerships (PPPs) provide an alternative model for producing and delivering public services, both the traditional public services and the electronic ones (i.e., the ones delivered through electronic channels, such as the Internet or other fixed or mobile network infrastructures; Aichholzer, 2004; Andersen, 2003; Broadbend & Laughlin, 2003; Jamali, 2004; Lutz & Moukabary, 2004; McHenry & Borisov, 2005; Nijkamp, Van der Burch, & Vidigni, 2002; Spackman, 2002; Wettenhall, 2003). The basic concept of the PPP model is that the public and the private sectors have different resources and strengths, so in many cases, by combining them, public services can be produced and delivered more economically and at higher quality. In this direction, a PPP is a medium to a long-term relationship between public organizations and private-sector companies, involving the utilization of resources, skills, expertise, and finance from both the public and the private sectors, and also the sharing of risks and rewards in order to produce some services, infrastructure, or other desired useful outcomes for the citizens and/or the businesses.

Information and communication technologies, and in particular the Internet and WWW (World Wide Web) technologies, have opened a new window of opportunity for a new generation of PPPs for offering new electronic public services in various domains, for example, for developing and operating public information portals (Andersen, 2003), electronic transactions services (Lutz & Moukabary, 2004), electronic payment services (McHenry & Borisov, 2005), value-added services based on public-sector information assets (Aichholzer, 2004), and so forth. However, before such a new service is developed, it is of critical importance to design systematically and rationally its business model, which, according to Magretta (2002), incorporates the underlying economic logic that explains how value is delivered to customers at an appropriate cost and how revenues are generated. Vickers (2000) argues that most of the failures of e-ventures (also referred to as dot-coms) are due to the lack of a sound business model

or due to a flawed business model. However, most of the research that has been conducted in the area of e-business models is dealing mainly with the description and abstraction of new emerging e-business models, the development of e-business-models classification schemes, and the clarification of the definition and the components of the business model concept, as described in more detail in the next section. On the contrary, quite limited is the research on e-business-models design methods despite its apparent usefulness and significance; moreover, this limited research is focused on private-sector e-business models. No research has been conducted on the design of PPP business models for offering electronic services.

In the next section of this article, the background concerning PPPs and e-business-models research is briefly reviewed. Then a new framework for the design of e-business models is presented, which has been customized for the design of PPP business models for offering electronic services. Next, the above framework is applied for the design of a PPP business model for the electronic provision of cultural-heritage education for the project E-Learning Resource Management Service for the Interoperability Network in the European Cultural Heritage Domain (ERMIONE) of the eTEN Programme of the European Union (Grant Agreement C517357/2005). Finally, the future trends and the conclusions are outlined.

BACKGROUND

PPP is defined as “an institutionalized form of cooperation of public and private actors, which, on the basis of their own indigenous objectives, work together towards a joint target” through “leveraging joint resources and capitalizing on the respective competences and strengths of the public and private partners” (Jamali, 2004, p. 416). Even though in the past various forms of public-private mixing arrangements had been used (such as mixed enterprises, outsourcing, subsidization, etc.), the concept of PPP appeared in the early '90s when the Private Finance

Initiative (PFI) was introduced in Great Britain; it envisaged that private companies would design, build, operate, and finance hospitals, schools, prisons, and so forth, and the government would agree to purchase their use as a service for a fixed period of time (Spackman, 2002; Wettenhall, 2003). The evolution of the PFI concept resulted later in the PPP concept. In general, PPPs shift government ministries and agencies from financing, owning, and operating assets to contracting the private sector to finance, build, and operate assets, and to deliver public services using these assets. The private sector is paid for these services, or is given a share of the income generated from them or some other rights. The main drivers for PPP have been improving efficiency in the production and delivery of public services, and finding alternative methods of financing the investments required for developing public infrastructure and for offering public services.

