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A SHARED INFORMATION SYSTEM FOR TOURISM ENTERPRISES IN DEVELOPING ECONOMIES

Requirements specification of inter-organizational information system

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ABBREVIATIONS:

HICD: Human and institutional capacity development; Widely used methodology for measuring institutional performance improvement, derived from balanced score card method.

ICT4D: Information technology research for development; ICT research branch which concentrates studies in developing countries and developing areas.

INTUR: Instituto Nacional de Turismo; Nicaraguan states' Tourism Institute. States official supporter of tourism activities in Nicaragua.

IOIS: Inter-organizational information system; Information system which is shared by multiple user organizations.

IS: Information systems science.

ISDT: Information systems design theories; A broad specification of information systems design theories provided by Gregor and Jones (2007).

VTC: Virtual travel community; An interactive portal where visitors of certain interest can share their opinions and have peer-to-peer recommendations or complaints.

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ABSTRACT:

In a developing economy's business environment, introduction of new technology creates a large potential for more effective and streamlined production of tourism services. This study shows guidelines of design of an inter-organizational information system for small tourism enterprises. The entrepreneurial goal is to support strategic alliances in order to obtain better market-fit and sustainable competitive advance. This requires that the enterprises are capable of evaluating their existing processes, identify and outline improvements, and implement them. More than that, enterprises have to execute profound strategic changes in their business processes. For this change, study shows that adaption of supportive information system can be a key factor to satisfy these demands.

Firstly, using systematic literature review the study identifies global trends of e-tourism. Secondly the trends are compared with the reality of small tourism enterprises in Nicaraguan Caribbean coast. With interview and brain storming sessions with hotel managers and local tourism specialists, desired state of e-tourism enhanced business processes is defined. Performance gaps and solutions are identified and outlined in order to reach new customer segments and better customer satisfaction with use of inter-organizational information system. With help of shared information system, enterprises search for sustainable economic growth and more stable business environment for their activities.

The scientific domain of research is Information systems science. The method used for data collection and interpretation is systematic literature review and human and institutional capacity development -method. As result, the research identifies critical business processes when implementing e-Tourism services into tourism enterprises in developing economies. Strategic solutions for sustainable improvements in business processes supported by use of shared information system are outlined. As a practical result, the study lists required steps in order to reach desired changes in tourism enterprises with e-tourism initiative. Specification of requirements for information system is made. The implementation process and construction of information system is left out from this research and it requires later its own case study.

KEYWORDS:

e-Tourism, developing economies, shared information systems, design science, HICD

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TIIVISTELMÄ:

Varsinkin ns. kehittyvien talouksien liiketoimintaympäristössä uuden teknologian käyttöönotto on tarjonnut yrityksille mahdollisuuden parantaa liiketoimintansa laatua, saavuttaa uusia asiakassegmenttejä ja siten parantaa toimintansa tuottavuutta. Tutkimus määrittelee suuntaviivat kehittyvissä talouksissa toimiville pienille turismiyrityksille tarkoitetun jaetun tietojärjestelmän suunnittelulle. Yritysten tavoitteena on, että tietojärjestelmä tukee ja edistää strategista yhteenliittymää, jonka avulla pienet yritykset saavuttavat paremman markkina-aseman ja saavuttavat kestävää kilpailuetua. Tämä kuitenkin edellyttää yrityksiltä kykyä arvioida omia liiketoimintaprosessejaan, tunnistaa ja määritellä parannuksia prosesseihin ja ottaa uudet prosessit käyttöön. Informaatioteknologian käyttö prosessien tukena muuttaa välttämättä myös liiketoiminnan strategiaa. Tutkimus osoittaa, että yritysten yhteistoimintaa vahvistavan yhteisen tietojärjestelmän adoptointi on keskeinen tekijä tässä prosessissa.
Systemaattisen kirjallisuuskartoituksen avulla tutkimus selvittää turismiteollisuuden sähköisten Internet-palveluiden trendit. Sen jälkeen verrataan globaaleja e-turismi-palveluja Nicaraguan Karibian rannikolla sijaitsevien pienyritysten tämän hetkiseen todellisuuteen. Hotellien johtajien ja paikallisten matkailuasiantuntijoiden haastattelujen avulla selvitetään yritysten sähköisten palvelujen nykyinen tila sekä määritellään toivetila, joka johtajien mukaan toisi yrityksille uusia asiakassegmenttejä ja taloudellista tuottoa. Sen jälkeen tutkimus määrittelee askeleet, joiden avulla toivottu tila yrityksissä saavutetaan.
Tutkimuksen viitekehys on tietojärjestelmätiede. Data kerätään systemaattisen kirjallisuuskartoituksen sekä yritysten johtajien ideariihien ja haastattelujen avulla. Data analysoidaan yrityksen suorituskykyä mittaavan HICD -metodin avulla. Tuloksena tutkimus identifioi kriittiset liiketoimintaprosessit joita voidaan tukea yhteisen tietojärjestelmän käyttöönoton avulla. Samoin tutkimus määrittelee e-Turismipalvelujen käyttöönoton askeleet, joiden avulla yritykset voivat muuttaa toimintaansa tuloksellisemmaksi. Tutkimus rajautuu tietojärjestelmän vaatimusmäärittelyyn. Tietojärjestelmän rakentaminen ja käyttöönotto dokumentoidaan myöhemmin omana tapaustutkimuksenaan.

AVAINSANAT

e-turismi, kehittyvät taloudet, yritysten jaettu tietojärjestelmä, suunnittelutiede, HICD

1. INTRODUCTION

Introduction of new technology creates a large potential for more effective and streamlined production and services. This requires that the enterprise is capable of evaluating its existing processes, identify and outline improvements, and implement them. Especially in so called developing economies the lack of overall education and the basic information technology skills of population makes modern interactive Web 2 solutions and mobile interactive technology approaches very challenging -both for the enterprises and their clients. From the other hand, a development and implementation of cheap and easy to use new technological innovations have caused a so called quality leap for many small enterprises and artisan's businesses. In the time of cell phones many enterprises in developing countries can't simply stay without of the Internet based services even in if the economic situation is not very supportive for new investments and to base the business in new skills and uncertain emerging technology. This apparently contradictory situation is the starting point of this research.

Since last decade tourism has evolved emerging opportunity of enterprises in the developing countries. For example, in Nicaragua, Central America, annual growth of tourism-oriented activities has been more than 20 % and there are no visible signs of decrease. (National tourism plan INTUR 2010). Anyway, the huge internationally owned enterprises of this increasingly lucrative industry have make the most of the benefits, due to their efficient centralized marketing and management systems and synchronized production of tourism services and facilities. Locally owned, often family based smaller enterprises have obtained some revenue of this emerging tourism era, but their share of the whole cake is still minimal. These small local enterprises are the ones that give employment and better future prospects for their own communities and even for whole countries. Baseline of the study is create strategic and ICT -supported tools for these small and medium size enterprises in order to obtain better market-fit and sustainable competitive advance.

Systematic literature review demonstrates that the technological revolution experienced through the development of the Internet has changed dramatically the market conditions for tourism organizations. ICTs evolve rapidly providing new tools for tourism marketing and management. They support the interactivity between tourism enterprises and consumers and as a result they re-engineer the entire process of developing, managing and marketing tourism products and destinations. Increasingly the impacts of ICTs are becoming clearer, as networking, dynamic interfaces with consumers and partners and the ability to redevelop the tourism product proactively and reactively are critical for the competitiveness of tourism organizations. The literature review demonstrates that eTourism research is in its infancy and that a number of issues are only now beginning

to be addressed in the literature. This is especially the case when it comes to development of tourism industry in developing economies.

In this study is provided a comprehensive review to the key ICTs in Tourism (or e-Tourism in short) themes and aims to illustrate the principle dimensions of the research domain. Three main themes are identified as the main axes of e-Tourism research, namely: 1) Consumers and demand factor, 2) Technological Innovation -factor and 3) Industry functions -factor. These three themes represent the stakeholders in the demand, supply, and technologies usage in enterprises. The research demonstrates the contribution to knowledge, theory and professional practice resulting from these publications as well as exploring future prospects for the research area and the interdisciplinary contributions. It also provides practical managerial implications whilst suggesting strategic and operational solutions for the industry in general and for small tourism enterprises in Nicaraguan Caribbean Coast.

The problem domain of the research is process modeling and sustainable business development in the small international tourism oriented family enterprises in Nicaraguan Atlantic coast, in the municipalities of Pearl Lagoon and Corn Islands. Practical importance of the research topic is obvious: in this study is intended to create currently non-existent strategic structure, which may provide significant improvement of sustainable competitive advance for local tourism enterprises. The goal is to set further a local competitive frontier and improve enterprises shared competitive advantage in fierce competition of growing international tourism markets. In order to reach this objective, a need for supportive inter-organizational information system (IOIS) is identified, which may be a basic element in the process of strategic change. Shared IOIS drives enterprises to improve their competitive market position in order to better fulfill the demands of actual tourism market's demands and satisfy customer’s needs. Scientific importance of the research is based on systematic literature review results. It reveals an evident gap in theories when it comes to designing an information system that fits to economical, educational and market realities of developing countries tourism industry. This is an obvious defect for enterprises operating in this promising but strongly competed and challenging market environment.

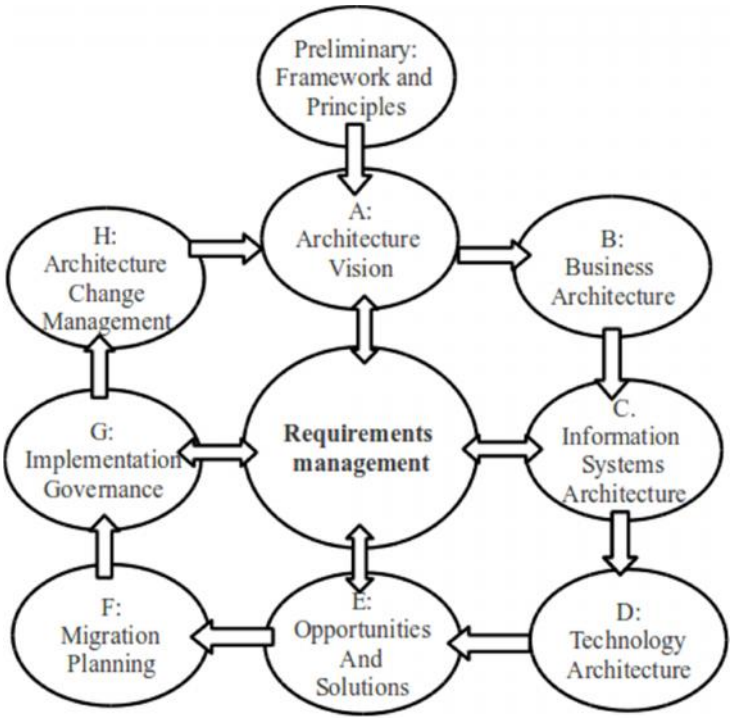

Figure 1: IS- Mainframe of this study: *In this research attention is put to the first topics of circle: architecture vision, Business architecture and information systems architecture (A, B, C.). Some attention is paid to technology architecture (D) and opportunities and solutions (E).*

When business is looking at implementing a new business system it is recommendable to use a system development method such as system development life cycle. The life cycle includes analysis, requirements, design, development, testing and implementation. In the results of the research, preliminary framework and principals, analysis, architecture vision, business architecture and information systems architecture are fully covered. Technology architecture left out since there are various alternatives for its design. Technology design is covered as an initial step, but detailed IOIS design for tourism enterprises is not completed. Development, testing and implementation of IOIS are considered as future research topics.

As practical objective of the research, tourism enterprises in Nicaraguan Caribbean coast will reach full understanding about importance of participation in e-Tourism endeavors. Enterprises need to evaluate their critical business processes towards suggestions picked from e-Tourism literature utilizing HICD -method. Then enterprises make strategic chooses in order to improve the quality of business. Once business processes are evaluated, hotel managers with help of researcher define the requirements of IOIS design according to business processes. The design process of shared IOIS and e-Tourism platform is initiated, including definition of desired performances and features. Preparedness for adoption and inclusion of e-Tourism enhanced processes inside enterprises is improved. Practical tasks of development, testing and implementation of in-

formation system are yet out of the scope of actual research. The research is finalized in global definition of software requirements specification of IOIS for tourism enterprises in developing economies.

Structure of the study is based on logical development of research topic. After short introduction section preview of development of tourism industry in developing economies is provided. In the 3:rd chapter is illustrated the theoretical mainframe of the research. Data collection and interpretation structure of the research is described, as well. In the 4:th chapter Consumer and demand -factor is presented and performance gaps and performance improvement solutions for Nicaraguan tourism enterprises are evaluated. In the 5:th chapter is evaluated Industrial functions -dimension, identify performance gaps and offer solutions for better performance. In the 6:th chapter is evaluated the impact of utilization of technological innovations in case enterprises. In the 7:th chapter is summarized the results of the research and give a set of practical instructions in order to building next to optimal IOIS for the use of enterprises and recommendations for IOIS adoption. In the 8:th chapter there is a discussion about the future of e-tourism in developing economies. It is describes how outcomes can be exploited in the future initiatives and what kind of restrictions and limitations the study has for its implementation in other environments and organizational setups. Much attention is paid for the future research.

2. BACKGROUND OF STUDY

Introduction of new technology creates a large potential for more effective and streamlined production and services. This requires that the enterprise is capable of evaluating its existing processes, identify and outline improvements, and implement them. especially in so called developing economies the lack of overall education and the basic information technology skills of population makes modern interactive Web 2 solutions and mobile interactive technology approaches very challenging -both for the enterprises and their clients. From the other hand, a development and implementation of cheap and easy to use new technological innovations have caused a so called quality leap for many small enterprises and artisan's businesses. In the time of cell phones many enterprises in developing countries can't simply stay without of the Internet based services even in if the economic situation is not very supportive for new investments and to base the business in new skills and uncertain emerging technology. This apparently contradictory situation is the starting point of the research.

As the basis of the study, systematic literature review relies on the published articles on eTourism in the past 15 years. Using a wide variety of sources, mainly in the tourism literature, the study reviews and analyzes prior studies in the context of Internet applications for tourism. The research also projects future developments in e-Tourism and demonstrates critical changes that will influence the structure of tourism industry. The research demonstrates overview of the research and development efforts in the field, and the challenges that tourism researchers face in developing economies.

2.1. Systematic literature review

The study provides a comprehensive review to the key ICTs in tourism (or e-Tourism in short) themes and aims to illustrate the principle dimensions of the research domain. Three main themes are identified as the main axes of e-Tourism research, namely: 1) Consumers and demand factors, 2) Technological Innovation and 3) Industry functions. These three themes represent the stakeholders in the demand, supply, and technologies usage in enterprises. The research demonstrates the contribution to knowledge, theory and professional practice resulting from these publications as well as exploring future prospects for the research area and the interdisciplinary contributions. It also provides practical managerial implications whilst suggesting strategic and operational solutions for the industry in general and specifically designed for small international tourism oriented enterprises in Nicaraguan Caribbean Coast.

