Trust building electronic services as a crucial self-regulation feature of Digital Business Ecosystems

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Abstract: *In the field of digital business ecosystem, the self-regulation feature plays crucial role. ICT supports biological and sociological phenomena through efficient electronic services. One of the main roles is building and enhancing efficient relationships between actors within the ecosystem. Problem of interaction between commercial subjects depends on expected benefits. These expectations are predictors of successful result from realized transaction with potential partner. And this predictor is based on trust and trustworthiness. The paper presents trust as crucial factor for cooperation and discusses specifics of several trust building mechanisms to increase the level of trust in e-cooperation within digital business ecosystems. Based on results provided by questionnaire survey in Slovak business environment, the paper discusses the relationship between the level of respondents´ electronic business experience and their preferences for the portfolio of trust building mechanisms.*

Keywords: Trust, trust building, inter-organizational trust, strategy, electronic services

1. Introduction to Digital Business Ecosystem

A Digital Ecosystem as a European concept is a digital infrastructure established with the aim of creating a digital environment for networking Nachira et al. (2007). This environment based on the properties of self-organization, self-adaptability, scalability and sustainability, inspired by natural ecosystems should be capable of supporting co-operation, knowledge sharing, the development of open and adaptive technologies and evolutionary business models (Nachira and Louarn, 2007). Some of the basic features of digital ecosystems support collective learning development, efficient knowledge flow and innovation creation and implementation across Small and Medium Enterprises (SMEs) and other actors within the ecosystem.

First research effort focusing on the Digital Ecosystems (DEs) theme started around 2000 when the eEurope 2002 action plan (Council of the European Commission, 2000) established the term digital Ecosystems. Later on, Digital Business Ecosystem (DBE) research community was shaped (Nachira et al., 2007). This was immediately supported by the first EU FP6 funded integrated research project – the Digital Business Ecosystems (2002) project (IST-2002-507953). The DBE project involved 20 partners in 9 member states and received over €10M funding, making it the largest EC research investment ever in Open Source Software in ICT for E-Business.

From 2004, the DBE concept was supported also by other EU FP6 funded Project OPAALS (2004), Project SEAMLESS (2004) and Project CONTRACT (2004). Generally, projects within cluster Technologies for DEs were focused on developing an open-source, peer-to-peer information technology system that can facilitate effective and efficient exchange among businesses and communities of interest, such as SME networks or academic research communities.

The digital ecosystem provides the advantage of ICT in term of enhanced dynamic interaction (cooperation and competition) in network environment by networking of numerous and diverse actors (small & medium-sized and large enterprises; government and local administrations, training and learning institutes, innovation and research centers). Through natural ecosystem features it is able to produce comprehensive innovation and economic development.

Self-organizing feature is responsible for dynamic adaptation of the ecosystem to the environment with fluid, amorphous and transitory structures of collaboration and cooperation. As each ecosystem, also the success of DE development and sustainable growth depends on interactions between actors.

The Digital Ecosystem concept developed and promoted by the Digital Ecosystems Community distinguishes itself on the basis of open source and peer-to-peer nature – a loosely coupled server system (Nachira and Louarn, 2007). This makes it ideal for SMEs:

- its open source philosophy makes it free,
- it requires minimal ICT resources
- it requires minimal investments by the SMEs,
- it is adaptable to SMEs' existing applications and business models.
- it provides a more secure digital environment for sharing and exchanging sensitive knowledge,
- and it involves no central control, no single point of failure, no dominant position, no pre-defined business model.

One of the crucial systemic features of DE is self-regulation and self-adaptation. DE's feedback mechanisms maintain the components of the system in equilibrium state. An equilibrium state demonstrates the stability of ecosystems. However, the components of ecosystems are still in dynamic exchanges. Ecosystems tend to cycle between states of change and stability and are looking for cycling stability. Together, different ecosystems of different parameters are in some way interconnected and determined each other what also impact the equilibrium state.

Self-regulated and self-adaptive systems work in a top-down manner. They examine their own global or local behavior and modify it. The signal for modification is indicated by the status, when it is not accomplishing what the system was intended to do, or when better functionality or performance is possible.