A wide spectrum of PPP forms have been used for achieving various public-sector objectives, such as public-infrastructure building (e.g., roads, bridges, hospitals, energy stations, telecommunications, etc.), urban-areas renewal, rural-areas development, the solving of various social problems, environmental protection, education, the provision of community-based services for disadvantaged children, technology research and development, and so forth (Jamali, 2004; Nijkamp et al., 2002; Spackman, 2002; Wettenhall, 2003), and recently for the provision of electronic services (Aichholzer, 2004; Andersen, 2003; Lutz & Moukabary, 2004; McHenry & Borisov, 2005). However, the relevant literature strongly emphasizes that PPP has resulted not only in successes but also in failures (e.g., Jones, 2005). The central critical success factor of a PPP is to reconcile the different values and objectives of the participating public and private actors (Pongsiri, 2002); in this direction, it is of critical importance to develop an appropriate regulatory and contractual framework that accomplishes the following:

- provides assurance to the public sector that the PPP operates efficiently and in line with their policy objectives (e.g., economic development, environmental protection, various social policy objectives, etc.) without opportunistic or inappropriate behaviors from the private actors
- provides assurance to the private actors concerning their protection from expropriation, the arbitration of commercial disputes, respect of contractual agreements, and legitimate recovery of costs and profit proportional to the risks undertaken

In general, the whole business model of a PPP is of critical importance for its success. The business-model concept has been created and used in management study and practice as a unifying unit of analysis that incorpo-

rates a number of important decision variables and parameters, which are of critical importance for the success of entrepreneurship and business, and for the development of theory in this area (Morris, Schindehutte, & Allen, 2005). Pateli and Giaglis (2004), based on an extensive literature survey, classify the research that has been conducted on e-business models into eight subdomains: definitions, components, taxonomies, conceptual models, design methods and tools, change methodologies, evaluation models, and adoption factors. They also argue that most of this e-business research lies mainly in the first three subdomains (definitions, components, taxonomies), while limited research has been conducted in the other five subdomains.

Historically, the first research stream in this area focused on the clarification of the definition and the components of the business-model concept. There is no generally accepted definition of a business model; in the relevant literature there are many definitions, which can be grouped into three categories according to their basic focus. The first category of definitions focuses mainly on the economic model, that is, how revenue and profits are generated. For example, Stewart and Zhao (2000) define the business model as “a statement of how a firm will make money and sustain its profit stream over time.” The second category of definitions focuses on the value created for the customer and on the value-production architecture. For example, Linder and Cantrell (2001) define a business model as “the organization’s core logic for creating value.” The third category of definitions focuses mainly on the strategic level. For example, Slywotzky (1996) defines a business model as “the totality of how a company selects its customers, defines and differentiates its offerings, defines the tasks it will perform itself and those it will outsource, configures its resources, goes to market, creates utility for customers and captures profits.” Based on a synthesis of existing definitions of business models, Morris et al. (2005) propose the following definition: “A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture and economics are addressed to create sustainable competitive advantage in defined markets.”

Other researchers adopt the approach of defining the business-model concept by specifying its primary elements and their interrelations. Characteristic is the approach of Timmers (1998), who defines a business model as “an architecture for the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various actors; and a description of the sources of revenues.” In the same line, Weill and Vitale (2001) define a business model as a description of the roles and relationships among a firm’s consumers, customers,

allies, and suppliers that identifies the major flows of products, information, and money, and also the major benefits to participants.