Between October 2009 and July 2011, online databases of ScienceDirect and EBSCO-Host's tourism and hospitality index, as well as the Google Scholar search engine were

used to search for related articles, mainly in the tourism literature, using different combinations of keywords that are related to e-Tourism. Key references from main-stream journals were also included in the analysis. Besides, published articles in ENTER proceedings and the Journal of Information Technology & Tourism were assessed by the author to identify the relevant articles. At the end of the database search, 149 published articles were determined to be relevant to this study as they had made a critical contribution to this area and they are analyzed in this report. The results of the literature review are divided between chapters according to their domain – consumers and demand (chapter 4), industry functions (chapter 5) and technological innovation (chapter 6).

Technological progress and tourism have been going hand in hand for years (Sheldon, 1997; Poon, 1993). Since the 1980s, Information Communication Technologies (ICTs) have been transforming tourism globally. Developments in ICTs have undoubtedly changed business practices and strategies as well as industry structures (Porter, 2001). The establishment of the Computer Reservations Systems (CRSs) in the 1970s and Global Distribution Systems (GDSs) in the late 1980s, followed by the development of the Internet in the late 1990s, has transformed the best operational and strategic practices in the industry dramatically (Buhalis, 2003; O'Connor, 1999; Emmer *et al*,, 1993; eBusiness Watch, 2006). If the past 15 years have seen an emphasis on technology *per se*, then since the Year 2005 we have been witnessing the truly transformational effect of the communications technologies. This has given scope for the development of a wide range of new tools and services that facilitate global interaction between players around the world.

Tourism as an international industry and as the biggest provider of jobs on the planet boasts a greater array of heterogeneous stakeholders than many other industries. The energetic growth and development of the industry is perhaps only mirrored by the growth of ICTs. The accelerating and synergistic interaction between technology and tourism in recent times has brought fundamental changes on the industry and on our perceptions of its nature. The significance of crossing the new information threshold of universal, ubiquitous communications access have brought the entire tourism industry to the new levels of interactivity, propelling management by wire. Increasingly, ICTs play a critical role for the competitiveness of tourism organizations and destinations as well as for the entire industry as a whole (UNWTO, 2007).

Developments in search engines, carrying capacity and speed of networks have influenced the number of travelers around the world that use technologies for planning and experiencing their travels. ICTs have also changed radically the efficiency and effectiveness of tourism organizations, the way that businesses are conducted in the marketplace, as well as how consumers interact with organizations (Buhalis, 2003). There have been many new entrants among the players on the tourism stage, shifts in market share

and balance of power, changes in political perceptions of tourism, and a growing recognition of the importance of tourism to an ever-increasing number of national and regional economies.

The ICT driven business processes re-engineering observed in the industry gradually generates a new paradigm-shift. This alters the structure of the entire industry and develops a whole range of opportunities and threats for all stakeholders. Not only ICTs empower consumers to identify, customize and purchase tourism products but they also support the globalization of the industry by providing effective tools for suppliers to develop, manage and distribute their offerings worldwide (Buhalis, 1998). As a result, a major research field is emerging from this interface, as increasingly researchers seek to understand and communicate the significance of the new technologies, investigate and interpret contemporary activity, and attempts to forecast the way ahead for both industry and technological developments.

The rapid development in telecommunication technologies, collaborations at the national and international levels had substantially increased publications 154% and 275% respectively between the first and second decades during the study period. Leung and Law (2007) report on that out of 4140 papers published in the six leading research journals in hospitality and tourism in the period of 1989 to 2007 (Annals of Tourism Research [ATR], Journal of Travel Research [JTR], Tourism Management [TM], International Journal of Hospitality Management [IJHM], Cornell Hotel and Restaurant Administration Quarterly [CQ], and Journal of Hospitality & Tourism Research [JHTR]) 195 papers focused on ICTs, 66 of which appeared in the CQ and only 5 in the ATR. Among the 195 papers analyzed in that study, 137 papers (70.26%) had at least one author who was affiliated with North American institutes. O'Connor and Murphy (2004) reviewed research on information technology in the hospitality industry and revealed three broad research areas: the Internet's effects on distribution; on pricing; and on consumer interactions. These are consistently examined in most of the publications on the subject.

2.2. e-Tourism endeavors in developing economies

Since last decade tourism has evolved emerging opportunity of enterprises in the developing countries. For example, in Nicaragua, Central America, annual growth of tourism-oriented activities has been more than 20 % and there are no visible signs of decrease. (National tourism plan INTUR 2010). Anyway, the huge internationally owned enterprises of this increasingly lucrative industry have make the most of the benefits, due to their efficient centralized marketing and management systems and synchronized production of tourism services and facilities. Locally owned, often family based smaller enterprises have obtained some revenue of this emerging tourism era, but their share of

the whole cake is still minimal. These small local enterprises are the ones that give employment and better future prospects for their own communities and even for whole countries. Baseline of the study is to create strategic and ICT -supported tools for these small and medium size enterprises in order to obtain better market-fit and sustainable competitive advance. E-tourism in the context of developing countries is sparsely researched in the past and the literature review demonstrated clearly, that the study is one of the first pioneers in the field.

As results of this research show the importance of strategic change in researched five enterprises in Nicaraguan Caribbean coast, which is supported by adaptation of shared IOIS. According to interviews with managers and tourism specialists in Nicaragua, enterprises need to focus their vision from local competition to co-opetition (Padula & Dagnino 2007). This means reduced unification and merging of critical competitive structures and managerial activities between carefully selected enterprises. To reach deep change in entrepreneurial strategy and management functions, in this study is suggested adaptation of shared inter-organizational information system (IOIS) as a key factor for the change. Enterprises push the local competition frontier further away and therefore gain new competitive -free micro environment, new segments of visitors and new standards of quality of service.

2.3. Pearl Lagoon in Nicaraguan Caribbean Coast as a research area

The fabled Caribbean "Mosquito" Coast of Nicaragua represents one of the last roadless and isolated areas of Central America, a condition that has contributed to its wildness and has hampered its economic development. To some extent the Mosquito Coast has benefited from isolation. Isolation spared the communities from many of the economic disasters experienced by the rest of the country. The region has avoided the widespread trends of agricultural failure, resource exhaustion, and urban migration observed in many communities that depend on agriculture and natural resources for their livelihoods. Because of its isolation, it has not been affected by an influx of competing imported goods (agricultural or otherwise) and has maintained its agrarian/fisheries economy.

For decades, rural tourism has been installed as a realistic alternative to supplement the income of residents in rural depressed areas. The identity crisis that cities bring to their residents has launched the search for new cultural boundaries. In addition to this identity crisis, there is a strong current associated with individual responsibility and versus environmental imbalances. The growth in demand for destinations that summarize this reality requires training to prepare our spaces for these challenges and also prepare for these new opportunities.

In this context it is assumed that rural tourism can be a crucial component of local economic development, thus requiring the necessary incentives and encouragement, as well as training, planning and management to convene and mobilize community resources, municipalities, companies and public institutions.

At present, the principles and objectives of tourism is to "maximize the involvement of local people", therefore it is what has led to the spring up of various forms of tourism such as eco-tourism, heritage tourism, community, rural, eco-cultural or more clearly defined as "alternative", all of which respond to the development of populations. But this should be seen as an alternative and not, as the only way to increase and diversify sources of labor. While we talk about development, we must consider the tourism and any of its branches, as integral and complementary to this development. So, it is understood that the importance of considering the participation of local people and their communities, is also the indirect relationship with biodiversity, because there are many ways in which human beings possess unique culture, and therefore interact with the rest of the planet and try to sustain it over time.

The research stems from the need to cluster the community experiences as grassroots communities, seeking solidarity and equitable development of sustainable economic activities such as tourism, and enhancing the quality of life of local populations in the Pearl Lagoon Basin. Managed properly, tourism has an impact on the appreciation and re-valorization of culture in the recovery of native products, protection of natural resources, and promotion of local development, environmental protection, cultural promotion, and organizational support. The research aims to reach out to communities in the Pearl Lagoon Basin because of their rich cultural heritage and abundant virgin natural resources and landscape, working with and in a network environment towards promoting sustainable long term community tourism in the area, while promoting activities such as processing and marketing of handicrafts and other products related to Community Tourism, conservation of forest reserves for sustainable eco-tourism related activities and enhance the initiative of local participation and development.

2.4. Tourism oriented enterprises as unit of analysis

A small, family owned international tourism oriented enterprise in Nicaraguan Caribbean coast is the unit of analysis in this research. These enterprises possess very often common characteristics, such as basic business processes, lack of organized marketing efforts, more or less undefined tourism products and quality of service -standards. Normally they have not organized web services, they have not standardized education of personnel, there is not organized electric payment method (credit and debit cards) and

before all, they are missing culture of local cooperation between enterprises of same kind – what in this study is called co-opetition.

In the case study researcher is collaborating with five small family-owned hotels and five other tourism oriented enterprises in Nicaraguan Caribbean Coast. Main goal of co-operation is to define their opportunities to improve customer-basis and demand. The use of technological innovations in encouraged in order to improve their industry functions, business processes and establish common and shared standard of quality in the production of local tourism services.

Enterprises for the case study are carefully selected based on their present activities, ability and willingness to use new technology in improvements of their industrial performance for international customers. Basic characteristics of selected enterprises are similarities in their actual set up of provided tourism services, such as lodging services, restaurant services, adventure tour production, and their geographical similarity and before all their interest for strategic problem solving.

One of the important criteria used in selection of the enterprises was their shared vision of strategic change to gain local co-operation. This means that managers and owners of selected enterprises are ready to change their attitudes from fierce competition between local tourism enterprises in order to compete with larger national-level or even international regions. Managers of enterprises understood that their principal goal is gain confidence and increase visibility in international market-area with shared business processes and share positive results of this sustainable and steadily increasing customer-base. Locally this development means practically competitive free tourism zone for local enterprises and increases cooperation in the production of basic tourism services. The metaphor used to visualize this shared vision was taken from Blue Ocean strategy – created by Kim and Mauborgne, (2005).

Enterprises who participated in the research were selected through a set of managerial and owner meetings, organized by local office of National Institute of Tourism in Nicaragua (INTUR). INTUR was encouraging enterprises to participate in the study by providing information about successful examples of enterprise co-opetition in Costa Rica, which is stronghold of adventure and community based tourism in Central America. After a set of preparative meetings and re-unions, hotel managers were convinced to provide all necessary information of their functions, including reduced economical calculations about their actual performance in tourism production. Managers expressed their willingness to unify the standards of quality of their business processes, to create a shared lists of tourism products for commercialization purposes and to share all collected visitors information among enterprises. However, all of the enterprises wanted to

keep their financial information confidential, and maintain their entrepreneurial independence as intact as possible.

Researcher started to investigate actual performance of enterprises and made a final selection of enterprises who participated in this pilot study of local e-Tourism and IOIS -supported strategic change. As a result, five hotel enterprises, three restaurants and two adventure tour organizations were selected as final participants in the research – and beneficiaries of possible pilot project based on the results of this research in the future.

2.5. Objectives, limitations and methodology

The problem domain of the research is process modeling and sustainable business development in the small family enterprises in Nicaraguan Atlantic coast – especially in the municipalities of Pearl Lagoon and Corn Islands. Practical importance of the research topic is obvious: With help of this study, enterprises can create currently non-existent local competition free zone, which may provide significant sustainable competitive advance. Objective of the study includes definition of requirements for shared IOIS for enterprises in order to enhance this development.

Observing the time line of the research, it possesses at least two kinds of limitations. When researcher entered to researched enterprises, they have already created a shared vision of limited co-operation or co-opetition – as it is denominated it in the research. Therefore in this research the development process of shared vision is not emphasized in the beginning of research process. It is taken as a starting point of the endeavor. In the end of research's time line main goal was to create specification of requirements for shared supportive information system to be built and implemented in the future. Therefore much attention is not put to either construction or implementation processes, and they are considered merely as a future research topic.

In the image the logical structure of this study and information flows during the research are described. The basic idea is divide IOIS in three sub systems and evaluate them as individual information systems. The data is collected from systematic literature research and from interviews and mind mapping sessions with local stakeholders. Then the data is divided in three factors: 1) consumers and demand dimension, 2) industry functions –dimension and 3) technological innovation in enterprises -dimension. Then the data is analyzed using Design science method and IOIS configuration analysis. As result, requirements specification of IOIS for tourism enterprises is deduced.

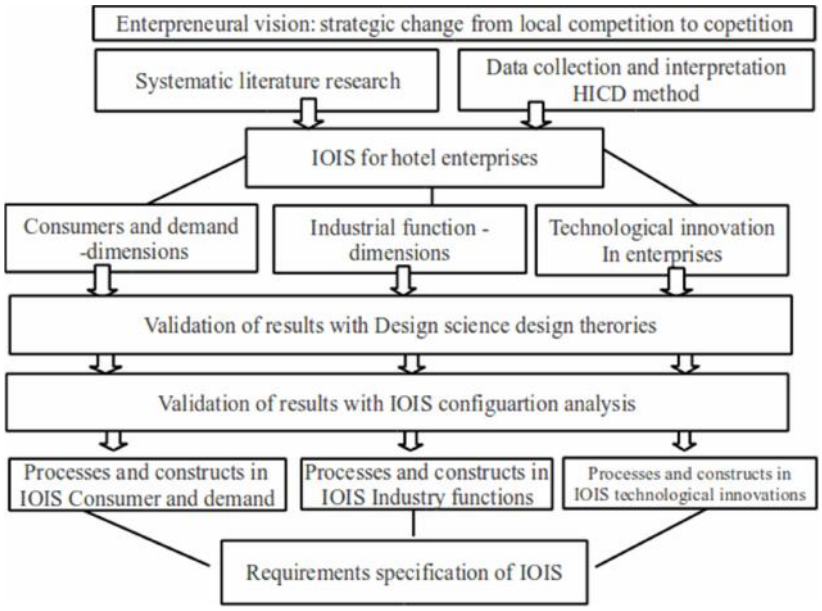

Figure 2: *Research structure and information flows during the research.*

Chosen methodology for the research is following: Human and institutional capacity development -method (HICD) was used as a basic structure of data collection and interpretation in the field-work of the research. Utilizing HICD:s eight steps model for identification of performance gaps and performance improvement solutions in e-Tourism, the study defines root causes of performance gaps in enterprises. After definition of root causes, the study provides a definition of IOIS structure and desired features included in it. As a tool for validating research findings, design science -method is utilized.

As expected practical results, tourism enterprises will reach deeper understanding about importance of participating in e-Tourism efforts. Enterprises need to evaluate their critical business processes towards suggestions derived from e-Tourism literature and make strategic chooses in order to improve their quality in business. Once business processes are evaluated, hotel managers and researcher define requirements and features included in e-tourism services. Preparedness for use the information system and inclusion of e-Tourism -enhanced business processes in enterprises' every day's practices is fortified. Construction, testing and implementation of information system are out of the scope of actual research. Anyhow, in the future there will be a possibility for e-tourism initiative for participating enterprises, provided by United Nations Development Program UNDP.