In the field of digital business environment/ecosystem, the self-regulation feature plays crucial role. ICT supports biological and sociological phenomena through efficient electronic services. One of the main roles is building and enhancing efficient and trusted relationships between actors within the ecosystem. Problem of interaction between commercial subjects depends on expected benefits/utility. These expectations are predictors of successful result from realized transaction with potential partner. And this predictor is based on trust and trustworthiness. According to Fukuyama (1995), to increase and maintain high level of trust leads to sustainable growth and development. That's the reason, we are focusing our research in next sections on trust building mechanisms or strategies identification and analysis to be able to provide more efficient and trusted cooperative environment for the current business.

2. Trust as the social component for economic development

Although some experts examine trust only from security aspect (Prins et al., 2002; Salam et al., 2005; Doucek, 2008), the trust has been often proclaimed as a valuable socio-economic asset. It plays a role as an important driving factor to an effective and efficient inter-organizational collaboration. In many studies, trust impacts on transaction costs reduction and allows greater flexibility to respond to changing market conditions (Dore, 1983, Barney and Hansen, 1994; Dyer, 1997). Together, it supports efficient information sharing standards improving coordination and joint efforts to minimize inefficiencies (Aoki, 1988; Clark and Fujimoto, 1991; Nishiguchi, 1994). It can also provide investments in transaction or relation-specific assets' which improve productivity (Lorenz, 1988; Asanuma, 1989; Dyer, 1996). Some other studies even claim that national economic efficiency is highly correlated with the existence of a high trust institutional environment (Fukuyama, 1995; North, 1990; Casson, 1991; Hill, 1995). For example, Fukuyama (1995) argues that the economic success of a nation depends on the level of trust inherent in the society.

Several other studies contend that e-commerce cannot fulfill its potential without trust (Jones et al., 2000; Farhoomand and Lovelock, 2001; Raisch, 2001). Lee and Turban (2001) highlight lack of trust as the most commonly cited reason in market surveys why consumers do not shop online. The reason for this is that online sellers are not well known to the consumers, the consumer has no opportunity to physically examine the product before buying, and the consumer cannot protect any sensitive private or financial information that the seller receives.

Trust among partners is one of the most important factors that decide whether the cooperation of companies will occur and in case it occurs, if it will be successful. From several researches and reports conducted in recent years, the set of mechanisms needed for trust has been identified. This set needs to be analyzed with regard to the level of significance to trust building, especially for e-business networks. The trust can serve as the source of competitive advantage (Barney and Hansen, 1994) and it has impact on several economic indicators as transaction cost reduction, sustainable growth, price premium (Fukuyama 1995, Ba and Pavlou 2002, Dorčák and Pollák, 2011).

According to Ganesan (1994), trust consists from two elements: credibility and benevolence. The credibility Cognitive-based trust or "credibility" is a belief, sentiment, or expectation about partner's

trustworthiness determined by his competences, reliability or dependability. Affect-based trust or "benevolence" is a purpose or behavior that is based on dependence on the partner and involves vulnerability and uncertainty on the part of the trustor. Benevolence is about partner's intention and motives to be a beneficial to other side in new situation, where no previous transaction between partners exists.

3. Trust and ICT

Trust in information and communication technology (ICT) is an important concept. Nowadays, people depend on ICT more than ever before. The Internet has emphasized world's dependence on IT by using huge amount of SW application, media, general information etc. (Pollák and Dorčák, 2010).

Trust in ICT is similar to the trust within human interactions. The main difference according to McKnight and Chervany (2001-2002) is in the object of trust, which means the trust of people into a specific technology. But one more important difference exists. It is the feature of trust asymmetry. Humans are able to build trust into the technology, but technology cannot build the trust into humans. It is an important issue, as social-human version of trust is symmetric; it depends on actions and reactions on both sides. If a person trusts another and the second person trust into the first one, the trust relations are built. In ICT we have only one side trust and whole trust depends only on the first impression of technology.

Trust in information and communication technology determines use and adoption of ICT. On the other hand, ICT can be a facilitator of the value of trust. ICT makes things transparent, information more reliable and timely.