Another stream of research in this area is dealing with the identification of emerging e-business models and their classification into taxonomies or generic e-business models. Several taxonomies have been proposed based on different classification criteria and dimensions. Timmers (1998), using the degree of innovation and the functional integration as classification criteria and dimensions, identifies 11 emerging generic e-business models: e-shop, e-procurement, e-auction, e-mall, third-party marketplace, virtual community, value-chain service provider, value-chain integrator, collaboration platform, information brokerage, and trust and other relevant services. Tapscott, Ticoll, & Lowy (2000) introduce the concept of electronic-business webs, which can be considered as fundamental types of e-business models that are differentiated in two primary dimensions: the level of economic control by one of the participating actors and value integration. Based on these dimensions and criteria, the authors identify five fundamental types of electronic-business webs: agora, aggregation, alliance, distributive network, and value chain. Lam and Harrison-Walker (2003) argue that the main dimensions for classifying e-business models should be associated with their strategic objectives. Using the value-based objectives and the relation objectives as classification dimensions, they group existing e-business models into six basic types: Internet merchants and portals, brokerage networks, Internet promoters, virtual product differentiation, interactive networks, and image building.

However, limited research has been conducted on the design of e-business models; this limited research focuses on e-business models implemented exclusively by private enterprises. No research has been conducted on the design of PPP business models for offering public electronic services. Morris et al. (2005) proposed an integrated framework for characterizing business models consisting of six significant design decision components (questions to be answered when designing a business model), which are further analysed into subcomponents (subquestions) intended to structure and assist both the description and the design of business models. Also quite interesting is the research work of Shubar and Lechner (2004), which resulted in the IDEA (identify new design possibilities, design new business models, evaluate business models,

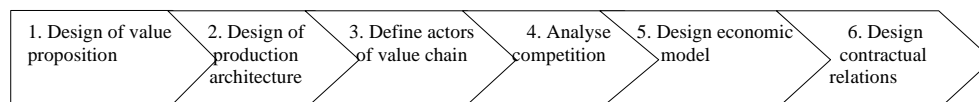
aggregate to the new value chain) framework for the redesign of existing business models, taking advantage of new technologies; however, the IDEA framework does not support the development of business models from the beginning, but only through the evolution of existing business models, which might result in much less innovative business models.

A FRAMEWORK FOR PPP E-BUSINESS-MODELS DESIGN

In order to fill the above research gap, we have developed a generic framework for the innovative design of electronic business models, defined as business models aiming at offering electronic informational, communicational, transactional, and other services through various electronic channels, such as the Internet or other fixed or mobile network infrastructures from the beginning without relying on previously existing ones. Also, we have customized this framework for the design of PPP business models aiming at offering electronic services. The objective of the framework is to design the four most important components of the e-business model: the value proposition, value-production architecture, actors, and economic model. The framework consists of six stages, which are shown in Figure 1; their execution should follow an iterative approach so that each iteration takes into account the results of the previous ones and provides a better and more detailed design.

It is assumed that as input we have only a rough and basic description of the electronic service under consideration. In Stage 1, the value proposition is designed. Initially, the targeted segments (user groups) are identified, and for each of them the basic elements of the service (capabilities offered) are defined. For this purpose, with some enhancements, the buyer utility-map framework is used, which has been developed by Chan Kim and Mauborgne (2002) in order to support the design of products and services with high levels of utility. According to this framework, the experience of the user of a product or service is in general created during a cycle consisting of six distinct phases: purchase, delivery, use, supplements, maintenance, and disposal. Moreover, according to this framework, cutting across these phases there are six basic levers of utility, with this term

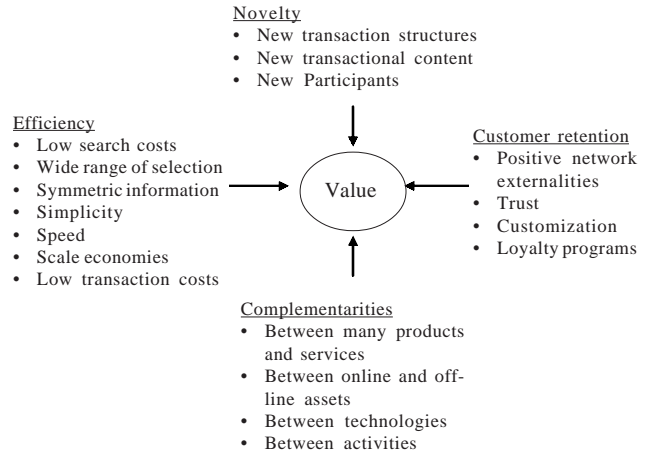
Figure 1. Stages of the framework for PPP electronic business-models design



