



The Business Model Handbook for Developing Countries

Alexander Osterwalder, Mathias Rossi and Minyue Dong

University of Lausanne, Tel: (+4121) 692-3420, {alexander.osterwalder, mathias.rossi, minyue.dong}@hec.unil.ch

ABSTRACT

The Business Model Handbook (BMH) for Developing Countries is a proposition for a tool that has for goal to help Small and Medium Sized Enterprises (SME) and local entrepreneurs to design business models that use Information and Communication Technologies (ICT) and particularly the Internet in the context of developing economies. It shall help to develop the urgently needed critical mass of knowledge workers, technology users, and motivated entrepreneurs in order to deploy ICT in businesses of developing countries. Never before the Internet has it been as easy to share and transfer knowledge in such an efficient and global way. The objective of this Paper is twofold. First it proposes a theoretical business model framework (BMF) which shall allow SMEs, but also motivated local entrepreneurs in developing countries to understand the most relevant business issues in the Information Society. The BMF gives special attention to the opportunities that arise out of the use of Information Technology (IT) and particularly the use of the Internet for businesses in emerging economies. The second objective, which lies in the introduction of the Business Model Handbook for Developing Countries, shall allow an efficient knowledge transfer of the concepts developed and illustrated in the BMF. In order to achieve this, the BMH should be deployed as a Web based tool, which allows Users to navigate through the concepts and the corresponding real world examples (case studies) and easily learn about business opportunities.

INTRODUCTION

We are aware of the fact that the use of Information and Communication Technologies (ICT) is not a panacea for all development problems and that there are several obstacles that make it difficult for Small and Medium Sized Enterprises (SMEs) in developing countries to adopt ICT and particularly Internet business tools. But detailed analysis of experience around the world reveals ample evidence that, used in the right way and for the right purposes, ICT can have a dramatic impact on achieving specific social and economic development goals as well as play a key role in broader national development strategies [Digital Opportunity Initiative, 2001]. One of the greatest impacts of ICT is the mobilization of worldwide knowledge and expertise [World Bank, 1996] and their knowledge transfer to the actors of developing economies.

The goal of this Paper is to focus on the development of human capacity in ICT and Internet use for businesses in developing countries. This is also one of the pillars of the Digital Opportunity Initiative Framework and means building a critical mass of knowledge workers, increasing technical skills among users and strengthening local entrepreneurial and managerial capabilities. The Business Model Handbook for Developing Countries which we propose and explain in the following pages relies on extensive research on e-business models [Ben Lagha & al., 2001]. This Web-based knowledge transfer tool should show SMEs and local entrepreneurs the relevant business issues in the information society and help them find new business opportunities. With this tool they could, for example, learn how to improve business process efficiency and productivity or understand how to reduce operational costs by decreasing material, procurement and transaction costs, resulting in lower prices for intermediate and finished goods. Finally they should also understand how to use more and better information to improve the value of their output.

In short, the Business Model Handbook for Developing Countries should be an openly accessible resource on the Web addressing the following three points:

1. Understanding the business issues of the Information Society in the context of developing countries.
2. Understanding the relationship between these business issues, ICT and particularly the Internet in developing countries.
3. Finding case studies of SMEs in developing countries that illustrate the business issues and the use and adoption of ICT detailed above.

This Paper is organized in four sections. Following this introduc-

tions, the next section explains the Business Model Framework (BMF) for Developing Countries on which the Business Model Handbook (BMH) will rely. Section 2 explains the concept and the functioning of the BMH for Developing Countries. The conclusion of this Paper is provided in the last section.

THE BUSINESS MODEL FRAMEWORK (BMF) FOR DEVELOPING COUNTRIES

The Business Model Framework for Developing Countries that we propose in this paper shall help SMEs and entrepreneurs to structure their organizations in a way to become more efficient, more flexible and responsive to customer demand and information society opportunities. Under a business model we understand nothing else than the architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams.