Strategic IT alignment, defined as the extent of fit between information technology and business strategy, remains a top priority for information systems researchers and practitioners (Tallon & Pinsonneault, 2011). Studies have repeatedly found that alignment affects profit, productivity, sales growth, and reputation, prompting firms to consider efforts to further increase the extent of fit between IT and business strategy (Chan et *al*., 1997; Chan et *al*., 2006; Oh & Pinsonneault, 2007; Preston & Karahanna, 2009; Tallon,

2008). At the same time, a marked increase in environmental volatility due to greater uncertainty in international financial markets, volatile consumer demand, and rapid product obsolescence has led firms to consider their ability to respond to change. Faced with rapid and often unanticipated change, agility, defined as the ability to detect and respond to opportunities and threats with ease, speed, and dexterity, has emerged, next to alignment, as a key business imperative. Tallon and Pinsonneault (2011) explain the connection between business performance and alignment of enterprise's IT and business strategies as following:

"*Prior research shows that alignment matters to firm performance; our results help explain why alignment matters. Firms align IT and business strategy in order to direct key IT resources to where they can support the strategic needs of the business and to apply existing IT capabilities to discover new business opportunities" (Tallon, 2008).*

The fact that the effects of alignment on firm performance are fully mediated by agility shows that the ultimate value of alignment lies in how alignment prepares firms for change. According to Tallon, if alignment remains fixated on supporting the status quo, it can produce little more than competitive parity. If alignment enables firms to shift direction or to pursue a new strategy, alignment could emerge as a critical source of competitive differentiation. Agility is essential to survival during periods of intense change but alignment might also be seen as essential for firms to extract enduring value from IT following each market change.

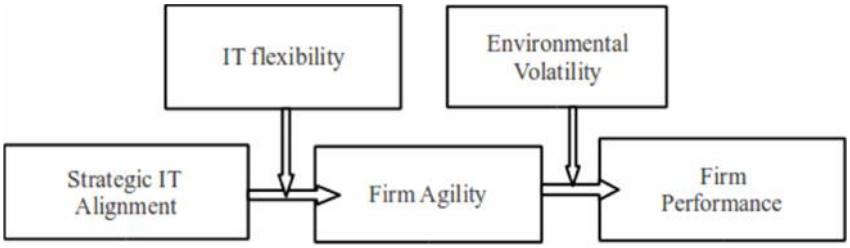

Figure 3: *Strategic IT alignment's influence to enterprises performance (according to Tallon and Pinsonneault, 2011).*

When it comes to developing economies business environment, structural volatility is basic factor. Tourism enterprises in Nicaraguan Caribbean cost have to adopt measures against this structural volatility. According to results of the research, strategic information systems alignment with business strategies of tourism enterprises is essential to improve their capabilities for tourism products design and distribution and in overall business performance. Therefore, IOIS utilization in enterprises' business processes makes them less vulnerable for environmental changes.

2.6. About researchers and case study team

Data collection and data -analysis processes for this research report were prepared by multi-disciplined field research team, consisting of MsC in anthropology Kensy Sambola, who is owner of one of tourism enterprises involved in case study; MsC Melvin Archbold, who is local planning officer of United Nations Development Program (UNDP) and MsC in Information sciences Matti Tyynela, who was former country director of Service Center of development of Finland (KEPA)- in Nicaragua 2006-2008.

During the period of KEPA, author was facilitating projects for implementation of information technology improvements in small enterprises. In many cases, there is an obvious lack of knowledge in the use of new technology. UNDP has detected information systems development in enterprises as a key factor of business development especially in important sector of local tourism services. Anyhow there have been very few initiatives of e-Tourism or business development in this sector. This study is an attempt to improve the actual situation.

Author of research report, Matti Tyynelä was elected as the leader of field research team and he is responsible for data collection, data interpretation, publications and initial design of shared information system for tourism enterprises. Underlying purpose of the research is to create an executable model for transition of business strategies for tourism-oriented enterprises in Pearl Lagoon's basin area. As a vision, co-opetition between tourism enterprises was seen as a source for sustainable improvement of economic well-fare in production of tourism services. UNDP's role is to support this entrepreneurial change and increase economical activities of local enterprises in remote communities. Therefore the study is encouraged by UNPD and – if successful – leads to the development project financed by them. Strategic design team was formed for collection and interpretation of data and to disseminate strategic changes to elected tourism enterprises. Managers of elected enterprises, researchers and external experts of tourism development are members of the team. The team gathered together four times in the year, started in 2009. Data for this research was collected in these meetings during period of 2009-2010, utilizing mind mapping sessions and brain storming.

3. THEORETICAL FRAMEWORK AND DEFINITION OF KEY CONCEPTS

The scientific domain of this study is Information systems science (IS). As a discipline, it examines the technological system and the social system side by side (Gregor & Jones, 2007; Lee, 2001). Therefore, Information Systems research is seen, on the one hand, as an independent discipline (Orlikowski & Iacano, 2001; Benbasat & Zmud, 2003), and on the other hand, as multidisciplinary (Alter, 2008; Markus, 2004) where organization science is a reference discipline. When business is looking at implementing a new business system it is recommendable to use a system development method such as system development life cycle. The life cycle includes analysis, requirements, design, development, testing and implementation. In the research two first steps, so to say analysis of business environment and definition of requirements are covered in this study. Design is covered as a initial step, but the technology design of IOIS for tourism enterprises is not completed. Development, testing and implementation of IOIS are considered as future research topics.

3.1. Inter-organizational information systems (IOIS)

Inter-organizational Information Systems (IOIS) founded on common information technology (IT) that facilitates business transactions between organizations have existed at least for half a century. Initially, they were mainly used to automate portions of order fulfillment cycles in long standing customer-supplier relationships. Recently, however, IOIS have advanced to encompass completely new functionalities so that they enable, for example, the formation of new market places or sophisticated auctions. At the same time, the continued slow and sometimes painful adoption of IOIS constitutes a challenge for both industry and academia (Reimers *et al*., 2008). Critical industry observers raise concerns about overall IOIS benefits and their low rate of utilization (Nagy, 2006), while academia raises concerns about inadequate models and frameworks to understand and manage IOIS adoption (Reimers *et al*., 2008; Reimers & Johnston, 2008).

IOIS can be defined as an information system used jointly by at least two autonomous organizations that draw upon common and/or shared IT capabilities. An IOIS is typically built around shared (having similar functionality), or common (the same) IT capabilities that facilitate the creation, storage, transformation and transmission of information across organizational boundaries (Johnston & Vitale, 1988). Most IOISs of today are based on open standards and their ownership is shared. In open and shared IOIS, the creation, transformation, manipulation and transmission of data are governed by open data and process standards that define the format, structure and semantics of data flowing across organizational borders and the exchange choreographies that constitute valid

business transactions. Such standards allow business level interoperability across separate and heterogeneous systems (Damsgaard & Truex, 2000). Standard openness implies that neither the user nor the standard creator has complete control over the standard specification or application (Lyytinen & Daamsgaard 2011).

The design and deployment of IOIS exhibit high level of complexity generating a variety of interpretations of the functionality and goals of IOIS. Due to the network effects, the IOIS deployment also demands mutual coordination with respect to these features (Lyytinen & Damsgaard, 2001, Markus *et al*., 2006). Therefore, the aims and functions of the IOIS must be agreed upon through creating and sharing organizing visions and then propagated in chorus by coordinating adopter behaviors. This vision conveys a persuasive cognitive model of how the IOIS will improve inter-organizational structures and processes (Swanson & Ramiller, 1997).

A configuration can broadly be described as a constellation of conceptually distinct elements or traits that commonly occur together and form an integrative, meaningful whole (Miller, 1986; Meyer *et al.*, 1993; Miller, 1996). In the social domain industries, organizations, cultures and technology uses are prone to form constellations that also are often called clusters, archetypes, configurations or gestalts. A large number of different elements can be selected to form constellations and these elements can, in turn, theoretically generate an infinite number of structural variations. The condition for cogent configuration analysis is that investigators can theoretically justify what types of elements will count in creating stable configurations (Lyytinen & Daamsgaard, 2011).

The configuration concept forms the fundamental observation and analysis unit for the analysis of IOIS adoption. For useful analysis it is therefore important to define what constitutes the critical elements that make an adopter configuration. These elements will consequently guide IOIS adoption investigation to be theoretically sensitive to the holistic nature of the configuration that consists of actors, technology and institutional elements. By carefully selecting theoretically critical elements the investigator can open to the dynamism of the configuration and become more sensitive to the differences among configurations as determined by variation in the elements and their essential relationships.

Therefore, Lyytinen and Damsgaard propose that IOIS scholars need to look beyond the single adopting organization in IOIS adoption studies and in contrast consider adoption units what we call an adoption configuration. Each such configuration can be further characterized along the following dimensions: 1) vision, 2) key functionality, 3) mode of interaction, 4) structure and 5) mode of appropriation. In addition, these dimensions do not co-vary independently. For example, a particular organizing vision assumes a specific inter-organizational structure.

Table 1: *Key elements of an adoption configuration (Lyytinen & Damsgaard, 2011)*

Adopter configuration element	Definition
Organizing vision	Conveys a persuasive cognitive model of how the IOIS helps organize better inter-organizational structures and processes.
Key functionality	Defines, in turn, the scope and content of data exchanges and related business functionality in terms of the contents of messages, their choreography and coverage
Structure	Defines the scope and volume of structural relationships among participating organizations.
Mode of interaction	Nature of relationships between the participating organizations as defined by the IOIS
Mode of appropriation	The scope and intensity of potential effects of adopting the IOIS for the participating organization.

These concepts help one determine an adequate scope – the real population – for a given IOIS adoption study (Pouloudi & Whitley, 1997; Boonstra & de Vries, 2008). Accordingly, we have to give up the concept of a fixed and homogeneous population. In contrast, the scope and size of the adopter population depends on the technological, temporal and institutional elements embedded in the set of adopter configurations available to would be adopters, the constant shaping of the technology by the adopters and promoters, and structural properties of the networks created by adopter configurations (including modalities of interactions, trust, history, culture, globalization *etc.*).

The topic 'dynamics of adopter configurations' focuses on the change and evolution of adopter configurations, and on explanations of such change. Here, the investigator needs to take seriously the path dependent and often chaotic nature of the change, and the drivers of change. At this level, configuration analysis by definition implies process oriented analysis and theorizing over diffusion processes in specific contexts (Langley, 1999; Pentland; Van de Ven *et al*., 1999). This is defined by each adoption configuration (primary context), and adopter ensembles (secondary context). It invites simultaneous examination of actor's engagements with IOIS over a number of contexts (adopter configurations), and an exploration of how IOIS become embedded into adopter populations. Thus, the use of adopter configurations leads to theoretical accounts that are accurate and operate with a few simple concepts. Here, an investigator needs to investigate in motion the interactions between organizations and configurations, and between configurations; and observe changes at multiple levels: singular adopters, within adopter

configurations, and across adopter configurations. Critical in these analyses is observing both quantitative and qualitative changes: differences in singular adopters' adoption rationale, evolution and change in character and volume of adopter configurations, and stabilization of adopter configurations. (Lyytinen & Daamsgaard 2007).

3.2. Design science -method in information systems

Two paradigms characterize much of the research in the Information Systems discipline: behavioral science and design science. The behavioral-science paradigm seeks to develop and verify theories that explain or predict human or organizational behavior. The design-science paradigm seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts. Both paradigms are foundational to the IS discipline, positioned as it is at the confluence of people, organizations and technology (Hevner *et al*., 2004).

Information Systems research can be seen from both descriptive and prescriptive research (Van Aken, 2004) perspectives. As descriptive Information Systems research can be regarded explanatory and therefore including to the social sciences and management sciences. The prescriptive part of Information Systems as design science endeavors, is based on, usefulness or performance. Design science has its roots in pragmatism, technology development and scientific problem solving (Niiniluoto, 1993).

In the research there is an obvious combination of both description driven and prescription driven research approaches. In the first place, intention is to give an explanation to the actual phenomena, what in this case is expressed and measured performance of tourism enterprises in a set of business processes, conducted from e-Tourism literature. Results of these research questions is typically organizational theory: What is the actual state of tourism enterprises and what is the starting point of design process described in the research? Secondly in the research is given a set of alternative solutions for class of identified problems. Typically the result for prescription driven part of the research is tested and grounded technological rule, derived from design science principles. Therefore result is management theory: What is the desired state of tourism enterprises in adopting e-tourism enhanced business processes and how they can reach this desired state of business?

Table 2*: The main differences between description driven and prescription driven research. (Van Aken, 2004)*

Characteristics	**Description driven research**	**Prescription driven research**
Dominant paradigm	Explanatory science	Design science
Focus	Problem focused	Solution focused
Perspective	Observer	Player
Logic	Hindsight	Intervention outcome
Typical research question	Explanation	Alternative solutions for a class of problems
Typical research product	Causal model, quantitative law	Tested and grounded technological rule
Nature of research product	Algorithm	Heuristic
Justification	Proof	Saturated evidence
Type of resulting theory	Organization theory	Management theory

Design work and design knowledge in Information Systems (IS) is important for both research and practice, when it deals with problem of specifying design theory so that it can be communicated, justified and developed cumulatively. In order to provide a basis for a more systematic and usable formulation of these theories, Gregor & Jones (2007) provided specification of information systems design theories (ISDT).

They identify eight separate components of design theories: 1) purpose and scope; 2) constructs; 3) principles of form and function; 4) artifact mutability; 5) testable propositions; 6) justificatory knowledge (kernel theories); 7) principles of implementation; and 8) an expository instantiation. In this research these guidelines are followed as a basic theoretical mainframe. Validation of results of the study is made according to descriptive principles of information systems design theory.

1) The purpose and scope tells "what the system is for", the set of meta-requirements or goals that specifies the type of system to which the theory applies and in conjunction also defines the scope, or boundaries, of the theory. These theory requirements are meta-requirements; they are not the requirements for one instance of a system, as would be

the case if there was a need to build a single system in industry. In defining the goals of an artifact, other goals are excluded and the boundaries of the theory are shown. This aspect of the theory formulation allows different theories to be categorized, compared and extended." (Gregor & Jones 2007, p. 325).

2) Constructs at the most basic level in any theory are the representations of the entities of interest in the theory . These entities could be physical phenomena or abstract theoretical terms. As in any theory, the terms used to refer to the entities of interest should be defined as clearly as possible. A feature of design theories for information technologies is that a single construct in a theory can represent a sub-system that has its own separate design theory. At the higher level it is not necessary for the designer to understand the detailed complexities of all the design sub-parts. The result is that the description of a construct in a design theory may be indicative, rather than detailed and complete." (Gregor & Jones 2007, p. 325).

3) Principles of form and function -component refers to the principles which define the structure, organization and functioning of the design product or design method. The shape of a design product is seen in the properties, functions, features or attributes that the product possesses when constructed. In a sense this component gives an abstract "blueprint" or architecture for the construction of an IS artifact. Similarly, the principles of a design method show in a generalized form the shape and features of the method, for example the steps in the waterfall model of the systems development life cycle." (pp. 325-326).

4) Artifact mutability as component of ISDTs arises from consideration of the special nature of the IS artifact. There is increasing recognition of the mutable nature of these artifacts. That is, they are artifacts that are in an almost constant state of change. Simon (1996) spoke of evolving artifacts, where flexibility and adaptability could be enabled by feedback loops to refine design. Specifying the degree of mutability of designed artifacts has some parallels with the specification of the states of a physical system covered by a natural science-type theory as recommended by Dubin (1978, p. 326).