meaning the ways in which we can offer utility to the user of the product or service: increasing user productivity (by offering him or her capabilities for accomplishing a task better and faster), reducing his or her risk, and offering simplicity, convenience, a fun image, and environmental friendliness. Based on the above principles, for the systematic design or improvement of a product or service, we construct a 6x6 table (utility map) with the above six phases horizontally and the above six levers of utility vertically, and we try to fill as many of these cells as possible, and each cell with as many product-service elements and capabilities as possible. In order to make this buyer utility map more appropriate for designing electronic services, we enhanced it by adding to the above buyer experience cycle two additional phases—the phase of search (in the beginning of the cycle before the phase of purchase) and the phase of customization (between the delivery and the use phases)—since, according to the relevant literature (e.g., Amit & Zott, 2001), the most important sources of the value created by electronic channels are the extensive search and customization capabilities they offer. We can use this enhanced buyer utility map for designing the elements and capabilities of the new electronic service, and also for analysing similarly other existing competitive services (electronic or physical) and comparing them with the new service; this comparison may give very useful indications for enriching the utility map of the new service with additional elements and capabilities. In this way, an initial list of the elements of the new service can be developed.

However, in order to exploit to the highest possible extent the capabilities offered by the specific electronic channel for which we design the new service (e.g., the Internet or any other fixed or mobile network infrastructure), we can use additionally a value model of this channel, which incorporates the main sources of value the specific channel can create. For designing Internet-based electronic services, we can use the model of the sources of value creation in Internet e-business developed by Amit and Zott (2001). It has been constructed based on an extensive theoretical background concerning virtual markets, value-chain analysis, Schumpeterian innovation, resource-based view of the firm, strategic networks, and transaction-cost economics, and also on an extensive case study (detailed study of 59 successful public e-business companies from the USA and Europe). This model is shown in Figure 2. According to this model, there are four basic sources of value creation in Internet e-business: efficiency, novelty, complementarities, and customer retention; each of them is also analysed into a number of specific value drivers. For each of the value sources and drivers of such a value model, we try to devise relevant elements of the new service, which are based on this specific value source or drive, and in this way we

Figure 2. Sources of value creation in Internet e-business



enrich the above initial list of capabilities of the service. This approach enables us to generate new ideas for innovative capabilities of the new service by exploiting the extensive theoretical background and practical experience incorporated in such value models. Moreover, taking into account the existing public policy objectives and the existing information concerning the value criteria of the targeted segments (user groups) concerning similar services (electronic or physical), we can further enrich the above list of elements of the new service. This final list of elements is examined in order to define which of them constitute basic public services (taking into account the culture and the expectations of the society and the existing public policy objectives) and therefore need special treatment in the PPP contractual agreements (in Stage 6) concerning price, quality, and availability.

In Stage 2, the production architecture is designed, consisting of all the activities that have to be performed in order to deliver the value (i.e., offer all the service elements and capabilities) defined in Stage 1. For the design of the production architecture, we can use the value-chain model of M. Porter (1980, 1985, 1996), which includes five categories of primary activities: inbound logistics, operations, outbound logistics, marketing and sales, and service. We can also use the two additional value-creation configurations that have been proposed by Stabell and Fjeldstad (2001) for analysing complex services: the value shop, which includes five categories of primary activities—problem finding, problem solving, choice of alternative, execution, and control and evaluation—and the value network, which includes three categories of primary activities—network promotion and contract management, service provision, and infrastructure operation. Moreover, for the same purpose, we can use the virtual value-chain model proposed by Rayport