Our business model framework is therefore divided into four principal components. (1) The **products and services** a firm offers, representing a substantial value to the customer, and for which he is willing to pay. ICT have theoretically opened up new opportunities for products and services for firms in developing countries. (2) The **relationship capital** a firm creates and maintains with the customer, in order to satisfy him, to create trust and to generate sustainable revenues. This element is particularly critical for firms operating in international export markets. (3) The **infrastructure and the network of partners** that are necessary in order to create value and to maintain a good customer relationship. And last, but not least, a business model contains (4) **the financial aspects** that can be found throughout the three former components, such as cost and revenue structures.

Figure 1: Business model framework

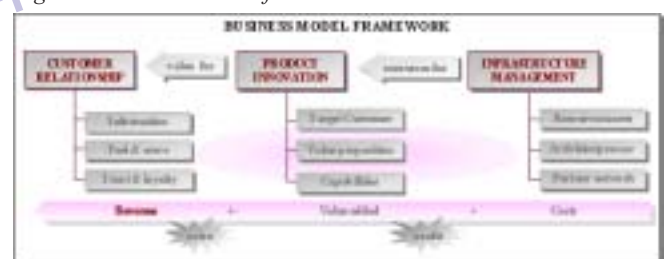


Figure 2



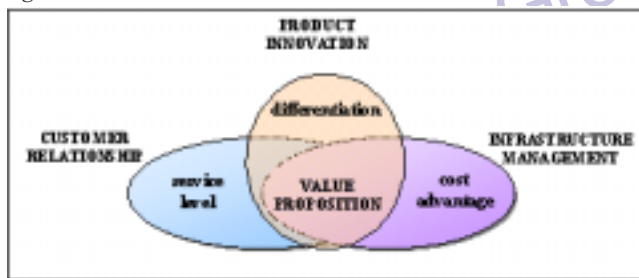
Product Innovation

A firm must ask itself what the business, the product innovation and the *value proposition* is that it wants to offer on the market. It must understand whether the originality of the value proposition is sufficient to survive and to guarantee long term growth. The firm must identify the *customer segment* it wants to target and what in-house or out-house *capabilities* are necessary in order to deliver this value.

Value proposition. This element refers to the value a firm offers to a specific target customer segment. ICT have had a very important impact on new ways of creating and delivering value especially for enterprises in developing countries. With their lower labor cost for example, these firms have substantial *cost advantages*, but have not yet been able to accede global markets efficiently before the arise of the Internet. ICT have substantially reduced transaction costs inside companies, between business partners and in marketing to customers. In many cases firms can now sell directly to their customers through dis-intermediation [Benjamin & al., 1995]. Through PEOPLELink's global artisans trading exchange (<http://www.peoplink.org>), for example, local craftspeople in developing countries are increasing their incomes not only through access to new markets, but also because the wholesaling intermediaries for their produce have effectively been removed. Local craftspeople can now receive up to 95 percent of the selling price for their produce where previously they received only 10 percent [Digital Opportunity Initiative, 2004]. Several similar initiatives, offering indigenous peoples opportunities to globally market their traditional crafts and farm products exist on the Web (A selection of such initiatives can be found on the Website "Global Coalitions for Voices of the Poor Web Guide: E-Commerce to Support Grassroots Entrepreneurs" from the World Bank Group.). But one can also observe re-intermediation through the use of ICT. The successful Chinese Web site alibaba.com for example, matches international customer with Chinese suppliers. This is very helpful for Chinese manufacturers which often have little knowledge how to address international export markets.

Another important value proposition is *product differentiation* through innovation. This means that a firm offers either entirely new products/services or innovative complementary products/services. Through the arise of the Internet, firms in developing countries can offer such services as E-Transcription or E-Editing. A firm receives an audio file over the Web, splits it into sections and then several employees execute the full formatting in a parallel working mode. The electronic document can be returned in 24 hours. A one hour tape, which equals about five to six typed pages goes at US\$ 60 to 100 per hour in North America [Rostenne, 2000]. Another source of product differentiation based on ICT is customization. Through customization [Piller et al., 2000] firms can propose value tailored to the demand of a single customer. Small firms in developing countries have a substantial competitive advantage if they provide customized handmade products or customer-tailored services at low prices. The Internet makes it

Figure 3



possible for a tailor in Shanghai to hand-make a suit for a lawyer in Boston, FedEx taking care of the expedition [The Economist, 2000].