5) Testable propositions in ISDT can give rise to testable propositions or hypotheses about the system or tool to be constructed. These propositions can take the general form "If a system is built following certain principles and by certain processes then it will work, or it will be better in some way than other systems. There is the need for the system to be testable against all the stated objectives and requirements. The degree to which design knowledge can be expressed in general propositions remains an issue. Some degree of generality is recognized as a prerequisite for theory, even broad defined (Gregor 2006). The eternal issue is a particular problem when design knowledge arises from artifact construction, action research, and case studies, as it does in IS and any applied disciplines. Problems with generating theory from practice and ideographic case

studies have long been recognized. Testing hypotheses is demonstrated through an instantiation, by constructing a system or implementing a method (Dubin 1978, p. 327).

6) Justificatory knowledge provides the explanatory knowledge that links goals, shape, processes, and materials. Some knowledge is needed of how material objects behave so as to judge their capabilities for a design. For example, the bandwidth of communication channels limits designs of e-commerce systems by placing limits on data carried within a time period. Knowledge of human cognitive capacities heavily influences principles of human-computer interaction design. Here we argue that these theories are a linking mechanism for a number, or all, of the other aspects of the design theory. The justificatory knowledge provides an explanation of why an artifact is constructed as it is and why it works, and explanations are usually regarded as a desirable part of a theory specification, assisting with their communicative purpose and the facilitation of human understanding (Dubin 1978, pp. 327-328).

7) Principles of implementation concerns the means by which the design is brought into being – a process involving agents and actions. Simon (1996, p. 130) believed that process and product were inextricably linked. Principles can also be provided for the implementation in practice of an abstract, generic design method or development approach (Dubin 1978, pp. 328-329).

8) Expository instantiation is a realistic implementation contributes to the identification of potential problems in a theorized design and in demonstrating that the design is worth considering. The question that remains is whether an instantiation can be a component of a theory. Instantiated artifacts are things in the physical world, while a theory is an abstract expression of ideas about the phenomena in the physical world (Dubin 1978, p.329).

3.3. Co-opetition and interfirm value creation

Co-opetition strategy refers to a kind of interfirm strategy which consents the competing firms involved to manage a partially convergent interest and goal structure and to create value by means of co-opetitive advantage. Far from being a compact monolith, co-opetition strategy is a multidimensional and multifaceted concept which assumes a number of different forms and multiple levels of analysis and for which it is all but easy to grasp its structure, processes and evolving patterns. Co-opetition encompasses both economic and social issues related to interfirm interdependence and it is blurring boundaries in the firms' value chain(s) and relationships among co-opetitive players developing a co-opetitive system of value creation.

Network co-opetition concerns a structure of complex relationships among more than two firms at the same time and links up with: 1) co-opetition (competitive and cooperative relations) among multiple firms along one single level of the value chain *i.e.,* buyer-supplier relationships known as 'parallel sourcing'; 2) co-opetition (competitive and cooperative relations) among multiple firms along several levels of the value chain, *i.e.*, industrial districts, firm clusters and multilateral agreements. This is what we have termed 'complex network co-opetition'. Co-opetition strategy concerns interfirm strategy which allows the firms involved to manage a partially convergent interest and goal structure and to create value by means of co-opetitive advantage. This partially convergent interest and goal congruence is the base of a co-opetitive system of value creation. (Dagnino & Padula, 2002).

3.4. Research questions and a-priori situation of research

The research domain is compressed into following research questions, which are divided between descriptive and prescriptive driven problem domains (Van Aken, 2004). Shared vision among tourism enterprise's managers can be seen as a key element of research questions. When it comes to consumers and demand, the study responds to the following questions:

1."What are the critical e-business processes towards consumers and demand -factor in small tourism enterprises?" (Descriptive problem domain).

2."How to improve tourism enterprises performance utilizing shared IOIS in consumers and demand -business processes?" (Prescriptive problem domain)

Industrial functions of tourism enterprises are closely connected to supply of tourism products in the enterprises. When it comes to industrial functions, the study responds to the following questions:

3. "What are the critical business processes towards industrial functions -factor in small internationally oriented tourism enterprises?" (Descriptive problem domain).

4. "How to improve tourism enterprises performance utilizing shared IOIS in industrial functions -driven business processes?" (Prescriptive problem domain).

Use of new technology in e-tourism services is seen as a cornerstone of successful business. When it comes to use of technological innovations in the tourism enterprises, the study responds to the following questions:

5."What are the critical e-business processes towards technological innovation in small tourism enterprises?" (Descriptive problem domain).

6. "How to improve tourism enterprises performance utilizing shared IOIS in technology usage -driven business processes?" (Prescriptive problem domain)

Prescriptive research questions are derived from environment- and business strategy analysis. Key functionality and the structure of IOIS for tourism enterprises can be seen as the scope of the final research question:

7. "How may desired optimal IOIS to be designed to encourage needed strategic changes in small internationally oriented tourism enterprises in developing economies?" (Prescriptive problem domain)

A priori constructs of the case study in Nicaraguan enterprises are shown in the table 4.

Table 4: *IOIS design for tourism enterprises, a priori constructs (according to Gregor & Jones, 2007).*

	Type	*IOIS Component examples as a whole information system*
1)	Purpose and scope	The aim is to design an inter-organizational information system (IOIS) which support strategic change in tourism enterprises towards co-opetition. Strategic vision is to reach better market fit and sustainable improvement to their competitive abilities and improve their capacity to satisfy consumer's needs. The IOIS is developed for improve enterprise's performance when it comes to e-Tourism services. Identified factors for performance improvement solutions are consumers and demand, industry functions and technological innovations -dimensions. Factors are divided in to subsequences in order to design adequate services and include desired processes of tourism enterprises for each of them.
2)	Constructs	Examples are: In Consumers and demand dimensions: Direct interaction and information exchange with consumers, Visitors virtual community and interactive reservations/ payments system In industry functions -dimensions: Virtual learning environments (VLEs) for enterprises personnel and consumers, marketing and distribution function: included personalized tourism products and periodical newsletter Technological innovations -dimension: Enhanced use of multimedia in tourism products, stationary hot-spots provided by hotels to customers and local inhabitants

Table continues in the next page:

3)	Principles of form and function	Structure of IOIS must enhance co-opetition strategy between tourism enterprises of Pearl Lagoon area. Visibility in international tourism markets is included as a module. Shared tourism products are to design and their distribution is supported. Capacity building structure for personnel and management is organized and maintained.
4)	Artifact mutability	The designers consider the effects of team learning that occurs with the use of Steering wheel method of Cop:s and over multiple construction cycles and show how design of IOIS will vary over a number of cycles.
5)	Testable propositions	Predictions about outcomes are provided and some of them are tested in simulation experiments with hotel managers.
6)	Justificatory knowledge	Theory is offered relating to enterprise strategic coordination and renovation processes, team cognition, tourism products development productivity, and quality of standard and improvement of performance models.
7)	Principles of implementation	Participatory implementation process. Use of communities of practice and Steering wheel for management for Cop's model. Capacity building in tourism enterprises is required in all levels of personnel. It is stated that it might be necessary to build some randomness into the model in a real-life project and this is left for further work.
8)	Expository instantiation	Examples of the IOIS in action are provided through simplified simulations.

For data-collection and analysis, interpretative and participatory approach is utilized. There is a strong involvement of researcher and managers with the data collection, data interpretation and theory creating process (Eisenhardt & Graebner, 2007). In the description-driven part of the study focus is put in the identification and definition of existing critical business processes of enterprises. In prescription -driven part design science approach is used in order to produce tested and grounded technological rule (van Aken, 2004) as a cornerstone of desired IOIS, to resolve emerged needs of enterprises to change their strategic position in markets.

Research tactics utilizes a strategic development tool which is widely in use in assessment of information technology for Development (ICT4D) projects worldwide. Struc-

tured model for performance improvement tool is taken from USAID guidebook for Human and institutional capacity development -initiatives. In the research HICD -method is used as a basic tool for identify performance gaps of in tourism enterprises. First basic business processes and activities are outlined in enterprises, and then actual state of performance by each process is detected. After that a shared vision of the desires of hotel managers for each business process is advocated. Then definition of performance gaps is made in order to find strategic and practical solutions to them. In annex no. 1 is shown steps and information flows of HICD -method and how method is used in the study. HICD is a model of structured and integrated processes designed to identify root causes of performance gaps in institutions, address those gaps through a wide array of performance solutions in the context of all human performance factors, and enable cyclical processes of continuous performance improvement through the establishment of performance monitoring systems. In the study following structure was utilized for gathering and interpretation process of data in tourism enterprises (Fig 4).

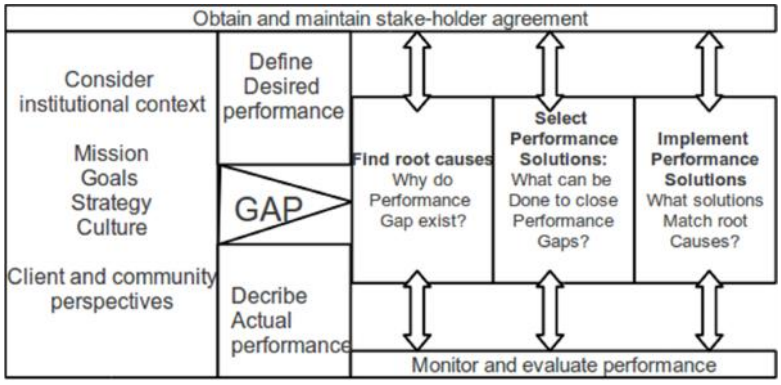

Figure 4: *HICD -model and its internal information flows*

3.5. Research tactics for the field work

Research tactics utilized in the field data collection in this study count on firstly open interviews and brain storming with hotel- and tourism enterprise managers, government officials and local professionals of tourism. The results of these sessions are conceptualized in form of mind maps. The first topic of brain storming sessions was concept of competence and co-opetition in local business environment. Enterprises tried to find ways to reduce local fierce competition in order to create a small-scale blue ocean competitive environment. Another topic is defining sustainable resource control among participating enterprises" (Yami *et al*., 2010) and how to create win-win situation within selected enterprises (Padula & Dagnino, 2007). Managerial mind map was created about critical business processes of international tourism oriented enterprises. The maps are

unified and the emerging ideas are set in the cross matrix, pondering their value, rareness, imitability and organization (Barney, 1995).

Secondly, each manager is interviewed about emerged results of brain storming sessions. Features and included services are outlined in design of desired inter-organizational information system (IOIS). Thirdly each emerged idea from stakeholders or recommendation provided by systematic literature review is evaluated by managers, using human and institutional capacity development -method. HICD is a model of structured and integrated processes designed to identify root causes of performance gaps in partner institutions, address those gaps through a wide array of performance solutions in the context of all human performance factors. Goal of this process is conceptualize practical activities of enterprises considering features of shared IOIS and evaluate its impact to selected enterprises.

4. IOIS AND CONSUMERS AND DEMAND DIMENSIONS

ICTs increasingly enable travelers to access reliable and accurate information as well as to undertake reservations in a fraction of time, cost and inconvenience required by conventional methods (O'Connor, 1999). ICTs can assist the improvement of the service quality and contribute to higher guest/traveler satisfaction. ICTs place users in the middle of its functionality and product delivery.

Every tourist is different, having a unique blend of experiences, motivations and desires. To an extent the new sophisticated traveler has emerged as a result of experience. Tourists from the major generating regions of the world have become frequent travelers, are linguistically and technologically skilled and can function in multicultural and demanding environments overseas. The development of ICTs and particularly the Internet empowered the "new" tourist who is becoming knowledgeable and is seeking exceptional value for money and time. They are less interested in following the crowds in packaged tours and much more keen to pursue their own preferences and schedules. Increasingly, package tours are losing market share in favor of independently organized tourism facilitated by dynamic packaging. The contemporary/connected consumer is far less willing to wait or put up with delays, to the point where patience is a disappearing virtue. The key to success lies in the quick identification of consumer needs and in reaching potential clients with comprehensive, personalized and up-to-date products and services that satisfy those needs. Gradually new, experienced, sophisticated, and demanding travelers require interacting with suppliers to satisfy their own specific needs and wishes.

Living in a hectic life, consumers in the developed world often have short periods of time to relax their batteries and also to engage in their favorite activities. Leisure time will increasingly be used for "edutainment", *i.e.* the exploration of personal interests for both their personal and professional development.

Travel and holidays are one of the most expensive items purchased regularly by households around the world and it represents a significant proportion of individual's annual budget. The Internet has changed tourism consumer behavior dramatically (Mills & Law, 2004). Prospective travelers have direct access to a much greater wealth of information provided by tourism organizations, private enterprises and increasingly by other users/consumers. From information search, to destination/product consumption and post experience engagement, ICTs offer a range of tools to facilitate and improve the process. Customers search for travel related information, make online air ticket bookings, online room reservations, and other online purchases themselves instead of relying on travel agencies to undertake this process for them (Morrison *et al*., 2001).

Due to the popularity of Internet applications, most tourism organizations such as hotels, airlines, and travel agencies have embraced Internet technologies as part of their mar-

keting and communication strategies. Information Search is a significant part of the purchase decision process and was revolutionized as a result of the Internet. ICTs not only reduce uncertainty and perceived risks but also enhance the quality of trips (Fodness & Murray, 1997). The more research undertaken on a trip and the more information found, the better customer needs can be met and served. A well informed consumer is able to interact better with local resources and cultures, to find products and services that meet his/her requirements and to take advantage of special offers and reduced prices.

According to Snepenger, Meged, Snelling and Worrall (1990), the four major factors that influence information search in the tourism context are 1) the composition of vacation groups, 2) the presence of families and friends at the destination, 3) prior visits to the destination, and 4) the degree of novelty associated with the destination. Gursoy and McCleary (2004) developed a comprehensive theoretical model that integrated all psychological/motivational, economics, and processing approaches into a cohesive whole for understanding tourists' information seeking behavior.

Moreover, Jang (2004) proposed that future research should explore potential travelers' concerns and difficulties when planning and purchasing trips online, which can be achieved through in-depth analysis of relationships regarding information search and cross-cultural impacts on tourists' online information search behaviors. Buhalis (1998) stated that potential tourists have become more independent and sophisticated on using a wide range of tools to arrange for their trips. These include reservation systems and online travel agencies (such as Expedia), search engines and meta-search engines (such as Google and Kayak respectively), destination management systems (such as visitbritain.com), social networking and web 2.0 portals (such as Wayn and Tripadvisor), price comparison sites (such as Kelkoo) as well as individual suppliers and intermediaries sites.

4.1. Consumer behavior patterns in e-Tourism

The Internet is one of the most influential technologies that have changed travelers' behavior. Previous research showed that tourists who searched on the Internet tended to spend more at their destinations as compared to those who consult other information sources (Bonn, Furr, & Susskind, 1998; Luo, Feng, & Cai, 2004). The Internet enabled consumers to engage directly with suppliers and challenging the role of intermediaries. It also allowed consumers to interact dynamically with suppliers and destinations and often make requests that will enable them to customize their products. At present, there is a large increase in the number of customers who make reservations directly from hotel websites (Jeong *et al*., 2003). With rapid data transmission on the Internet, the expected response time from organizations to customers has been greatly reduced. The

reaction to online inquiries can thus influence customer satisfactions and booking behavior. As a result, response behavior becomes an essential factor for the success of small and medium-sized tourism enterprises (Pechlaner *et al*., 2002; Main, 2002). In addition, satisfaction online has a positive impact on loyalty both to the organizational programmes and their website (Anderson & Srinivansan, 2003). According to Wolfe, Hsu, and Kang's (2004) research, the reasons of consumers not purchasing travel products online are the lack of personal service, security issues, lack of experience, and time consuming. Weber and Roehl (1999) found that people purchasing travel products online are more likely to have been online for four years or more and trust can be built between customers and online businesses through positive experience of past transactions (Bai *et al.*, 2004; Bieger *et al*., 2005). The Internet is already influencing the consumer behavior in developing countries such as China enabling consumers to have much more choice (Li & Buhalis, 2006).