Although, a significant amount of literature on trust in an organizational context exists (e.g. McKnight et al.,1998; Kramer, 1999; Tyler, 2003; Gulati and Nickerson, 2008), especially in interpersonal trust, academic work specifically dealing with ICT´s role in inter-organizational trust is a more limited area of research.

The role of ICT in trust relations is visible also in inter-organizational business relations. Trust in C2C or B2C auction sites is usually linked with the term of rating, in B2B supply chains can be linked with supplier performance measurement which aggregate several evaluated areas into one rating or maps of key performance indicators. However, trust is more than ratings or evaluation of partner's behavior. It is possible to build trust also by services assuring, supporting, controlling or correcting different activities done by the company in the environment of digital business ecosystems. Trust building mechanisms (services) are changing through ICT support. Electronic environment is able not only to record and monitor whole information flow, but it is able to support better decision making in business processes, increase transparency of environment, improve effectiveness and efficiency of escrow services, online dispute resolution or other mechanisms. Thus, ICT seems to have crucial role in increasing value of trust in economics and business.

3.1 Trust building mechanisms for Digital Business Ecosystems

To enhance trust and basic trust marks, several elements for improving confidence and generally supporting trust building in e-business can be utilized. To recognize appropriate trust building mechanisms and strategies regarding implementation into digital ecosystem environment, the research within two projects was conducted – European project "Empowering Business Ecosystems of Small Service Enterprises to Face the Economic Crisis" (FP7-SME-243554-2) where partial results of Slovak national research project "Strategies of trust building on Single European Electronic Market" (VEGA - 1/0679/10) were enhanced and used for eBEST implementation strategy proposition. Within these two projects, the research on significance of several Trust Building Mechanisms (TBMs) was conducted through questionnaire within Slovak business environment.

In the beginning of the questionnaire, respondents were asked to describe themselves in following *description areas*:

1 The area of respondent´s work position (his role in company):
- selling
- purchasing
- both selling and purchasing

2 The size of the company with respect to number of employees:
- micro (0-9 employees)

- small (10-49 employees)
- medium (50-249 employees)
- large (over 250 employees)

3 The main location company´s business partners:

- international
- local
- international and Local (approximately the same proportion)

4 The level of respondent´s experience with e-commerce solutions:

- no experience
- low level of experience (usage of Internet for viewing the web pages of partners, and e-mail)
- experience with internal Enterprise Resource Planning (ERP) system, electronic solutions for procurement, Electronic Data Interchange (EDI), catalogues, etc.
- experience with electronic markets

Our sample gathers data from 446 organizations operating within Slovakia. The distribution of sampleis provided in Table 1.

Table 1 Description of sample distribution

		Company´s experience in electronic commerce:				Total
		No experience	Low experience	Experience with internal ERP, e-business solutions	Experience with electronic marketplaces	
Size of company *(employees)*	Micro (0-9)	21	131	73	8	**233**
	Small (10 – 49)	5	57	41	2	**105**
	Medium (50 –249)	3	25	26	3	**57**
	Large (250+)	2	14	34	1	**51**
Total		**31**	**227**	**174**	**14**	**446**

In order to assure integrity of answers, the interviews were conducted only with managers responsible for procurement or sell related processes. More over every block of related questions, was explained by the description of related issues. This was done to ensure better understanding of the questions. The whole questionnaire, based on the methodology from Seamless project (Delina et al. 2007), examines 31 different TBMs. These mechanisms are analyzed from two different perspectives – significance and necessity.

The research was aimed to:

1. examine the level of trust of particular trust building mechanisms perceived by companies,
2. identify the set of TBMs which are perceived by companies as necessary to join the electronic market.

In questionnaire, respondents were at each trust business mechanism asked to:

- specify how significantly would particular trust building mechanism increase their trust in electronic business platform (if this trust building mechanism was part of it). Respondents were given 3 possible answers: 0 - no significance, 1 – medium significance, 2 – high significance,
- mark every trust building mechanism, which is perceived as necessary for them in order to join an electronic business platform.