and Sviokla (1995) for analysing the production of information goods, which includes five categories of primary activities: information gathering, organizing, selecting, synthesizing, and distributing. The production architecture of the new service can be based on one of the above models or a combination of them. Its structure can be either the classical linear one (each activity is fed by one previous activity and feeds one following activity) or a network one (some activities can be fed by more than one previous activities and/or feed more than one following activities), taking into account the evolutions that have taken place in several industries from simpler linear structures to complex network structures (Gulati, Nohria, & Zaheer, 2000; Li & Whalley, 2002). The design of the production architecture starts from the value proposition and moves backward. Initially we determine the direct activities required for delivering the value proposition (i.e., offering the service elements and capabilities) defined in the first stage, then for each of them, we determine the direct activities it requires as inputs, and so forth. In this stage, we can also use the value-chain model of Walters and Lancaster (2000) and the strategic value-creation-networks framework of Jarillo (1995).

In Stage 3, for each of the value-production activities defined in the second stage, the most suitable actors (i.e., class of private- or public-sector organizations) for executing it are determined based on the resource-based theory (Barney, 1999; Barney, Wright, & Ketchen, 2001) and the framework of Talluri, Baker, and Sarkis (1999). In particular, for each activity the resources and capabilities required for executing it efficiently and effectively, and its critical success factors are determined; based on them, various alternative classes of actors, that is, alternative types of private- or public-sector organizations who could undertake it, are initially identified, and then among them the most appropriate class is selected. In this stage, it is of critical importance to decide for each of the above activities whether it should be undertaken by the public or the private sector, taking into account the strengths, the weaknesses, the resources, and the capabilities of each. It is of critical importance in a PPP to combine properly and leverage the strengths of both the public sector (e.g., higher responsibility and accountability to society) and the private sector (e.g., higher efficiency, technical expertise, etc.). However this decision might have to be reexamined in the light of the results of the fourth stage.

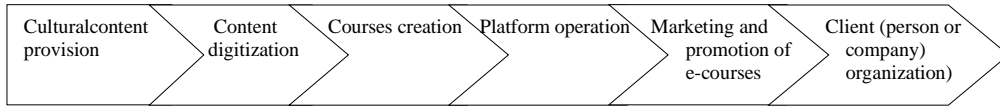
In Stage 4, for each of the activities of the production value chain defined in the second stage, an analysis of the competitive power of the potential actors is performed based on the five-forces framework of M. Porter (1980, 1985, 1996). According to this framework, the competitive power depends on the intensity of the following forces: threat of new entrants, threat of substitutes, bargaining

power of suppliers, bargaining power of buyers, and competitive rivalry; a higher intensity of these forces results in lower competitive power. From this analysis, we can identify activities executed by private actors having a very high level of competitive power (e.g., in cases of oligopolies with a small number of possible players, or in cases of high switching costs, etc.) who might dominate in the provision of the service. Such a situation is not acceptable in a PPP, therefore it might possibly necessitate the reconsideration of the decisions of the third or even of the second stage.

In Stage 5, the economic model is designed; that is, it is decided how revenue will be generated from the users of the service or from other sources (e.g., from advertisement, subsidies, etc.). For this purpose, we can take into account the revenue models proposed by Olla and Patel (2002; e.g., flat fee, volume based, per transaction, per message, session based, etc.) in combination with the price corridor model of Chan Kim and Mauborgne (2002). However, for the elements of the service that have been defined in the first stage as basic public services, a different economic model might have to be designed (e.g., with lower prices).