Pricing is also a major issue in eTourism as many organizations use ICTs to communicate directly to consumers on web-only fares and rates, passing on discounts that are generated from saved commissions and distribution charges made in a short value chain. Research found substantial price dispersion for domestic airline tickets offered by online travel agents in the US where the average price was lower than traditional travel agents (Brynjolfsson & Smith, 2000; Clemons *et al*., 2002). Also, customers have spent increasingly more time on price comparisons on different travel websites such as Kayak and Kelkoo searching for alternative products that can reduce the cost of their travels. Prior research shows that search costs decrease in electronic markets due to diminishing cost of data exchange. This, in turn, enables consumers to find offers that meet their needs and tastes (Bakos 1997, 1998).

Although plenty of choices are available on the Internet for customers to choose from, psychological barriers often prevent consumers from completing transactions online, resulting to "lookers" purchasing products off-line. With less time spent on waiting and planning, and more time on enjoyment, consumers would surely like to make reservations and received tickets at home via travel websites (O'Connor & Frew, 2001). Moreover, e-shopping provides a large geographic coverage which consumers can choose from a great product assortment when they shop at home (Peterson *et al*., 1997). Werthner and Ricci (2004) have thus found that the tourism industry is leading eCommerce applications. However, since payment is the most important item in eCommerce, consumers are always concerned on payment security.

Such concerns are a possible outcome of computer crimes, which are one of the primary factors that prevent consumers from providing credit card information. Mills *et al*. (2002) listed several cyber-crimes such as auction fraud, vacation fraud, gaming fraud, spamming, and identity theft. Business organizations must therefore pay more attention

to protect themselves and their customers from losses due to cyber-crimes. These crimes, however, are not likely to be completely prevented or easily detected by law enforcement alone (Mills *et al*., 2002). Additionally, privacy issues are found to be of major concern to many consumers. This leads to the situation that many travellers use the Internet to search for information but still purchase offline. Research findings have shown privacy issues also play a significant role in inhibiting purchase of travel-related products online (Kolsaker, Lee-Kelley, & Choy, 2004). Website owners should, therefore, pay more attention on making customers feel comfortable and secure to complete their reservations and to increase trust in the online environment (Chen, 2006; Bauernfeind & Zins, 2006).

4.2. New ways to interact with customers

Virtual communities are gradually becoming incredibly influential in tourism as consumers increasingly trust better their peers, rather than marketing messages. The most cited definition of a virtual community was firstly given by Rheingold (1993:p.58) as "a virtual community is a group of people who may or may not meet one another face-to-face, and who exchange words and ideas through the mediation of computer bulletin boards and networks". A Virtual Travel Community (VTC) makes it easier for people to obtain information, maintain connections, develop relationships, and eventually make travel-related decisions (Stepchenkova, Mills, & Jiang, 2007; Vogt and Fensenmaier 1998).

Since many travelers like to share their travel experiences and recommendations with others, VTCs have become one of their favorite areas to post their travel dairy. Additionally, online travelers are enthusiastic to meet other travelers who have similar attitudes, interests and way of life (Wang, Yu & Fesenmaier, 2002). As such, better understanding VTC users' behavior and motivation can assist tourism practitioners and policy makers to establish, operate, and maintain VTCs in a more efficient way. This, in turn, facilitates consumer centric marketing or relationship marketing (Niininen, March & Buhalis, 2006). VTCs, however, may be at risk of losing members if their members are not satisfied with the content, design, security policies, and repercussions for non-compliance with community rules (Allison *et al*., 2005; Wang *et al*., 2002).

The emergence of Web 2.0 or Travel 2.0 brings together the concept of Social networking/virtual communities and applies it to the tourism industry. TripAdvisor (www.tripadvisor.com) is amongst the most successful social networking/virtual community in tourism that facilitates the reviewing of all hotels around the world and brings together individuals in discussion forums. The system provides users with independent travel reviews and comments written from TripAdvisor members and expert advisors and pro-

vides a powerful platform for interaction between peers (Wang & Fesenmaier, 2004b). User satisfaction is a major factor for evaluating a travel organization.

By analyzing VTCs' content, travel organizations can understand their customers' satisfactions and behavior, and undertake corrective actions to improve their offering. They can also increase brand awareness and strengthen brand association through the assistance of VTCs. Despite VTCs' large potential impact on the tourism industry, Preece (2000) stated that research on the topic is still at an infancy stage when comparing to other geographical and physical communities.

ICTs and the Internet have dramatically increased the number of choices for consumers. Until the emergence of the Internet consumers could only access major brand names and also those organizations in their immediate vicinity. Consumers can now have much more choice for searching and subsequently purchasing on the Internet. The choice is availed from single products to dynamically packaging holidays. For example with the fast expansion of no-frills airlines such as easyJet and Ryanair, as well as with holiday packages and hotel rooms discounted at the last-minute, travelers can enjoy low cost travel. Oorni and Klein (2003), however, found that low cost airlines have high online booking ratios because they offer simple products and are pursuing a direct sales strategy. Other airlines with complicated yield management strategies simply obstruct consumers to search for flights efficiently without expert assistance. Leading global online travel agents, such as Expedia, Orbitz, Lastminute.com, Opodo and Travelocity, are mainly successful for their provision of a platform for one-stop shopping with significant improvement in usability and interaction design (Klein, 2002).

Comparing with traditional travel organizations, making websites more user-friendly and with simple pricing could help attract customers to complete the online transactions. One of the problems that the Internet has a brought around was that of too many choices. When novice web users search for travel information, they tend to browse through multiple websites. This is often the result of starting seeking information in a generic search engine such as Google. A recommender system is to provide assistance in the social process of indicating or receiving indications about what options are better suited in a specific case for specific individuals (Resnick & Varian, 1997; Gretzel *et al*., 2004). Ricci (2002) further stated that a recommender system can provide valuable information to assist consumers' decision making process. A recommender system can support travelers in a complex decision-making process by identifying better customer requirements and by correlating those to other consumers and their preferences (Fesenmaier, Werthner, & Wöber, 2003; Ricci & Werthner, 2002, 2006).

Personality has been related to the selection of vacation destinations, the choice of leisure activities throughout the vacation, and other travel-related decisions (Mardrigal,

1995). When implementing tourism recommender systems, textual summary is used to classify the database item (tourism options) in themes or categories of the ontology (Loh *et al*., 2004). Although different recommendation technologies have been applied to eTourism, Rabanser and Ricci (2005) argued that the existence of different business models present application challenges.

ICTs also provide a very effective mechanism for consumers to air complaints. In the past, less than 5 percent of customers who were dissatisfied had actually voiced out their complaints (Albrecht & Zemke, 1985). In order to provide a channel for customers to have feedback and complaints, tourism organizations should have an e-complaint handling section on their websites so that there is a proper channel of communication between management and unsatisfied customers. However, with the rapid development of the Internet, users at present can easily spread their complaints which, in turn, can significantly affect a company's image. Electronic Word-Of-Mouth (WOM) is a useful tool to disseminate complaints about brands via websites, chat rooms and consumer forums (Gelb & Sundaram, 2002).

Untied.com is probably one of the most famous examples of an individual who not only used his website to complain against United Airlines himself but also to accumulate thousands of complaints from fellow travelers. In the Internet era even individuals have sufficient power to take on powerful organizations such as airlines (Buhalis, 2004). Many consumers rely on WOM to reduce the perceived risks and uncertainty before they make any purchases (Walker, 2001). Shea, Enghagen, and Khullar (2004) have illustrated a real case "Yours is a very bad Hotel" that made at least seven newspapers and magazines report the unpleasant experience. The influential power of the Internet, "complaint forum" and chat room were clearly shown in this study. At present, many tourism practitioners do not know which VTCs exist and how to handle e-complaints in virtual communities, resulting in losing customers and negative WOM (Mattila & Mount, 2003). To prevent the wide spread of e-complaints, tourism managers should locate these complaint forums and try to handle them professionally.

It is interesting to observe the many different ways that the web is used by different market segments. Cotte, Chowdhury, Ratneshwar and Ricci's (2006) study finds that utilitarian consumption highly correlates with information search and online shopping behavior. Utilitarian consumer behavior is rationally task-directed rather than directed by the nature of the experience itself. Instead, pleasure–oriented consumers typically enjoy interacting with the Web to play Web-based games, e-mail or chat. That is, interactive communication behavior can be viewed as a sort of entertainment. Increasingly profiling will lead to better personalization, customization and interaction between consumers and tourism organizations.

4.3. Customers segmentation

Pouloudi, Vassilopoulou, and Ziouvelou (2002) summarized the Internet users' profile into seven e-social factors, namely: region/geography, culture, legal/regulation/policy, economic, ethical/ professional, social capital/social networks, and social structure. In particular, information search behavior has a significant relationship with demographic and lifestyle characteristics. Enabling consumers to develop their online profile and to include personal data that indicate their preference can support tourism organizations to provide better service. Also, understanding how different market segments appreciate different tourism products and services also enhance the possibilities to put suitable products forward. For instance, Lastminute.com collects suitable information to personalize the weekly newsletter sent to consumers and also identifies what parts of the newsletter are accessed by consumers in order to personalize their offerings even further. Demographics and life cycle information is critical for profiling. For example, where to go for holidays has long been considered as a joint decision-making process between husbands and wives.

In recent years, children, however, also play a key role in the decision making process (Wang *et al*., 2004). Children often seek fun, games and chat-rooms on the Internet. As such, for the children- target tourism attractions, managers should provide more children-friendly content, such as interactive games in order to attract children to visit and engage with their websites (Tufte & Rasmussen, 2003). With the growing popularity of the Internet, not only teenagers browse information online, but also senior members of the society (e.g. age 50 and above) are also becoming active Internet users. According to Graeupl (2006), flight information and accommodation are the most searched topics for the consumers aged between 50 to 60 years old, and most of them were not interested in package holidays. As a result, consumers have expressed their increasing interests for more convenience, choice and in online travel shopping.

Increasingly consumers are willing to provide significant personal information in exchange for recognition and better services. Tourism organizations should also collect customer information at each stage of service, before, during and after a visit in order to understand behavior choices, concerns and determinants. Customer satisfaction depends highly on the accuracy and comprehensiveness of specific tourism information and the ability of organizations to react instantly to consumer requests. Consumers not only require value for money, but also value for time for the entire range of their dealings with organizations. This reflects people's shortage of time, which is already evident in Western societies. Therefore the value proposition offered to consumers' needs to be revised accordingly (Minghetti, 2003). Personalized services driven by advanced Customer Relationship Management systems should record customer preferences and re-

quirements for present and future usage (Picolli & O'Connor, 2003). Systems need to be location, context and mood aware in order to provide sensible advice.

4.4. Implications for consumer and demand dimension

Systematic literature review demonstrates a set of challenges for developing countries tourism enterprises to overcome, in order to enable travelers to access reliable and accurate information as well as to undertake reservations in a fraction of time, cost and inconvenience required by conventional methods (O'Connor, 1999). When used conveniently ICTs can assist the improvement of the service quality and contribute to higher guest/traveler satisfaction.

Utilizing HICD –method (explained in annex 2), the research demonstrated firstly identified changes in customer behavior. Secondly, actual level of performance in enterprises towards customer satisfaction was analyzed. Thirdly strategic design team of managers of tourism enterprises created shared and common vision to be used as a base of desired IOIS. This is denominated as a desired performance in case enterprises. Fourth step – following HICD model – is visualize root causes of performance gaps and create viable performance improvement solutions and create a model for their implementation in tourism enterprises. All these performance improving solutions are divided between formerly identified factors of consumers and demand -dimensions (chapter 4), industrial functions (chapter 5) and technological innovations (chapter 6). Customer behavior models and their implications to enterprises performance are demonstrated in table 5 in Annex 2.

Assessment of importance -value – made by team of hotel managers – shows in the scale 1 – 5 the importance of identified change of consumer behavior. Value 1 indicates minimum value and therefore it is considered as not to be implemented in IOIS. Value 5 indicates assessment of maximum importance and it shows that hotel managers consider correspondingly item should be implemented in IOIS. The value is reached in brain storming sessions among researcher and hotel management and it is used in the research to evaluate the structure and interactive services included in IOIS and the changes in strategic design of co-opetition between tourism enterprises. Identified performance gaps and evaluation of their importance is demonstrated in Annexes 2, 3 and 4.

Identified performance gaps in consumer and demand dimensions – given by conducted systematic literature review – are grouped in four factors. They are: 1) Direct interaction and information exchange with consumers, 2) Consumer segmentation and marketing, 3) Adaptation of special groups of customers and 4) New interaction channels with consumers. In each of the factors are included practical business processes of tourism en-

terprises, which are analyzed by hotel managers and researcher. Hotel managers stated actual performance of each process and discussed shared vision for future co-opetition according to each process. Last part of the data collection and interpretation process was the assessment of importance of each business process,

Some root cause's performance gaps are caused by an underdeveloped business environment of tourism enterprises. Many of them are based in very low educational level of personnel and other related stakeholders in tourism business– it is not uncommon, that some cooks, servants and tourism guides are illiterate or have not finished their first five classes of primary school. These dimensions are specific to developing countries business environment and therefore solutions need to be based on education of personnel, capacity building of counterparts and counseling or mentoring for hotel administration personnel and managers.

When it comes to attend consumer and demand dimensions, utilization of IOIS arises great hopes among hotel managers. Identified performance gaps in business processes might be resolved by usage of Internet based service production or other eTourism solutions. Without a doubt there are many items in actual business processes which can be improved by efficient use of IOIS. Another factor is aligning of business processes and strategies of individual enterprises according to IOIS structure. Example of this is an on-line payment and reservation system and virtual traveler's community of Pearl Lagoon. With proper use, it may provide an improvement of income for the enterprises, open a new, cost-efficient channel for information sharing and recommendations and increase the trust and confidence among consumers.

Direct interaction and information exchange with consumers was seen as a powerful tool in IOIS by hotel managers, as they ranked it as the most important item. Systematic consumer information collection enables product customization and personal product design. Virtual travel community for visitors in Pearl Lagoon basins area enables sustainable and cost-efficient marketing processes of tourism products and information sharing between enterprises and consumers. On-line reservation and payment system creates direct increase of incomes and gives a trustworthy opportunity for consumer to design their own traveling budgets, evaluate destinations and compare prizes. Consumer feed-back system gives a change to collect information about consumers' expectations and their assessment of offered tourism products. Therefore it will improve tourism products' quality and helps to create products that are better suited to consumer's expectations and measures quality of service -component of enterprises.