Each general trust building area was decomposed into several implementation trust building mechanisms with different level of complexity, from simple to more complex. The most interesting strategies or functionalities we have analyzed in our two projects are:

- *information quality*, where it must be ensured that information are correct, valid, up-to-date and potentially validate by third trusted party; trust building mechanisms (functionalities) were identified:

  5 Contact information; 6a Description of company's focus; 6b Product/service categories; 6c Detailed product/service description; 7 Company size; 8 Year of foundation; 9 Status of business activity,

- *certificates and references* to provide quality labels and information about past activities – partners or business information:

  11a National level certificates or marks of companies on the local market; 11b National level certificates or marks for foreign companies; 11c Known international established certificates; 12a List of important business partners; 12b List of conducted business,

- *reputation building* – to build credibility through ratings, feedbacks, discussion forums; e.g.:

  13a Positive-only feedback from the partners; 13b Positive and negative feedback from the partners; 13c Discussion forum; 13d Reports with aggregated historical data about the platform business activities of the company; 13e Rating presented as a simple symbol,

- *contract execution support* – support to create a legally enforceable agreement in which two or more parties commit to certain obligations in return for certain rights (Reinecke and Schoell, 1989). Efficient support of contract execution support can be achieved for example through contract clauses databases integration with data flow support. Trust building mechanisms (functionalities) considered:

  14a The integration of business negotiation outcomes into the contract; 14b Contract negotiation process tracking and recording; 14c Basic contract clauses and templates; 14d Database/service with complex contract clauses for the fee provided by specialized company; 14e Explaining contract template clauses and conditions,

- *online dispute resolution support* (ODR) – is a branch of dispute resolution which uses information and communication technology to replace the traditional out of court processes to facilitate the resolution of disputes between parties. It primarily involves negotiation, mediation or arbitration, or a combination of all three supported by intelligent software solutions e.g. for automatic negotiation of penalties etc. Trust building mechanisms (functionalities) can be then implemented as:

  15a Advisory support - recommendation of ODR experts to users; 15b Technical support; 15c Limited ODR; 15d Outsourced ODR service by specialized company;

- *escrow services* (ES) – which reduce the potential risk of fraud (for example the breach of contract) by acting as a trusted third party that collects, holds and disburses funds according to buyer and seller instructions, e.g.:

  16a Internal basic escrow service; 16b Bank as the mediator; 16c Trusted Third Party,

- *standardization activities* – for ensuring standard, ethic and fair processes and behavior through code of conduct, interoperability in the exchange of business documents with multilingual support based on ontologies etc., e.g.:

  17a Multilingual support with standard terms; 17b Code of Conduct.

How concretely these trust building mechanisms (TBM) are able to support trust building is described in more detail by Delina et al. (2007). For our research purposes, TBMs 14a, 14b, 15c are considered to be medially sophisticated, and TMBs 14d, 15d, 16c are considered to be highly sophisticated or complex.

On the one hand, these trust building mechanisms supported by ICT in digital business ecosystem were identified as facilitator of trust (it means also intensity of cooperation between ecosystem actors) – services, which can improve functionalities for reduction of information uncertainty, unfair practices, improvement of contract condition assuring, execution and problem solving. All these services have to

build trusted business environment for inter-organizational business cooperation. According to McKnight (2005), functionalities provided in higher quality of e-services should be the most trusted.

3.2 Research results

As we see from the Figure1 (explanations of numbers are above in text), the most complex (13d - Reports with aggregated historical data, 14a - Integration of negotiation outcomes into contracts, 14b - Contract negotiation process tracking and recording, 14d - Database/service with complex contract clauses provided by specialized company, 15c - Limited ODR, 15d - Outsourced ODR service by specialized company, 16a – Internal basic escrow service, 16c - Trusted third party as escrow provider) and high quality services are less trusted (These TBMs appear in third of observations with lowest significance). For the reason that the people with no or little skills and experiences have barriers to trust complex services, it is understandable.