A third form of value proposition can be the offering of a premium customer service level and customer relationship experience which accompanies the actual product. ICT allow firms to propose a whole new range of (free) services that augment the value of the sold product.

Target customer. A firm generally creates value for a specific customer segment. The definition of the market scope [Hamel, 2000; Afuah & al., 2001] captures the essence of where the firm does and does not compete — which customers, which geographical areas, and what product segments. With the arise of the Internet, firms in developing countries can market to entirely new customer segments. Chincheros for example, a small village in Peru, increased its income five-fold to US\$1,500 per month when the village leaders formed an Internet-enabled partnership with an export company in 1996. The village vegetables are now sold daily in New York [Digital Opportunity Initiative, 2001].

Capabilities. To deliver the value proposition to different customers, a firm must ensure that it possesses the range of capabilities that underpin the proposed value. This is particularly important for firms in developing countries, where ICT infrastructure and general infrastructure are not always satisfying and still often very expensive. Activities such as e-commerce need a functioning logistical infrastructure to deliver products to the end customer.

Customer Relationship

ICT offers firms in developing countries a range of new opportunities in creating customer relationships in international market segments. Through ICT, and particularly the Internet, these firms can *get a feel for* the customer's desires, *serve* him directly and develop an enduring relationship with him. In order to improve the customers experience in doing business, a firm has to gather and exploit *customer information*. Exporting firms in emerging economies can create relationship capital [Tapscott & al., 2000] with their customers which previously has been much more difficult. Through positive customer relationship and *trust* mechanisms, firms in developing countries can gain customer *loyalty* and compete directly with firms of developed countries.

Information. This element refers to all customer information and knowledge a company can gather and exploit in order to discover new and profitable business opportunities and customer segments and to improve their relationships with their customers. This does not necessarily have to be the implementation and use of relatively complex and expensive Datawarehouses and Datamining. ICT also enables the implementation of inexpensive *information retrieval strategies* which consist in the use of e-mail or feedback forms on the Web. But these insights are important and can be used throughout marketing and sales, and especially for customer relationship management (CRM). Hamel [Hamel, 2000] calls this the positive feedback effect. Firms can thus improve products and services faster than their competitors and increase product innovation. This, in return, attracts new customers, forming a virtuous circle. In addition to product improvement, a better knowledge of its customers allows a firm to establish a personalized relationship tailored to the needs of every single customer. Of course it is important that the firm has an explicit *privacy policy*, which it will respect and reveal to its customers.

Feel and serve. Serving the customer includes fulfillment, support and customer relationship management (CRM). Firms in developing countries often face poor infrastructure services (other than telecommunications), which are an important constraint on e-commerce. For example, the unreliability of postal services in Latin America

Figure 4



has meant that more expensive courier services must be used to deliver goods ordered over the Internet [World Bank, 2001]. Therefore, a firm must carefully define fulfillment and support which refers to the way it “goes to market” and how it actually “reaches” customers [Hamel, 2000]. But direct selling could improve margins to such an extent, that the higher logistical costs could become irrelevant. In Nepal for example, a Dhaka full-pattern shawl begins with 175 rupees (\$3.80) for yarn and Rs275 for the producer’s labor and ultimately sells for Rs5,250 in the U.S. or Europe [Goodman & al., 2001].

Not only direct selling, but also new Internet mediation services [Sarkar & al., 1995] could mean opportunities. AfricanCraft.com (<http://www.africancrafts.com>) is a Web site dedicated to bringing the arts and the craftsmen of Africa online. By supplying information on online shops, craftspeople, artists and designers in Africa, and by setting up on-line classrooms on subjects, such as “Kente paper weaving” or “Loom construction”, this Web site positions itself as a portal for African craftsmanship. This illustrates one of the best known and mostly applied aspects of e-business: providing information on products and value-added services over a Web Site. A firm can easily supply its customer with a wide range of basic information on products, prices and availability, or even offer him customized real-time information (i.e., delivery status, product lifecycle management). The diminishing export performance of African countries is largely attributed to non-price factors on the demand side [Oshikoya & al., 1999] and could be stopped if they would use the Internet for marketing information on prices and use the Web for after sales services and quality amelioration.