Table 5: *Validation of findings according to DS-method*

Type		***Consumers and demand component examples***
1)	Purpose and scope	The aim is to design an subsystem of inter-organizational information system (IOIS) which support direct inter-action and information exchange between tourism enterprises and their consumers. The IOIS consumer and demand component is developed for improve enterprises performance when it comes to maintain interaction with consumers. Users of subsystem are consumers themselves: consumers can compile their own personally tailored tourism product packets and pay for them. Consumers can exchange experiences and give recommendations to their peers (virtual tourism community VTC) and feedback and ideas for the use of enterprises tourism product design (feedback system).
2)	Constructs Examples are:	Reservation and direct purchasing system for tourism products. This includes personal budgeting system to define total costs of consumer when visiting in Pearl Lagoon area. Virtual tourism community (VTC -platform) for visitors of Pearl Lagoon area: system includes both information and experience sharing system for peer-to peer interaction and feedback system for enterprises. Consumer segmentation and marketing system is based in systematic consumer information collection. As a product example of the sub-system is periodical newsletter for selected customers and personalized tourism product packages for special groups
3)	Principles of form and function	Content is presented in an accessible and customizable way, accommodating users' needs and preferences. Needs from every group of users are considered and websites are designed to address inclusion. In modular implementation process the core business processes are implemented first and additional extra services are to be implemented later
4)	Artifact mutability	The designers consider the effects of team learning that occurs with the use of Steering wheel method of Cop:s and over multiple construction cycles and show how design of consumer and demand functions inside IOIS will vary over a number of cycles.
5)	Testable propositions	Predictions about outcomes are provided and some of them are tested in simulation experiments with hotel managers.
6)	Justificatory knowledge	Theory is offered relating to enterprise strategic coordination and renovation processes, team cognition, tourism products development productivity, and quality of standard and improvement of performance models.
7)	Principles of implementation	Participatory implementation process. Use of networks of practice as a foundation of information sharing. Capacity building in tourism enterprises in all levels of personnel.
8)	Expository instantiation	Examples of the IOIS in action are provided through simplified simulations.

Consumer segmentation and marketing is based on systematic consumer information collection. Segmentation can be made by language, origin, age, special interest and special needs of consumer. It enables “to the point -marketing” and periodical electronic newsletter. Tourism product design can be more accurate when customer segmentation is made properly. Performance gaps root causes in consumer segmentation were identified in all six components. In information component consumers information is not systematically collected and therefore not used to consumer segmentation. In Resources -component there is no available tool to collect and share customer's personal information even inside the enterprises or between them. The value of consumer segmentation is not fully understood by hotel managers and therefore not communicated to the personnel. ICT-skills – both managers and personnel – are not in adequate level in order to make full use for electronic consumer segmentation system. As a solution, utilization of IOIS is widely accepted as a basic tool for consumer segmentation. To give full use to the system, the both personnel and management of enterprises need capacity building program for basic ICT use.

Adaptation of special groups of customers is considered as major performance gap. Managers don't identify special groups such as children, elderly people, and persons with disabilities as a consumer group. Therefore there are no specialized tourism products for these groups. Root cause analysis of performance gaps in the adaptation of special groups of customers identifies that there is a need for severe change of attitudes. In information component and in knowledge and skills component there is an evident need of capacity building. In Resources component gap lies in inadequate infrastructure both in enterprises and even in national level structures when it comes to transportation for special groups. Therefore, until now, there are neither skills nor motivation to attend special groups and design special tourism products in order to satisfy their needs.

New interaction channels with customers are considered to be of great importance by hotel managers. Majority of hotel managers use Social media -applications frequently in their private life, but the importance of Social media as consumer attraction and as a market place of tourism products is not fully utilized or understood by them. Root causes of performance gaps are identified in missing understanding the real nature of social media usage in enterprises. Internet accessibility is a very new issue in Pearl Lagoon area and many of local hotels offer no ICT facilities for consumers nor for the use of the personnel. Knowledge and skills are reduced for this reason and there is a frequent need for capacity building. Therefore human resource for attend time consuming Social media solutions are not considered as a plausible investment by hotel managers.

Developing economies business environments challenges for enterprises are evident: modern communication channels are emerging, but they are relatively new and therefore not utilized. Knowledge and skills of hotel managers and personnel are undevel-

oped and need special attention. Technological possibilities such as mobile Internet connections are emerging in the area but they are not efficiently taken to use. All these macro-level factors of underdeveloped business environment are challenge for the design of IOIS and can be considered as local structural weaknesses.

5. IOIS AND STRATEGIC CHANGES IN INDUSTRY FUNCTIONS

Although the literature has been dominated by applications which explain how to automate rather than how to assist organization to evolve to the new era, gradually the importance and necessity of ICTs usage for both the strategic and operational tourism management is emerging in the literature (O'Connor, 1999; Inkpen, 1998; Marcussen, 1999a & 1999b).

Increasingly ICTs are used to re-engineer all business functions and processes towards supporting the organization on its entirety rather than automating. The strategic and operational dimensions of ICTs for tourism strategy are emerging in the literature. Law and Jogaratnam (2005) advocated that technologies can become part of the strategic planning process of a business only when managers make full use of it.

Furthermore, effective ICT applications require the knowledge of managers and operating personnel. ICTs should be used for both operational and strategic management. ICT developments have direct impacts on the competitiveness of enterprises they determine the two fundamental roots to competitive advantage, *i.e.* differentiation and cost advantage (Porter, 2001). Moreover, it is crucial for tourism practitioners to proactively incorporate ICTs into their efforts to improve service quality as ICTs enable organizations to dynamically differentiate and specialize their products and services. This almost leads to the market segment of one, where consumers can build their tourism experience by bundling their products dynamically (Buhalis & O'Connor, 2005). Recently, Mazanec, Wöber, and Zins (2007) argued that it is necessary to develop an Internet web site when the competitiveness of a tourism destination is evaluated. ICTs also become instrumental to cost management in the industry and particularly for the distribution and promotion costs (Connolly *et al*., 1998).

Redesigning processes and eliminating repetitive tasks reduced labor costs and increased efficiency (Buhalis, 1998). This has empowered the development of no-frills organizations that use technology heavily for operations and distribution and at the same time it has put incredible pressure on traditional organizations to re-engineer their operations. In several occasions this has led to outsourcing functions and process to external organizations (Paraskevas & Buhalis, 2002).

The emergence of the Internet affected all Five Forces in Porter's (1979, 1980) model, as it changed the conditions of competition in the marketplace. The Internet is changing the industry structure by altering barriers to entry, minimizing switching costs, revolutionizing distribution channels, facilitating price transparency and competition, whilst enhancing production efficiency (Kim, Nam, & Stimpert, 2004). Rivalry among existing competitors was also revolutionized, as technology and the Internet affected differentiation and cost structures as well as switching costs.

The Internet had a major effect on entry barriers as it altered market scope, economies of scale and the amount of capital required for competing. Porter (2001) demonstrates how the Internet has changed industry forces. The Internet has also enhanced the bargaining power of suppliers as it enabled them to monitor competitors and offer tailored and differentiated products. By being able to adjust to changes in demand and by being efficient, suppliers gain important cost savings. Overall, suppliers of travel products enhanced their position within the industry due to the increased possibility of interconnectivity and interactivity with consumers and partners.

From a customer perspective, the Internet affected the bargaining power of buyers. Buyers gained bargaining power as they now have instant access to information, understand market offers and conditions better and are constantly exposed to special offers. They have more choice and are able to make direct comparisons that are rising from their expectations and demands. As Porter (2001: 70) states "buyers back away from open marketplaces. They may once again focus on building close, proprietary relationships with fewer suppliers, using Internet technologies to gain efficiency improvements in various aspects of those relationships".

The increase in buyers' bargaining power is also related to the increased convenience, transparency, flexibility, direct communication with suppliers and depth of the available information. The Internet also enabled them to dynamically package their individualized products by combining different travel products, *i.e.* accommodation, transportation *etc*. (Daniele & Frew, 2005). Access to a greater range of available suppliers also increased their power. The threat of substitution may also be affected by technological advancements (Porter, 1980). The intensified rivalry led to increased difficulty to create and sustain competitive advantages through differentiation strategies (Go *et al*., 1999). Wöber (2001) suggested that the identification of tourism destinations competing for the same market can be assisted by a Group Decision Support System (GDSS). In this way, decision makers can include their subjective and objective views for analysis like the traditional forms of competitive analysis.

Similarly, there was a shift in the bargaining power of suppliers, as the Internet provided alternative procurement opportunities. The bargaining power of suppliers was also enhanced by allowing direct contact with consumers and decreasing distribution costs whilst creating the opportunity for partnerships with countless affiliates and other distributors. Consequently, tourism enterprises for the first time ever did not have to rely exclusively on powerful intermediaries, such as Tour Operators or Global Distribution Systems. As a result, the Internet forces tourism organizations around the world to change their strategies dramatically (Buhalis & Zoge, 2007). Constant innovations of both product and process supported by proactive and reactive strategies are some of the few sources of competitive advantage in the Internet era (Buhalis, 2003).

5.1. Marketing and distribution of tourism products

Perhaps marketing and distribution are the most affected business functions from the technological revolution (Go & Willams, 1993; O'Connor & Frew, 2002; O'Connor, 2000, Yu & Law, 2000). Technology supported organizations to develop their knowledge base to improve their management and marketing functions (Fesenmaier, Leppers, & O'Leary, 1999; Schertler & Berger-Koch, 1999). By using the Web and the Internet as marketing tools, tourism organizations also gained some distinct advantages in cost reduction, revenue growth, marketing research and database development, and customer retention (Morrison, Taylor, Morrison, & Morrison, 1999). Reaching world-wide customers in a cost effective way allows organizations to engage in a direct dialogue with consumers (Buhalis, 1998, 2003).

The Internet has assisted tourism organizations to use a wide range of promotional activities to supplement, if not replace, offline promotions. This change is important as the Internet is generally considered as a multi-promotion tool and distribution channel (Gretzel, Yuan & Fesenmaier, 2000; O'Connor & Frew, 2004). Web marketing is therefore gradually becoming main stream (Buhalis, 2003, Fesenmaier *et al*., 2003).

The flexibility of the Internet and the ability to address different target markets support tourism organizations to develop a marketing proposition for each target market and to create themes or routes through the destination to address the needs of each market. Thus, customers are dynamic targets at which marketers can aim promotional messages.

ICTs also transformed the distribution function to an electronic marketplace, where access to information and ubiquity is achieved, while interactivity between principals and consumers provides major opportunities. The Internet promotes the mass-customization of tourism products as it supports the industry to target niche markets of significant size in different geographical locations. Hence, the Internet propels the re-engineering of the entire process of producing and delivering tourism products, as well as it boosts interactivity between partners that can design specialized products and promotion in order to maximize the value-added provided to individual consumers. Ultimately, ICT tools re-invent the packaging of tourism to a much more individual- focused activity, offering great opportunities for principals and intermediaries and enhancing the total quality of the final product (fitness to purpose). Electronic tourism distribution channels dictate the choice of product as the difference between products becomes secondary to the easiness of getting an entire transaction completed (Buhalis, 1998). Therefore ICTs gradually exchange the function of distribution from facilitation of information exchange and reservations to a much more sophisticated mechanism of adding value and providing service. In addition, to the degree that a great number of new players provide tourism and regional information, there is a rapid expansion of intermediaries in the marketplace.

In the pre-Internet era tourism suppliers had no other choice but to use intermediaries, such as travel agents and tour operators, for their distribution functions. Central Reservations Systems (CRS) and Global Distribution Systems (GDS) facilitated the intermediation process (Sheldon,1997; O'Connor, 2003; Karcher,1997). Both intermediaries and end-consumers are dependent on comprehensive, accurate and timely information to aid in their travel choice as a result of the intangible nature of the tourism products (Poon, 1993).

The Web enabled organizations to be able to distribute their products not only through direct distribution but also through a very wide range of channels (O'Connor & Frew, 2002). Third party intermediaries included online travel agencies as well as meta search engines, all of which could distribute both static and dynamic information such as availability and pricing. Electronic intermediaries are also emerging dynamically and increasingly challenge traditional distributors. For example Expedia and Lastminute.com are now challenging the business models of Thomson and Thomas Cook, forcing them to rethink their operations and strategies. Auctions sites such as eBay.com, price comparison sites such as Kelkoo and Kayak.com; price reversing sites such as Priceline.com and price prediction sites such as Farecast.com also provide a great challenge for pricing of both suppliers and intermediaries. In a addition, Web 2.0 or Travel 2.0 providers such as Tripadvisor.com, IGOUGO.com and Wayn.com also enable consumers to interact and to offer peer to peer advice.

These changes force all tourism players to rethink their business models and to take drastic actions in redeveloping their value chains. Tourism organizations aim to disintermediate all intermediaries that add cost to their production and distribution. For example tour operators aim to sell their packages direct, bypassing travel agencies. They also disbundle their packages and sell individual components. On the other hand, travel agencies dynamically package tour products and support the development of customized packages, disintermediating tour operators. The web therefore introduced utter transparency in the marketplace (Buhalis, 2003). This trend commoditized the tourism product and challenged differentiation strategies and branding.

Consumers who search the Internet for accommodation or airlines for example would be offered listing of products based on price or commercial arrangements with intermediaries, rather than product attributes or brands. This had great implications, especially for branded products and services that could observe their customers switching products or channel if another product was cheaper by few dollars. Pricing became utterly transparent and hence the price that appeared in different distribution channels had to be coordinated to ensure price parity (O'Connor, 2003). Therefore organizations had to reinforce their brands online and offline and to justify their positioning and pricing strategies. At the time of a very volatile environment in the marketplace, tourism intermediaries are

forced to readdress both their revenue and costs bases as well as to re-evaluate all partnerships and value chains.

5.2. Tourism oriented E-learning and edutainment

eLearning includes all technology-enabled learning. The Internet provided innovative tools and techniques to facilitate eLearning for both students and professionals (Piccoli *et al*., 2001; Cheng & Piccoli, 2002; Baum & Sigala, 2001). eLearning is used by the entire range of the educational experience from distant leaning to mixed delivery and a wide range of research has been undertaken on the benefits and the challenges emerging. Tourism educators around the world use Virtual Learning Environments (VLEs) to support their class teaching, distribute notes and link to resources, stimulate discussion and facilitating marking and course administration. The Internet and computer simulations have also been used to simulate classroom discussions in order to enhance students' understanding and retention of taught theories (Fawcett & Lockwood, 2000). However, Sigala and Christou (2002) found that most educators mainly exploit the Internet in order to automate rather than to transform their instructions and foster pedagogical innovation. Naturally the educators' perceptions and abilities towards technology were found to significantly affect the type and degree of Internet use.

Sigala (2002) explores Internet learning environments by reviewing and evaluating the evolution of practices in Internet pedagogy in order to identify effective e-learning models for tourism and hospitality education. Her three-era model of eLearning includes: Automational era models that use the Internet for publishing and disseminating learning materials as a depository center. The mass learning era employs networking and interactive capabilities of the Internet for developing virtual eLearning applications based on collaborative and constructivist instructions. Finally the mass customization era empowers customized learning to the needs of individual learners. She concludes that that e-learning models should aim at the personalization of online instructions that simultaneously aim at exploiting the benefits of collaborative and constructivism practices.

eLearning is also widely utilized as an essential feature of training delivery, but the levels of its adoption in companies differ. eLearning has been accepted as a means of increasing skills and knowledge, and is being integrated into their training strategy along with other methods of delivering training. eLearning is particularly important for smaller companies that do not have sufficient resources to send their employees to expensive courses and those that require flexibility in working arrangements (Collins, Buhalis & Peters, 2003). The time constraints and workload of managers of SMTEs frequently prevents them from attending training sessions during their working hours. Therefore the prospect of flexible-location, cost-effective and time-independent learning environ-

ments may encourage them to participate more in training sessions via online learning systems. However, Braun (2002) suggests that SMTEs are still not committed to online training because they do not consider it a priority at present.