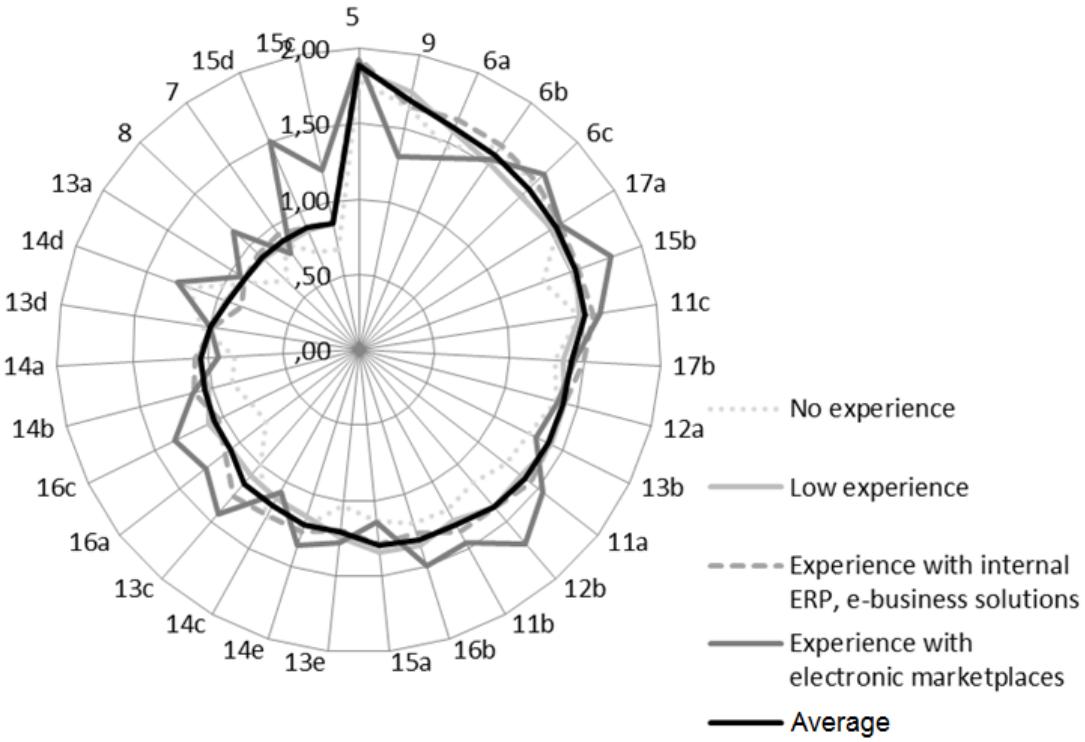

Figure 1 Significance of trust building mechanisms for e-trust building

Note: values of trust were 0 – no significance, 1 –medium significance, 2 – high significance for increasing trust

TBMs as Description of Company's background (1,6% on average), Status of business activity (1,64%), Multilingual (1,57%) and Technical support (1,53%), Known international certificates (1,52%) or Code of Conduct (1,41%) are mostly trusted as the companies know this information and services from real life and are very simple for understanding. As we can see, the idea of higher trust connected to the higher quality of e-service provided by McKnight (2005) is not supported, especially in conditions of inter-organizational business relations.

In order to define which of TBMs are perceived as necessary for most of the companies, we compute for every single TBM percentage of organizations (total necessity), which consider particular solution as necessary to entry market (Figure 2). Mechanisms in the figure are organized clockwise based on their total necessity. As figure illustrates, the situation is similar as in significance analysis. In generally, companies required mostly simple and basic TBMs as:

- Contact information (86%),
- Status of business activity (57%),
- Description of company's focus (53%),
- Product/service categories (48%),
- Detailed product/service description (44%),
- Multilingual support with standard terms (41%),
- Technical support (36%).

Other mechanisms as "Code of Conduct" (35%), Positive and negative feedback from the partners (32%) and Known international established certificates (31%) are important for more than one third of all organizations.

On the other hand there are sophisticated solutions, which are required by less than 10% of companies from Slovak business environment:

- Reports with aggregated historical data about the platform business activities of the company (9%),
- Database/service with complex contract clauses for the fee provided by specialized company (9%),
- Outsourced ODR service by specialized company (7%),
- Limited ODR – till some level of complexity (4%).

As findings suggest, it seems that in term on necessity, the complexity of TBM mechanism is an issue. Again we can say, that these complex TBMs appear in third of observations with lowest significance. More complex the mechanism is, fewer companies consider it as necessary mechanism in term of entry to online environment. This can also be interpreted as, more complex the mechanism is, the fewer companies qualify this mechanism as a tool required to build confidence in entry to online environment.