Finally, in Stage 6, the contractual relations among the public and private actors who will participate in the value-production architecture are designed, which according to the relevant literature are of critical importance for the success of the whole PPP due to the different values and objectives of the public and private actors, as mentioned in the previous section. Such PPP contractual relations are usually characterized by high complexity since they should define in detail the rights and the obligations of all involved parties, and also include numerous clauses for possible violations of obligations and corresponding penalties (e.g., if party A violates its obligation O_{Ai} , then penalty PA_i will be imposed on A, etc.). The design of these contractual relations is based on the e^3 -value modeling methodology and its extension (Gordjin, 2002; Gordjin & Akkermans, 2003; Kartseva, Gordjin, & Tan, 2004). The basic version of this methodology allows the formal representation of collaborative value creation through the cooperation of several actors who exchange objects of economic value (e.g., products, services, money, etc.) based on a number of basic concepts, such as the actor, value object, value exchange, value interface, dependency path, and so forth (see also Figure 4). In this way, the design and communication of the rights and obligations of each involved party can be supported. Its extension, referred to as e^3 -value+, allows also the formal representation of subideal situations, in which one of the involved parties violates its obligations (i.e., does not deliver one or more of the value objects it was contractually obliged to deliver to another party); in this way, the design of clauses for possible violations of obligations is supported.

Figure 3. Production architecture for e-learning of cultural heritage



APPLICATION

The above framework has been applied for the design of a PPP business model for the electronic provision of cultural-heritage education (e-learning) for the project ERMIONE of the eTEN Program of the European Union (Grant Agreement C517357/2005). The basic objective of this project is to provide all interested persons (e.g., artists, teachers, students, etc.) and cultural and educational institutions in Europe, or even all over the world, with a wide range of high-quality content and training courses about the European cultural heritage, coming from cultural and educational institutions (e.g., museums, collections, libraries, archives, archaeological sites, universities, etc.) dispersed all over Europe. In Figure 3, we can see the corresponding value-production architecture: In order to create e-courses in the domain of cultural heritage, owners of cultural-heritage assets (e.g., museums, collections, libraries, archives, archaeological sites, etc.) initially provide relevant content, which is digitised. This digitised content is then used by educational institutions (e.g., universities) in order to create e-courses. Next, these e-courses are uploaded on an e-learning platform, which is managed by a technology provider.

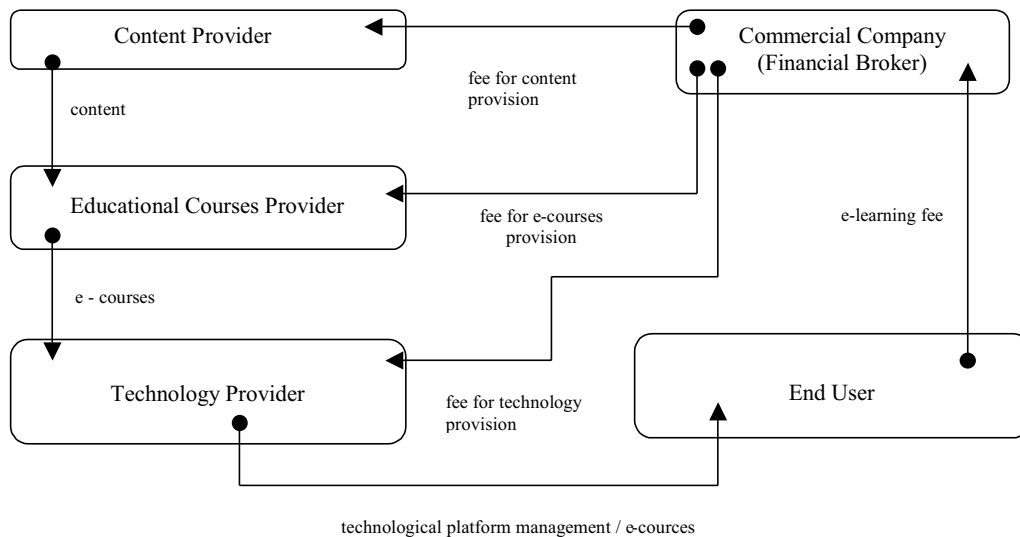
Finally, these e-courses are marketed and promoted by an experienced commercial company.