Trust and loyalty. Even though the Internet gives firms in developing countries access to global markets, this does not necessarily mean they are able to exploit these opportunities. In order to access these new customer segments, the firms must pay special attention to the elements of trust and confidence to build customer loyalty. The image of companies (i.e. branding) in the information society shifts towards relationship dynamics [Hamel, 2000] where emotional, as well as transactional elements in the interaction between firm and client, form the perception of a company. Firms in emerging markets must learn about and adopt mechanisms to build trust in e-business environments, such as, for example, virtual communities [Hagel & al., 1997], positive performance history, mediation services or insurance in case of harm, third party verification and authorization, and, a clear and explicit privacy policy [Friedman, 2000]. In some cases physical presence may be needed.

Infrastructure Management

The infrastructure component describes the value system configuration [Gordijn & al., 2000] that is necessary to deliver the value proposition; in other words, the relationship between in-house **resources and assets**, the **activity and process configuration** of the business the firm is operating in and the firms **partner network** which represents the essential external resources. Recent trends in business towards smaller, specialized enterprises that are interconnected open up new opportunities for innovative SME’s in developing countries. Especially since e-business reduces the costs of communication between geographically distant partners and lowers the search-and-compare costs involved in finding potential business partners.

Resources and assets. In order to create value, a firm needs resources [Tarondeau, 1999; Wernefelt, 1994]. Grant [Grant, 1995] distinguishes between tangible, intangible, and human assets. Firms in emerging markets should concentrate on resources in which they have a competitive advantage. An often cited example is the case of Indian firms that rely on cheap software developers or accountants to provide outsourcing services to western firms.

Activity and processes configuration. The main purpose of a com-

pany is the creation of value that customers are willing to pay for. This value is the result of a configuration of inside and outside activities and processes. To define the value creation process in a business model, we use the extension of the *value chain framework* [Porter, 2001] such as defined by Stabell and Fjeldstad [Stabell & al., 1998]. Understanding this value creation process can help a firm identify the right software and Internet tools in order to streamline business. Firms in developing countries can also benefit from the Open Source Software movement that delivers powerful, cheap and configurable (because open and reusable) ICT tools.

By applying new configurations of activities and processes enabled by ICT - including business process outsourcing, value chain integration and disintermediation - developing country firms can operate more efficiently in local markets or gain access to new markets and new sources of competitive advantage from which to drive income growth [Digital Opportunity Initiative, 2001].

Partner Network. This element of the business model framework is closely tied to the value proposition and the value creation process. These value networks [Brandenburger, 1996] or b-webs [Tapscott & al., 2000] detail how the value creation process is distributed among the partners of the firm. Shrinking transaction costs thanks to ICT makes it easier for firms to vertically disintegrate and to reorganize in partner networks. For example, PEOPLink provides CatGen, a software which enables local craftsmen to easily capture and transmit digital images of products over the Internet with minimal training and in conditions of poor connectivity. The solution is feasible due to the existence of public access points such as cybercafes and telecenters [infoDev, 1998].

Financial Aspects

The financial perspective of a business model is the fourth component and the consequence of the other three components formerly described. Financial aspects can be understood as the **costs** of the required infrastructure in order to create value and as the **revenues** of sold value. The difference between revenues and costs determines the **profitability** of a company. A very important aspect for firms in developing countries is the still very difficult access to funding. One of the major reasons for the lack of dynamic enterprises in developing countries is the shortage of affordable credit and investment to support new enterprises. Here ICT can reduce search costs.

Revenue Structure. This element measures the ability of the firm to translate the value it offers to its customers into money and therefore generate incoming revenue streams. ICT and particularly the Internet opens up several opportunities for new revenue streams and pricing models. Firms in developing countries must understand how the new pricing mechanisms [Klein & al., 2000] affect their market and how they can exploit them to their benefit.