5.3 Implications in industry functions

Systematic literature review demonstrated the importance and necessity of ICTs usage for both the strategic and operational tourism management. In tourism industry functions are differentiated into five sub categories: 1) Management perspective for strategic decision making, 2) Customers perspective for business processes, which can improve quality and experience the tourism product, 3) marketing and product distribution processes, 4) use of variety of product distribution channels and 5) tourism-oriented e-Learning.

In the case of Nicaraguan tourism enterprises it is notorious that development of functions and business processes are at very early stage. Identified performance gaps are merely design and implementation problems than improvements of performance. Web pages are novelty for enterprises in Nicaraguan Caribbean coast. Reason is that even Internet connectivity is rather new; in some of the enterprises Internet connection emerged in the year 2011 and is based on so called mobile Internet technology. General knowledge about Internet based business processes is relatively low. Therefore main prospect is basic capacity building and mentoring about possibilities and challenges of new technological innovations, made by researcher and external tourism consultants.

For the novelty of ICT driven business processes, assessment of their value and benefits for enterprises, made by hotel managers, is somehow vague. Anyhow it is valuable for the design process of IOIS. Table 9 demonstrates identified business functions, actual performance and desired performance towards each function, performance gaps and their value assessed by hotel manager team. Identified performance gaps from management perspective indicate an urgent need to improve the knowledge of managers and personnel about ICT usage in tourism enterprises. First steps are already taken but systematic approach is yet to emerge. Systematic capacity building program and learning material is needed to improve personnel's capacity and to create willingness and trust to e-Tourism service production. Basic idea is to incorporate ICTs into hotels everyday activities to improve service quality and tourism service. Identified performance gaps in Customer perspective indicate clearly novelty of e-Tourism initiatives among hotel managers. Once e-Services are provided adequately, consumers can build their tourism experience by bundling their products dynamically. Actually this kind of service doesn't exist but hotel managers considered it as a cornerstone of the future tourism services. Consumers make their own package in IOIS and it will be delivered as one product by

different individual enterprises. The performance gap is that there is no tool for product bundling, yet. Lack of combined tourism products between enterprises is evident, too. According to hotel managers, tourism products are bundled by need of selected consumer groups and prized individually as a special offer. More specified and individualized prizing may be applied once identification and segmenting of target groups is organized.

Services provided with e-Tourism platform give more personalized options for customers and they are able to make direct comparison between tourism services, -enterprises and -regions. In Pearl Lagoon area, actually comparison is made by "jungle drum" -method, which eradicates large segments of international tourists. As a vision of co-opetition strategy adopted by hotel managers, comparison will be made between international tourism regions –for example between Nicaragua and Costa Rica – not between tourism products and tourism enterprises inside the own region. This demands creation of shared marketing and information distribution for customers.

According to hotel managers, utilization of IOIS is a key method for edutainment and systematic information distribution for customers. When operational, IOIS provides dynamical information package about individualized products (i.e. accommodation, transportation etc.) and local conditions and traveling opportunities for consumers. Therefore it is considered as a base of future tourism services of local enterprises in Pearl Lagoons basin. Identified performance gaps in marketing and distribution -function indicate, that there is a need to develop hotel's knowledge base to improve their managerial and marketing functions, systematic marketing processes and management procedures.

Impact of IOIS usage in the enterprise's business processes is presented in the table 6.

Sharing business information between enterprises may facilitate this process. IOIS can be used as a base of standardization of management procedures and marketing. Enterprises start direct dialogue with consumers by providing promotional activities for special consumer sequences. A shared vision demonstrated by hotel managers is design of periodical e-newsletters and seasonal promotions for active consumers. Web marketing is considered as mainstream in the future.

Table 6: V*alidation of findings in industrial functions -dimensions*

	Type	***IOIS and strategic changes in Industry functions -dimension: Component examples***
1)	Purpose and scope	The aim is to design the subsystem of inter-organizational information system (IOIS) which support shared tourism product development and distribution, shared standards of quality in local tourism industry and shared distribution of capacity building of personnel. Shared marketing processes are considered as corner stone. The IOIS industrial changes component is developed for improve enterprises performance when it comes to satisfy consumers increasing needs. Users of subsystem are management of enterprises and communities of practice inside enterprises: enterprises distribute their shared tourism products to customers, create a learning platform for personnel and create unified standards of quality of their products and facilities according to information shared in IOIS.
2)	Constructs Examples:	ırketing function: Systematic collection and sharing customer related business information between enterprises and utilize it in unified marketing processes. Customer segmentation and identification of niche markets. learning functions improve quality of service of tourism enterprises. Shared e-learning platform for the use of communities practice of professionals -such as cocks and guides -- inside enterprises. Creating learning strategies and shared capacity building system. utainment platform for the use of consumers; attention is paid to cultural and environmental information sharing.
3)	Principles of form and function	The content is presented in an accessible and customizable way, accommodating users' needs and preferences. Needs from every group of users are considered and websites are designed to address inclusion. In modular implementation process the core business processes are implemented first and additional extra services are to implemented later. Especially need of capacity building considering to e-tourism services production is taken account.
4)	Artifact mutability	The designers consider the effects of team learning that occurs with the use of Steering wheel method of Cop:s and over multiple construction cycles and show how design of consumer and demand functions inside IOIS will vary over a number of cycles.
5)	Testable propositions	Predictions about outcomes are provided and some of them are tested in simulated experiments with hotel managers.
6)	Justificatory knowledge	Theory is offered concerning to enterprise strategic coordination and renovation processes, team cognition, tourism products development productivity, and standard of quality and improvement of performance models.
7)	Principles of implementation	Participatory implementation process. Use of communities of practice. Capacity building in tourism enterprises in all levels of personnel. It is stated that it might be necessary to build some randomness into the model in a real-life project and this is left for further work.
8)	Expository instantiation	Examples of the IOIS in action are provided through simplified simulations.

As a component of shared strategy within tourism enterprises, there emerged a need to create themes or routes through the destination. Some specific culture based routes are already created but they are still in initial stage and marketing efforts are not put to practice. As a shared vision, enterprise managers expressed a set of destinations and cultural themes to be utilized as tourism routes and destinations for different consumer segments. Mass-customization of tourism products is still in its initial stage. In order to save resources and create more visibility among visitors, managers designed shared and integrated tourism routes to different destinations as a solution for performance gap. IOIS provide platform for product packages and their distribution, as well as to target niche markets of significant size in different geographical locations. For example university tourism needs more marketing activities and identification and segmentation of consumer groups in order to be profitable and sustainable. As a whole, targeted marketing and products for special consumer segments are seen as a prominent future for small scale tourism enterprises in Pearl Lagoon region. Lack of customer segmentation, definition of target groups and identification of niche markets are commonly identified as a prior performance gaps. Tourism product design needs to enhance the total value of the final product and it's fitness to purpose. Frequent quality measuring and product improvement system for tourism enterprises needs to be implemented and IOIS offers a good platform for this purpose.

Other identified performance gap is that tourism organizations had to reinforce their brands both online and offline. Some individual branding efforts have been made, but common and shared brand for Pearl Lagoon tourism is commonly recognized as a solution, instead of individual enterprise branding. This requires strategic decision towards co-opetition among enterprises and use of IOIS as technological innovation that may enable desired strategic changes. Re-evaluation of all partnerships -relations and complete value chains of tourism products is urgently needed.

Professional e-learning is seen as a common effort in order to improve quality of service in tourism enterprises. Some tourism educators use virtual learning environments in national level of Nicaragua, but no active participation in these profession based educational efforts has emerged in Pearl Lagoon's tourism enterprises. Anyhow a urgent need for systematic capacity building for personnel and management is identified. To motivate common participation in these professional courses is challenging, because of inadequate ICT skills and long distances to the tourism education institutions. Use of Internet for publishing and disseminating learning materials for personnel was identified as a solution of performance gap. Until now, there is only little material available for different professional groups (such as guides, chefs *etc*.). IOIS was seen as a prominent learning environment by hotel managers. Capacity building for personnel was the first item to enhance with use of e-learning. Customized learning platforms for the needs of

individuals was also expressed, but it was still far beyond manager's scope and considered as a future issue. As a solution of performance gap for capacity building of hotel personnel, e-learning was integrated into enterprises training strategy. E-learning as part of personnel's training programs and virtual learning environments for different professional groups were identified as shared vision for the future.

From consumers perspective e-Learning platforms were identified as an attractive edutainment. There emerged a need to produce e-Learning material for visitors about cultural and environmental issues. Actually, in the web page of one enterprise there is some culture and nature related e-learning material, but as a shared vision hotel managers expressed Pearl Lagoon -area as a cultural entity to be presented as an e-learning platform for visitors. When it comes to design of IOIS, edutainment platform for consumers was seen as of great importance. This requires systematic collection of regional cultural and nature information and cooperation with local and international universities and other educational institutes for this purpose.

Despite the aforementioned benefits, as of now the eTourism virtuality is still primitive. This jeopardizes the opportunities for tourism corporations to develop credible interfaces with other members of the value-chain, and thus, it prevents them from developing their virtuality further. A number of organizations fail to appreciate the benefits of co-opetition and co-destiny, when organizations collaborate with stakeholders that they would normally regard as competitors. A wide range of issues must be therefore resolved before the tourism industry can take full advantage of the ICTs and maximize its virtuality.

6. IOIS AND TECHNOLOGICAL INNOVATION

Constant innovation in applications of hardware, software and network developments means that only dynamic organizations, which can assess the requirements of their stakeholders and respond efficiently and effectively, will be able to outperform their competitors and maintain their long term prosperity. Rapid technological development paradoxically means that the more powerful and complex ICTs become, the more affordable, user friendly they become, enabling more people and organizations to take advantage. Technological innovations in hardware, software and netware have been propelling a wide range of changes in Information Systems (IS). ICTs convergence effectively integrates the entire range of hardware, software, groupware, netware and humanware and blurs the boundaries between equipment and software (Werthner & Klein,1999). Wireless and mobile networks are extensively used for communications, networking of equipment and interoperability between both organizations and functions. As a result, IS have evolved from simply interrelated components working together to collect, process, store and disseminate information to support decision making, coordination, control, analysis and visualization in an organization, to dynamic, interoperable mechanisms of collecting, processing and disseminating intelligence within organizations and in their extensive environment (Laudon & Laudon, 2007; Turban &Aronson, 2001).

Technology therefore emerges as an "info-structure" of an organization that supports the entire range of internal and external communications and processes (Buhalis, 2003). ICTs are becoming a holistic integrated system of networked equipment and software, which enables effective data processing and communication for organizational benefit. In the last few years a number of technologies have been identified as critical for further innovation in the tourism industry. These technologies primarily provide innovative software and network that support organizations to improve their communications with partners and consumers. Interoperability and Ontology building is one of these technologies. Werthner and Klein (1999) defined interoperability as the provision of a well-defined and end-to-end service which is in a consistent and predictable way. This generally covers not merely technical features but also in the case of electronic market environments, contractual features and a set of institutional rules. Staab and Werthner (2002) stated that interoperability is a major technical issue. Interoperability offers a realistic alternative to standardization, as many of the initiatives to establish global standards in tourism have failed to be widely accepted. This is due to the lack of flexibility of the standardization process which requires every detail of the exchanged messages, include all the technical details depending on the communication mechanism being committed among all the communication partners, resulting to a high effort for defining and maintaining such standards (Fodor & Werthner, 2005).

Interoperability enables partners to interact electronically with each other by the most convenient method and to deliver the right information at the right time to the right user at the right cost. Using an ontology that represents a set of concepts within a domain and the relationships between those concepts a mediator software system (such as Harmonize) effectively "translates" partners' data and allows them to communicate electronically. Jakkilinki, Georgievski and Sharda (2007) proposed an ontology-based eTourism Planner - AuSTO that enables users to create itinerary in one single application by this intelligent tool that builds on semantic web technologies.

Similarly, Maedche and Staab (2002; 2003) showed that semantic web technologies can be used for tourism information systems to provide useful information on text and graphics, as well as generating a semantic description that is interpretable by machines. The OntoMat-Service, introduced by Agarwal, Handschuh and Staab (2003), can embed the process of web service discovery. Travelers thus no longer need to search information among millions of websites to grab the desire information. To the degree that tourism organizations need to interact dynamically with partners to develop and deliver tourism products, interoperability will be critical for their ability to work efficiently with others.

6.1. Use of multimedia solutions

Multimedia is also becoming one of key areas of development that influences tourism. Tourism information needs an extensive representation of photos and graphics in order to provide a tangible image or experience to travel planners. Using animations or video clips can enhance information richness and interaction. Unlike offline information, which is unilaterally exposed to travelers, the Web allows people from around the world to virtually interact with a destination through three-dimensional (3D) virtual tours (Cho & Fesenmaier, 2001). The experience within a computer-mediated environment can simulate real visits and virtual experience can provide almost real-life experiences. This can lead to the creation and communication of destination image (Cho, Wang & Fesenmaier, 2002). Three-dimensional (3D) interactive websites have been adopted by online marketers to attract online

Interactivity can be further enhanced using multimedia. Abad, Sorzabal and Linaza (2005) demonstrate how tourist attractions can be presented dynamically by virtual characters in real time, which is enhanced by the multimedia information about the items stored in a database. Using the system, visitors can ask for available attractions that correspond to the selection criteria with ranking based on travelers preferences. Interacting with multimedia-enhanced websites can produce telepresence and allow people to experience products and destinations without actually visiting a place.

Telepresence uses a range of technologies to make users feel as if they were present at a location or situation which in reality they are not (Steuer, 1992). Telepresence relies on how closely the computer-mediated experience simulates real-world interaction with a product and is determined by the extent to which interactivity is achieved (Fiore *et al*., 2005; Shih, 1998).

6.2. Use of mobile and wireless technologies

Perhaps one of the most interesting areas is mobile and wireless technologies. Wireless is a term used widely to describe telecommunications in which electromagnetic waves (as opposed to wire) carry a signal. ICT developments have proliferated the use of wireless applications and devices, including: Cellular phones and pagers; Global Positioning System; Cordless computer peripherals and telephones; home-remote control and monitor systems. The development of mobile telephony over the Global System for Mobile Communication (GSM) and the Wireless Application Protocol (WAP) allowed the communication of voice and data over mobile phones. General Packet Radio Service (GPRS) and Universal Mobile Telecommunications System (UMTS) as well as I-Mode in Japan gradually introduce third generation (3G) mobile phones and services, empowering the communication of multimedia information on interactive mobile devices. Mobile phones now have a greater penetration even to digitally excluded communities. The proliferation of different mobile devices, such as Personal Digital Assistants (PDAs) and 3G mobile phones with Global Position Systems (GPSs) enable travelers to retrieve travel related information without any time and geographic constraints. In addition, mobile services now enable travelers to book hotel rooms and air-tickets, car rentals, retrieve information about transportation schedules, travel guides for destinations, and dining guides (Berger *et al*., 2003). Flouri and Buhalis (2004) stated several potential mobile applications such as SMS and MMS. Solon, McKevitt, and Curran (2004) developed TeleMorph that can determine the mobile network bandwidth to output presentations, and receive and interpret voice questions from tourists to show destination information. This technology can prevent information delay when travelers retrieve information from low bandwidth networks.