The corresponding collaborative value-creation model based on the e³-value methodology is shown in Figure 4. We can see the main actors involved in the provision of e-courses in the area of cultural heritage (content provider, educational courses provider, technology provider, and commercial company) and the value objects they exchange.

FUTURE TRENDS

The need for developing and operating complex informational and transactional e-government services using various electronic channels, such as the Internet or other fixed or mobile networks, will necessitate extensive PPPs in the near future between public organizations of various levels (e.g., municipalities, regions, ministries, etc.) and private organizations of various sectors (e.g., from the ICT industry, banking, etc.). Therefore, it is necessary to develop effective methods for designing systematically and rationally the business models of these PPPs so that they finally offer highly valuable electronic services,

Figure 4. Collaborative value-creation model for the provision of e-learning in the area of cultural heritage



combine properly, and leverage strengths of multiple public and private organizations, and at the same time reconcile their different values and objectives; these design methods should combine knowledge from various areas (e.g., management science, public administration, information systems, etc.) and also incorporate the experience gained from previous PPPs, especially from PPPs that enable the provision of electronic services (e.g., basic problems and difficulties, critical success factors, etc.). Also, it is necessary to apply and evaluate such methods in real-life situations so that we can identify their advantages and disadvantages.

CONCLUSION

In this article, framework for designing PPP business models for the provision of electronic services has been presented. It supports the definition of the value proposition (elements and capabilities of the service), the value-production architecture (activities that have to be performed in order to provide the service) and the actors who will participate in it (both public and private organizations), the economic model (i.e., how revenue will be generated from the users of the service or other sources), and finally the contractual relations among the actors (rights and obligations of each actor, and clauses concerning possible violations of obligations and corresponding penalties). This framework has been used in order to provide a solid ground for the ERMIONE project of the eTEN Program of the European Union and to design its basic PPP business-model concept. Taking into account the fact that, as mentioned in the previous section, growing PPPs are expected in the near future for the provision of various types of electronic services to citizens and enterprises, such a framework can be very useful for the design of successful PPPs with solid foundations: clear and attractive value propositions, appropriate actors with clear roles and well-defined and fair relations among them, and power balance, avoiding too powerful private players who might cause unacceptable situations and finally degenerate the PPP. Further research is in progress by the authors in order to further elaborate this framework, enrich it with experience gained from existing PPPs for electronic services provision, and also evaluate it in more real-life situations.

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KEY TERMS

Business Model: A concise representation of how an interrelated set of decision variables concerning value proposition, value-production architecture, value-production actors, and economics are addressed, aiming at the introduction and the sustainable success of a product or service.

Electronic Business Model: A business model aiming at offering electronic informational, communicational, transactional, and other services through electronic channels, such the Internet and other fixed or mobile network infrastructures.

Electronic Learning (E-Learning): The use of information and communication technologies for the creation of enhanced learning experiences, aiming at improving the knowledge and skills and/or changing the attitudes of a target group on a specific topic.

Public-Private Partnership (PPP): “An institutionalized form of cooperation of public and private actors, which, on the basis of their own indigenous objectives, work together towards a joint target” through “leveraging joint resources and capitalizing on the respective competences and strengths of the public and private partners” (Jamali, 2004, p. 416).

Value Model of an Electronic Channel: The main sources of value that a specific electronic channel can create (i.e., ways to create value using this electronic

channel); for example, for the case of the Internet, the main sources of value are efficiency, novelty, complementarities, and customer retention.

Value-Production Architecture: A set of activities that have to be performed in order to deliver a value proposition (i.e., offer a predefined set of service elements and capabilities); its structure can be either linear (each activity is fed by one previous activity and feeds one following activity) or network based (some activities are fed by more than one previous activities and/or feed more than one following activities).

Value Proposition (of an Electronic Service): The set of useful elements of the service (i.e., the set of useful capabilities offered to the users).