Of course the total revenue of a firm will depend on the value proposition and the customers it targets. The Internet could erode an important advantage now enjoyed by firms in industrial countries: proximity to wealthy customers [World Bank, 2001]. Through disintermediation or integration in western value networks, firms in emerging economies can gain access to high value markets that have been out of reach up to now.

Cost structure. This element measures the costs the firm incurs in order to create, market and deliver value to its customers. It sets a price tag on all the resources, assets, activities and partner network relationships and exchanges that cost the company money.

Profit structure. This element simply measures the ability of a firm to create positive cash flow.

Figure 5



Figure 6



THE BUSINESS MODEL HANDBOOK (BMH) FOR DEVELOPING COUNTRIES – A PROJECT TO LAUNCH

The Business Model Handbook (BMH) for Developing Countries is a proposition for a tool that has for goal to help Small and Medium Sized Enterprises (SME) and local entrepreneurs to design business models in the context of developing economies that use Information and Communication Technologies (ICT) and particularly the Internet. The BMH should be a Web-based tool that relies on the Business Model Framework (BMF) outlined above. It is essential that this tool be driven by user demand and realized through direct participation of targeted end users. It should not be perceived as a kind of Trojan Horse [Afemann, 2000] to impose business and ICT concepts of more developed countries. ICT use should be adapted to the capacities of its adopters. In other words, firms should only use technologies if they effectively bring advantages. The relationship between costs and opportunities should remain realistic.

The goal of the BMH for Developing Countries is threefold. The first goal consists in the transfer of business knowledge for the information society. ICT have had an important impact on business and enterprise structure and therefore make it necessary to rethink the way a firm builds its business. Business model design relying on the BMF detailed above shall allow local SMEs and entrepreneurs to be competitive in a increasingly global economy.

The second goal of the BMH is to help SMEs and local entrepreneurs identify new opportunities arising through ICT deployment in developing countries. Firms in emerging economies have several competitive advantages, such as low wages, that they could not exploit without the use of recent ICT evolution.

Government agencies and Non Governmental Organizations (NGOs) should not only be involved in the supplying of local/regional information, but should also be consulted in the construction of a BMH for a specific country/region. Typically this concerns information on local taxes, specific trade regulations and other legal frameworks.

The last goal and probably the most important aspect of the BMH is the collection of successful case studies of firms in developing countries that have adopted ICT in their businesses. The value, the comprehension and the usability of existing databases and case collections of other organizations (i.e. The World Bank Group, UNDP) could be multiplied if integrated in a tool like the one we propose.

CONCLUSION

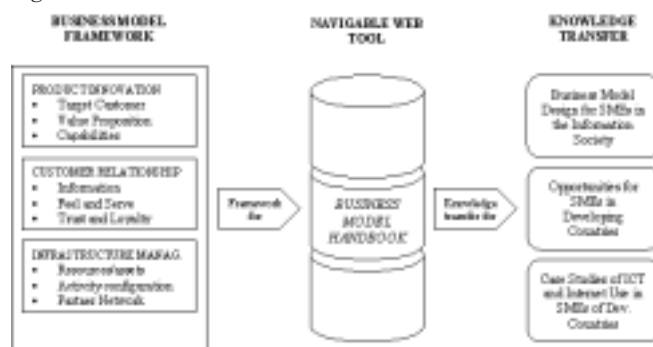
We agree with Emmanuel Castells that “technology per se does not solve social problems” [Castells, 1998]. And we also agree with him, that “the availability and use of information and communication technologies are a pre-requisite for economic and social development in our world. They are the functional equivalent of electricity in the industrial era”. Therefore the goal of this project is to use ICT for knowledge sharing and transfer. The main contribution of this paper is to make a comprehensive business model framework available, allow-

ing an effective transfer of knowledge in the domain of ICT use to developing countries. This could be achieved through a Web-based business tool we call the Business Model Handbook (BMH) for Developing Countries. Implementing such a tool will help accelerate the creation of a critical mass of motivated entrepreneurs and people with business expertise that can leverage new opportunities [Digital Opportunity Initiative, 2001].