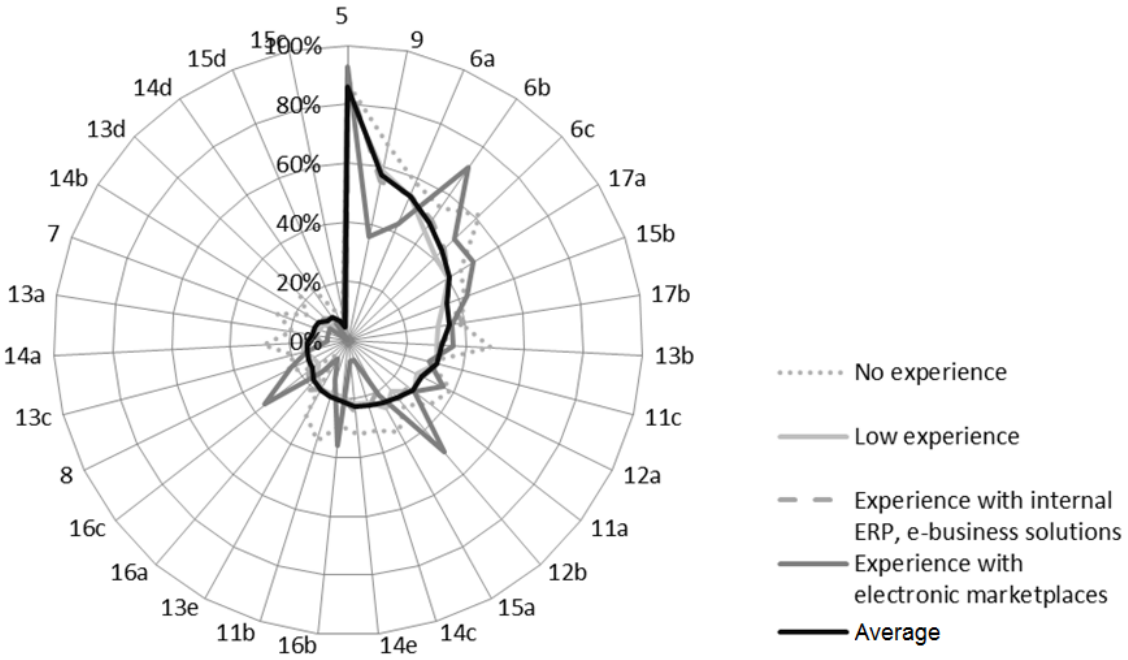

Figure 2 Percentage distribution of necessary TBM based on the ICT experience of the company

Key finding in term of required and trust of Trust Building Mechanisms we can summarize as follows:

- greatest discrepancies exist between companies with no ICT experiences and companies with experiences with electronic market place,
- complexity of Trust Building Mechanisms is crucial factor in significance in both trust level and necessity of Trust Building Mechanisms,
- according to trust significance, more experienced companies are demanding highly sophisticated TBMs,
- and according to reducing barriers of e-marketplace entries, no experienced companies are demanding highly sophisticated TBMs.

4. Conclusion

Trust is a visible social phenomenon with still higher impact on economic environment. Not only financial crisis and trust reduction into financial institutions, but also trust between actors within supply chains influence the economic performance of countries. Generally, trust can improve cooperation and reduce transaction cost with higher efficiency. On the other hand, the trust is based on credibility which can be much more supported by ICT, which can bring higher transparency, information access and efficiency of trust building processes. Very interesting example is digital business ecosystem, where network character with trust building mechanisms as self-regulating feature can be more efficient and effective environment as in physical world. To improve cooperation by new ICT functionalities we have identified set of suitable trust building strategies or mechanisms for electronic cooperation networks, which can considerable influence the interaction between companies, increase trust into the software network environment but also into huge number of unknown but potential business partners. Together, through the questionnaire survey, the trusted level of each TBM was identified together with the necessity of each TBM's implementation in the e-marketplace environment. Although, we have found interesting issue, where new ICT based trust building mechanism is not as trusted as simple one.