REFERENCES

- [Afemann, 2000] Afemann, U. (2000) Internet and Developing Countries – Pros and Cons, International Workshop “Social Usage of Internet in Malaysia”, http://www.rz.uni-osnabrueck.de/Dokumentation/Lokale_Kopien/Internet_Und_Dritte_Welt/Malaysia/InternetProsandCons.htm
- [Afuah, 2000] Afuah, A., C. Tucci (2001). *Internet Business Models and Strategies*, McGraw Hill.
- [Ben Lagha & al., 2001] Ben Lagha, S., Osterwalder, A., Pigneur, Y. (2001) Modeling e-business with eBML, accepted for publication in CIMRE’2001
- [Benjamin & al., 1995] Benjamin, R.I., Wigand, R.T. (1995). “Electronic Commerce: Effects on Electronic Markets”, JCMC 1 (3).
- [Brandenburger, 1996] Brandenburger, A., Nalebuff, B. (1996). *Co-opetition*, Doubleday.
- [Castells, 1998] Castells, M. (1998) Information Technology, Globalization and Social Development, UNRISD Conference on Information Technologies and Social Development, <http://www.unrisd.org/infotech/conferen/castelp1.htm>
- [Daly & al., 1998] Daly, J., Miller, R.R. (1998) Corporations’ Use of the Internet in Developing Countries, IFC Discussion Paper Nr.35, The World Bank
- [Dhawan & al., 2001] Dhawan, R., Dorian, C., Gupta, R., Sunkara, S.K. (2001) Connecting the unconnected, The McKinsey Quarterly, Nr.4 Emerging Markets, http://www.mckinseyquarterly.com/article_abstract.asp?tk=351136:1110:22&ar=1110&L2=22&L3=77
- [Digital Opportunity Initiative, 2001] accenture, Markle Foundation, UNDP (2001) Creating a Development Dynamic: Final Report of the Digital Opportunity Initiative, <http://www.opt-init.org>
- [Elotu, 2000] Elotu, J. (2000) ITU Brings Telemedicine to Uganda, On The Internet (e-OTI), December/November 2000, <http://www.isoc.org/oti/articles/1100/uganda.html>
- [Friedman, 2000] Friedman, B., Kahn, P., Howe, D. (2000) Trust Online, *Comm. ACM*, 43 (12) 34-40
- [Goodman & al., 2001] Goodman, S., Kelly, T. (2001) Electronic Commerce in Nepal, On The Internet (e-OTI), March/April 2001, <http://www.isoc.org/oti/articles/0401/press.html>
- [Gordijn & al., 2000] Gordijn, J., Akkermans, J., van Vliet, J. (2000). “What’s in an Electronic Business Model?”, *Knowledge Engineering and Knowledge Management - Methods, Models, and Tools, LNAI 1937*: 257-273.
- [Grant, 1995] Grant, R.M. (1995) *Contemporary Strategy Analysis*, Malden MA: Blackwell.
- [Hagel & al., 1997] Hagel, J., Armstrong, A. (1997) *Net Gain - Expanding Markets through Virtual Communities*, Harvard Business School Press.
- [Hamel, 2000] Hamel, G., (2000). *Leading the revolution*, Harvard Business School Press.
- [infoDev, 1998] infoDev (1998) Implementing a Global e-Commerce Network for Artisan Groups, infoDev Project Proposal, Project Number 289-980521, <http://www.infodev.org/projects/289peoplelink>
- [infoDev, 2000] infoDev (2000) The Networking Revolution – Opportunities and Challenges for Developing Countries, infoDev Working Paper, Global Information and Communication Technologies Department of the World Bank Group, <http://www.infodev.org/library/NetworkingRevolution.pdf>
- [Klein & al., 2000] Klein, S., Loebbecke, C. (2000) The transformation of pricing models on the web: examples from the airline industry. *13th International Bled Electronic Commerce Conference*, Bled,