It seems the trust into the TBMs as a software service depends on a level of e-skills, when higher level of e-skills means higher trust into more complex and innovative trust building mechanisms. This issue is suitable for e-market makers when optimizing implementation strategy. According to different level of e-skilled companies/users, it is possible to provide most trusted strategy. One important factor can be used to support trust building mechanisms deployment in digital business ecosystems. It is synergy or multiplicative trust in cooperation processes, where new and complex trust building mechanisms can be supported by more trusted simple mechanisms as for example ratings. In the field of reputation building which plays very crucial role in synergy between particular trust building mechanism, more technically focused studies which enhance our research from computational aspects of interaction based trust are available, for example trust inherence based on fuzzy theories (Skopik et al 2010). Interlinking and synergy relations between several types of trust building mechanisms or services can reduce barriers in adoption of these new facilitators of e-cooperation and achieving higher market efficiency in supply chains.

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5. References

Aoki, Masahiko, 1988. *Information, Incentives, and Bargaining in the Japanese Economy*, New York: Cambridge University Press

Asanuma. Banri, 1989. 'Manufacturer-Supplier Relationships in Japan and the Concept of Relation-Specific Skill'. *Journal of the Japanese and International Economies*, 3, pp. 1-30

Ba, S., Pavlou, P.A., 2002. Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behaviour. *MIS Quarterly,* September 2002, vol. 26, no. 3, pp. 243-268

Barney, J. B. and M. H. Hansen, 1994. Trustworthiness as a source of competitive advantage. *Strategic Management Journal* 15: pp. 175-190

Casson, M., 1991. *The Economics of Business Culture*, Oxford: Clarendon Press.

Clark, Kim B., Takahiro Fujimoto, 1991. *Product Development Performance.* Boston:Harvard Business School Press.

Council of the European Commission, 2000. eEurope 2002 Action Plan: *An Information Society for All* [on-line]. June 14, 2000 [cit. September, 2011]. http://ec.europa.eu/information_society/eeurope/2002/documents/archiv_eEurope2002/actionplan_en.pdf

Delina, R., Vajda, V., Bednár, P., 2007. *Trusted operational scenarios: trust building mechanisms and strategy for electronic marketplaces* [on-line]. August 2007 [cit. August 2011]. Kranj: Moderna organizacija, 2007. 78 p. <http://www.seamless-eu.org/deliverables/TrustedOperationalScenarios.pdf>

Dorčák, P., Pollák, F., 2011. Influence of virtual social networks on increase in sales in electronic commerce. In: Organizacja prihodnosti: *30. Mednarodne konference o razvoju organizacijskih znanosti*, Slovenija, Portorož, 23.-25.3.2011. - Kranj: Moderna organizacija, 2011. pp: 260-267.

Dore, Ronald, 1983. Goodwill and the Spirit of iMarket Capital ism. *British Journal of Sociology*. Volume XXXIV, NO. 4, pp 459-482

Doucek, P., 2008. Applied information management - Management reference model - Security metrics. In Chroust, G. - Doucek, P. - Klas, J. (ed.). *IDIMT-2008*. Linz: Universität Linz, pp. 81-106

Dyer, Jeffrey H., 1996. Specialized Supplier Networks as a Source of Competitive Advantage: Evidence from the Auto Industry, *Strategic Management Journal*, Vol. 17, 4. pp: 271-292

Dyer, Jeffrey H., 1997. Effective Interfirm Collaboration: How Firms Minimize Transaction Costs and Maximize Transaction Value. *Strategic .Managernent Journal*. Vol 18, 7, pp: 535-556

Farhoomand, A., Lovelock, P.,2001. *Global e-Commerce – Texts and Cases*. New York: Prentice Hall, 2001. Fukuyama, F. (1995). Trust- The social virtues and the creation of prosperity. New York, New York, Simon & Schuster Inc.

Ganesan, S., 1994. Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, April 1994, Vol. 58, pp. 1-19

Gulati, R., Nickerson, J. A., 2008. Interorganizational Trust, Governance Choice, and Exchange Performance. *Organization Science*, Vol. 19, No. 5, pp. 688-708

Hill, Charles W.L., 1995. National Institutional Structures. Transaction Cost Economizing, and Competitive Advantage: The Case of Japan. *Organization Science*. Vol. 6, No. 1, pp. 119-131

Jones, S., Wilikens, M., Morris, P., Masera, M., 2000. Trust requirements in e-business: A conceptual framework for understanding the needs and concerns of different stakeholders. *Communications of the ACM*, 2000, Vol. 43, No. 12, pp. 81-87

Kramer, R. M., 1999. Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology*, Vol. 50, pp. 569-598.