Figure 7



June 19-21

- [Oshikoya & al., 1999] Oshikoya, T.W., Hussain, M.N. (1999) Information Technology and the Challenge of Economic Development in Africa, African Development Bank Group Economic Research Paper No.36
- [Panos, 1998] Panos (1998) The Internet and Poverty: Real Help or Real Hype?, Panos, London
- [Piller et al., 2000] Piller, F.T, Reichwald, R., Möslin, K. (2000). "Information as a Critical Success Factor for Mass Customization or: why even a customized shoe not always fits", *ASAC-IFSAM 2000 Conference*, Montreal, Canada.
- [Porter, 2001] Porter, M. (2001). "Strategy and the Internet", *Harvard Business Review* 79 (3): 62-78.
- [Rappa, 2001] Rappa, M. (2001). *Managing the digital enterprise - Business models on the Web*. http://ecommerce.ncsu.edu/business_models.html
- [Rostenne, 2000] Rostenne, J. (2000) Internet for Business – Making Money on the Web, a Specialized Workshop for Executives and Entrepreneurs http://www.bellanet.org/partners/aisi/adf99docs/rostenne-ADF_workshop.ppt
- [Sarkar & al., 1995] Sarkar, M., Butler, B., Steinfield, C. (1995). "Intermediaries and cybermediaries: a continuing role for mediating players in the electronic marketplace", *Journal of Computer-Mediated Communication* 1 (3).
- [Stabell & al., 1998] Stabell, C.B., Fjeldstad, O.D. (1998). "Configuring value for competitive advantage: on chains, shops, and networks", *Strategic Management Journal*, 19: 413-437.
- [Tapscott & al., 2000] Tapscott, D., Lowi, A., Ticoll, D. (2000). *Digital Capital - Harnessing the Power of Business Webs*, Harvard Business School Press.
- [The Economist, 2000] The Economist (2000) Falling through the net?, September 21st
- [Wernefelt, 1994] Wernefelt, (1984). "A resource-based view of the firm", *Strategic Management Journal*, 5: 171-181.
- [World Bank, 1996] World Bank Group (2001), Harnessing information for development: a proposal for a World Bank Group vision and strategy, *Information Technology for Development*, 6(3/4), 145-188, <http://www.worldbank.org/html/fpd/harnessing>
- [World Bank, 2001] World Bank Group (2001), *Global Economic Prospects and the Developing Countries 2001*, <http://www.worldbank.org/prospects/gep2001>

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/proceeding-paper/business-model-handbook-developing-countries/31846

Related Content

Deep Mining Technology of Database Information Based on Artificial Intelligence Technology

Xiaoai Zhao (2023). *International Journal of Information Technologies and Systems Approach* (pp. 1-13).

www.irma-international.org/article/deep-mining-technology-of-database-information-based-on-artificial-intelligence-technology/316458

Modified Distance Regularized Level Set Segmentation Based Analysis for Kidney Stone Detection

K. Viswanath and R. Gunasundari (2015). *International Journal of Rough Sets and Data Analysis* (pp. 24-41).

www.irma-international.org/article/modified-distance-regularized-level-set-segmentation-based-analysis-for-kidney-stone-detection/133531

Change Management: The Need for a Systems Approach

Harry Kogetsidis (2013). *International Journal of Information Technologies and Systems Approach* (pp. 1-12).

www.irma-international.org/article/change-management/78903

Modeling and Forecasting Electricity Price Based on Multi Resolution Analysis and Dynamic Neural Networks

Salim Lahmiri (2015). *Encyclopedia of Information Science and Technology, Third Edition* (pp. 6397-6409).

www.irma-international.org/chapter/modeling-and-forecasting-electricity-price-based-on-multi-resolution-analysis-and-dynamic-neural-networks/113095

The Role of Systems Engineering in the Development of Information Systems

Mirosljub Kljajic and John V. Farr (2008). *International Journal of Information Technologies and Systems Approach* (pp. 49-61).

www.irma-international.org/article/role-systems-engineering-development-information/2533