Lee, M., Turban, E. A., 2001. Trust Model for Consumer Internet Shopping. *International Journal of Electronic Commerce*, 2001, Vol. 6, No. 1, pp. 75-91. ISSN 1086-4415

Lorenz, Edward H., 1988. *Neither friends nor strangers: Informal networks of' subcontracting in French industry*. in Trust: Making and Breaking Cooperative Relations. New York: Blackwell.
pp. 194-210

McKnight, D. H., Cummings, L. L., Chevrany, N. L., 1998. Initial trust formation in new organizational relationships. *Academy of Management Review*, Vol. 23. No. 3, pp. 473-490

McKnight, D. H., 2005. Trust in Information Technology. In G. B. Davis (Ed.), *The Blackwell Encyclopedia of Management.* Vol. 7 Management Information Systems, Malden, MA: Blackwell, pp. 329-331

McKnight, D. H. and Chervany, N. L., 2001-2002. What Trust Means in E-Commerce Customer Relationships: An Interdisciplinary Conceptual Typology. *International Journal of Electronic Commerce* 6(2), 2001-2002, pp. 35-59

Nachira, F. et al., 2007. *Digital Business Ecosystems*. Luxembourg: Office for Official Publications of the European Communities, ISBN 92-79-01817

Nachira, F., Louarn, L.M., 2007. *The Information Resource about the European approach on Digital Business Ecosystems* [on-line]. 2007.<http://www.digital-ecosystems.org/>

Nishiguchi, Toshihiro, 1994. *Strategic Industrial Sourcing.* New York: Oxford University Press.

North, Douglass C., 1990. *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge, UK.

Pollák, F., Dorčák, P., 2010. Internet as the new mass media - traditional and new forms of internet advertisement. In: Management 2010. (Part I.) : *Knowledge and management in times of crisis and ensuing development*, R. Štefko, M. Frankovský, P. Adamišin (Eds.). - Prešov : University of Prešov, 2010, pp. 456-463

Prins, J.E.J., Ribbers, P.M.A., van Tilborg, H.C.A., Veth, A.F.L. & J.G.L. van der Wees (Eds.), 2002. *Trust in Electronic Commerce: The role of trust from a legal, an organizational and a technical point of view.* Kluwer Law International, The Hague (The Netherlands)

Project CONTRACT, 2004. Contract based Systems Engineering Methods for Verifiable Cross-Organisational Networked Business Applications, FP6 IST-2004-034418, http://www.digital-ecosystems.org/cluster/contract/contract.html

Project DBE, 2003. Digital Business Ecosystem, FP6 Integrated Project IST-2002-507953, http://www.digital-ecosystem.org

Project OPAALS, 2004. Open Philosophies for Associative Autopoietic Digital Ecosystems FP6-034824, http://www.opaals.eu

Project SEAMLESS, 2004. Small Enterprises Accessing the Electronic Market of the Enlarged Europe by a Smart Service Infrastructure, FP6 STREP - IST-2004-026476, http://www.seamless-eu.org/

Project eBEST, 2011. "Empowering Business Ecosystems of Small Service Enterprises to face the economic crisis" 7th Framework Programme FP7-SME-2008-2, http://www.ebest.eu/

Raisch, W., 2001. The E-Marketplace – Strategies for Success in B2B Ecommerce. McGraw-Hill, 2001. ISBN 978-0071361231

Salam, A.F. et al., 2005. Trust in E-commerce, Communications of the ACM Vol. 48. No. 2 February 2005, p. 73-77

Skopik, F.; Schall, D.; Dustdar, S., 2010. Modeling and mining of dynamic trust in complex service-oriented systems. Information Systems 35(7): 735-757

Tyler, T. R., 2003. Trust within organizations. Personell Review, Vol. 23, No. 5, pp. 556-568

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