Alfaro *et al*., (2005) implemented a multimedia guide on PDA with each destination installed infra-red emitters. When tourists approach, their PDAs will automatically display a multimedia presentation of the destination. A major challenge for their wide adoption, however, is the language barriers (Chen & Hsu, 2000) that make the mobile information not providing the latest information due to delay in translation.

6.3. Use of WLAN:s or WIFI:s in destinations

In addition to mobile networks, Wireless Local Area Networks (WLANs) allow users to connect devices to the Internet through a wireless-radio connection (WiFi), whilst Bluetooth connects PDAs, cell phones, computer mice, and other peripherals over short distances. WLANs have limited area coverage and they are offered at a range of about 100 meters away from stationary hot-spots. WiFi is now extensively used in hotels, airports and cafes allowing people to connect to the Internet. It is not expected to offer wide and omnipresent coverage like mobile networks do. The next technological evolution emerging is WiMAX, defined as Worldwide Interoperability for Microwave Access. WiMAX promotes conformance and interoperability of the IEEE 802.16 standard and provides wireless data over a long distance (Patton, Aukerman & Shorter, 2005). This enables users to browse the Internet without physically connecting the computer to a wall jack. WiMAX supports the delivery of last mile wireless broadband access as an alternative to cable and DSL. WiMAX is expected to offer the highest possible coverage, up to 30 miles (Odinma, Oborkale, & Kah, 2007) providing Internet broadband wireless access to entire destinations. This will support users to have Internet access whilst at the destination without having to pay expensive data-roaming charges. WiMAX is also predicted to have its largest impact in developed countries or rural, remote locations characterized by low population density in which an adequate wired infrastructure was never developed, or cannot be developed for economic reasons (WiMAX Forum, 2004). This narrows the digital divide, favoring the transition to a new stage of information and service providers (Ohrtman, 2005). Always-on (when users are connected to the Internet constantly) connectivity creates great opportunities for interactivity at the destination and the provision of personalized, contextualized, and location based services (LBS). The four primary functions of LBS for the traveler are: 1) localization of persons, objects, and places, 2) routing between them, 3) search for objects in proximity such as restaurants, shops, hotels, or sights, and 4) information about traveling conditions, such as traffic-related data (Berger *et al*., 2003).

6.4. Use of Ambient Intelligence

Perhaps the next major revolution will emerge in the form of Ambient Intelligence (AI) defined by ISTAG (2003) as a set of properties of an environment which people are in the process of creating. AI represents a new paradigm for how people can work and live together. According to the ISTAG vision statement, in an Ambient Intelligent Environment humans will be surrounded by intelligent interfaces supported by computing and networking technology that is embedded in everyday objects, such as furniture, clothes,

vehicles, roads and smart materials - even particles of decorative substances like paint (Manes, 2003).

Humans will live in an AI Space in which there will be seamless inter-operation between different environments – home, vehicle, public space, work, leisure space, tourism destination etc. This implies a seamless environment of computing, advanced networking technology and specific interfaces which should be aware of the specific characteristics of human presence and personalities; adapt to the needs of users; be capable of responding intelligently to spoken or gestured indications of desire; and even result in systems that are capable of engaging in intelligent dialogue. Pursuit of the AI vision will require contributions from many streams of research to realize both 'ambient' and 'intelligence'. The development of the AI space will depend not simply on finding solutions to the research challenges for ambient and intelligence, but on the extent to which mechanisms can be found to ensure the successful, seamless, integration of components and their convergence into AI systems. There are a number of research domains or components in which significant progress must be made in order to further develop and realize the AI vision (Buhalis & O'Connor, 2005).

6.5. Implications of improved technology utilization

Constant innovation in applications of hardware, software and network developments means that only dynamic organizations, which can assess the requirements of their stakeholders and respond efficiently and effectively, will be able to outperform their competitors and maintain their long term prosperity. Rapid technological development paradoxically means that the more powerful and complex ICTs become, the more affordable, user friendly they become, enabling more people and organizations to take advantage. Technology therefore emerges as an "info-structure" of an organization that supports the entire range of internal and external communications and processes (Buhalis, 2003). ICTs are becoming a holistic integrated system of networked equipment and software, which enables effective data processing and communication for organizational benefit. In table 7 is demonstrated some component examples for IOIS technological innovation -dimension.

Table 7: *Validation of findings in technological innovations-dimension*

	Type	***IOIS and technological innovation -dimension: Component examples***
1)	Purpose and scope	The aim is to design a subsystem of inter-organizational information system which enhances use of new technological innovations in tourism product design and marketing. Technology emerges as an "info-structure" of an organization that supports the entire range of internal and external communications and processes (Buhalis, 2003). ICTs are becoming a holistic integrated system of networked equipment and software, which enables effective data processing and communication for organizational benefit.
2)	Constructs Examples are:	Multimedia solutions such as animations or video clips of destinations were mentioned as desired state for future when designing marketing and e-learning environments for personnel and edutainment for consumers Stationary hot-spots provided by hotels and local information sharing services based on hot spots such as real time schedules of airplanes and motor-boats and tour group's formation Internet -cafe services for local communities and visitors of enterprises
3)	Principles of form and function	Content is presented in an accessible and customizable way, accommodating users' needs and preferences. Needs from every group of users are considered and information systems are designed to address inclusion. Especially need of capacity building considering using of services has to be a key area.
4)	Artifact mutability	The designers consider the effects of team learning that occurs with the use of Steering wheel method of Cop:s and over multiple construction cycles and show how design of use of technological innovations inside IOIS will vary over a number of cycles.
5)	Testable propositions	Predictions about outcomes are provided and some of them are tested in simulated experiments with hotel managers.
6)	Justificatory knowledge	Theory is offered concerning to enterprise strategic coordination and renovation processes, team cognition, tourism products development productivity, and quality of standard and improvement of performance models.
7)	Principles of implementation	Participatory implementation process. Use of the both communities of practice and networks of practice as a basic structure of information exchange. Capacity building in tourism enterprises in all levels of personnel. It is stated that it might be necessary to build some randomness into the model in a real-life project and this is left for further work.
8)	Expository instantiation	Examples of the IOIS in action are provided through simplified simulations.

Tourism enterprises in Caribbean coast of Nicaragua do not possess significant info-structure. Idea is taken positively by enterprise managers and creation of shared info-structure is identified as a cornerstone of future business processes and product design. Hotel managers stated that info-structure must be designed and implemented and strategic and operational decision making tool designed, taken account actual state of enterprises reduced capacity in technology adaptation. As a consequence many forms of advanced ICT technology were rejected by hotel managers as too futuristic solutions for third world reality.

When it comes to use of advanced ICT solutions, attention was put merely basic Internet technology, such as building and enhancing interoperability inside and between enterprises. Telephone is an actual tool for interoperability in enterprises. When co-operation is needed, it works in ad hoc basis. As a shared vision of enterprises, systematic interoperability based on shared IOIS and common tourism products was set as a goal for the future. This requires both empowerment of technological innovation inside enterprises and strategic decision making from the part of the hotel managers.

Enhanced use of multimedia was seen as a key area by hotel managers. Multimedia solutions – such as animations or video clips of destinations – were mentioned as desired feature for future when designing marketing and e-learning environments for personnel and edutainment for consumers. Actually tourism enterprises possess poor performance in the use of modern ICT technology. Only one of hotels provides interactive services and multimedia -solutions in its web -site. As a shared vision of all enterprises, video presentations will be produced of all their tourism products and facilities. With this enhanced video marketing material, managers attempted to simulate real visits and create virtual experiences. Personnel's capacity building in e-learning environments using videos as a basic learning material was demonstrated as one of key functionalities of desired IOIS. As an early start of this process, one of the enterprises has virtual jungle simulation in its web site, which was made by professionals of State University of Michigan. Other features of enhanced tourism information are presented in the form of digital maps with aerial and satellite images where tourist attractions can be presented dynamically by virtual characters in real time.

Other technological innovations in e- tourism were not at the scope of hotel managers. Even if websites can produce virtual telepresence or allow users to create their personal profiles with their special needs, the overall technology illiteracy of managers and other stakeholders made this kind of “fancy” features rejected. Ambient intelligent environments (AIS) and location based services (LBS) were introduced and demonstrated to hotel managers, but their value to enterprises was not fully recognized or merely not fully understood.

Instead, stationary hot-spots provided by hotels were a feature, what was widely understood and valued by hotel managers. Hot spots for consumers use already exist in two of the hotels, and hotel managers demonstrated their willingness to invest in this kind of services in all of the hotel facilities. Until now, there is no local information sharing services based on hot spots, but this was mentioned as a common goal for the future. Every hotel and tourism enterprise may provide hot-spot for the use of its consumers and personnel. Local information sharing, such as time tables of boats and airplanes, restaurant menus and other up-to-date information of services for customer is involved in the service. According to hotel managers, Internet cafe services will be provided not only for hotel's visitors but for local consumers in the communities where hotels are located. This is important feature in some rural communities, where this kind of services doesn't exist.

The technical complexity of modern systems based on ICTs demands that all aspects of the innovation chain integrate their efforts. The concentration and coherence required to achieve both significant technological development and market impact necessitate engagement of both the research and business communities to integrate the rapid co-evolution of technology, the market, social and administrative requirements.

A configuration of before mentioned sub-systems is not a simple aggregation of behaviors of its independent elements. It forms a set of emergent behaviors that differ from the sum of the parts. Accordingly, an IOIS adopter's behaviors neither form an independent observation unit nor can they be analyzed in isolation. As elements of any adopter configuration cannot vary independently. That is a chosen organizing vision obligates a creation of a certain structure (Miller, 1986; Miller, 1996). Each configuration entails a dedicated way of linking would-be-adopters in their use of the IOIS (Miller, 1986). These conditions alternate significantly between a finite and relatively small number of possible, viable configurations.

7. REQUIREMENTS SPECIFICATION FOR E-TOURISM IOIS SERVICES

Requirement engineering is a sub-discipline of systems engineering and software engineering that is concerned with determining the goals, functions, and constraints of hardware and software systems (Laplante *et al.*, 2007). Systematic requirements analysis is also known as requirements engineering. Requirements engineering can be divided into discrete chronological steps, which are; 1) Requirements elicitation, 2) Requirements analysis and negotiation, 3) Requirements specification, 4) System modeling, 5) Requirements validation and 6) Requirements management. In this study the process of requirement engineering ends to requirement specifications of e-tourism enterprises shared information system. Next steps are considered as future research topics.

A software requirements specification (SRS) is a complete description of the behavior of the system to be developed. It includes a set of use cases that describe all of the interactions that the users will have with the software. Use cases are also known as functional requirements. In addition to use cases, the SRS also contains nonfunctional (or supplementary) requirements. Non-functional requirements are requirements which impose constraints on the design or implementation, such as performance requirements, quality standards, or design constraints. Recommended approaches for the specification of software requirements are described by IEEE 830-1998. This standard describes possible structures, desirable contents, and qualities of a software requirements specification.

A use case is a structure for documenting the functional requirements for a system, usually involving software, whether that is new or being changed. Each use case provides a set of scenarios that convey how the system should interact with a human user or another system, to achieve a specific business goal. Use cases typically avoid technical jargon, preferring instead the language of the end-user or domain expert. Use cases are often co-authored by requirements engineers and stakeholders.

Use cases are deceptively simple tools for describing the behavior of software or systems. A use case contains a textual description of the ways in which users are intended to work with the software or system. Use cases should not describe internal workings of the system, nor should they explain how that system will be implemented. Instead, they show the steps needed to perform a task.

7.1 Use cases and customer requirements of tourism IOIS

Shared IOIS of Pearl Lagoon basins tourism enterprises is a Web -based information system. IOIS as an integral artifact is a composition of individual sub-systems, such as 1) reservation an purchase system for clients, 2) Virtual travel community for infor-

mation exchange between enterprises and customers, 3) e-learning environment for personnel and management of tourism enterprises and 4) edutainment sub-system for information retrieval for customers. Below is presented use cases of selected set of examples of sub systems and their requirements. All of the sub-systems are not introduced here, but are in constant state of evolution.

Sub-systems are derived from different business processes of the tourism enterprises. Each of them includes service modules, which are designed to accomplish an individual task or single business process accomplished in tourism enterprise. As an example, "tourist information elicitation -component" in all enterprises performs a task where receptionists in all participating enterprises collect information of visitors to shared data-base. Tourist information is collected not only by receptions of the hotels, but from virtual tourism community -users, edutainment sub-system -users and from variety of available sources. This information is used for combined marketing efforts of hotels, identification of niche markets and customer segmentation and evaluation and improvement of tourism products.

The mission of desired IOIS as a whole is to improve tourism enterprises competitiveness. It is used by enterprises management and personnel to distribute their e-Tourism products to customers of hotels. Hotels share their reservation systems, info-structure, web based marketing and information exchange with consumers -sub-systems. Internal economical information of each enterprise, such as book-keeping is excluded from the shared IOIS. For security reasons, economical transactions are not provided directly by IOIS, but they are provided by external service provider such as a bank or other financial organization.

Consumers of hotel enterprises are the other identified user group. They search and collect information about the hotel infrastructure, provided services and local conditions and travel possibilities. Consumers can make comparisons between different local tourism service providers. According to this information consumers are able to make their personalized tour description, -reservation and payment procedures utilizing tourism IOIS of Pearl Lagoon hotels. They can give assessment, complaints and peer-to-peer information sharing inside the IOIS, as well.

The third user group of IOIS is local inhabitants of the communities where hotels are placed. They are able to use wireless information networks provided by hotels and use the unified Internet -cafe -service provided by hotels. Small enterprises or individual persons, such as local artisans, can use IOIS in the marketing of their own products, because clients of hotels and artisans entrepreneurs are the same – the visitors of the area.

User cases -examples in consumer and demand -dimensions are:

1) Inter-active and personalized composing, reservation and direct purchasing system for tourism products. This sub-system includes personal prizing and budgeting component to define total costs of consumer when visiting in Pearl Lagoon area. The sub-system includes a component of selection of provided tourism packages provided by enterprises and a purchasing component where user can make a confirmation for reservation and payment of selected bundle of products for his/ hers visit in the form of a direct bank transaction or credit card purchasing.

er of this sub-system is a common visitor, who lives in United States, Europe or in the cities of western coast of Nicaragua. His / hers task is get to know what kind of tourism product alternatives there are when visiting in Pearl Lagoon area. The pricing of each individual product is available as well as all the items included in each individual product. Visitor composes the bundle of products according to his / her traveling time, budget and personal preferences. Once the selection is made, visitor makes reservation according to her choose in the sub-system, including payment of the reservation fee. If visitor wants, she can make a payment of chosen products in the IOIS using banking / credit card purchasing system, which is provided by a bank or credit card company. Once the payment is made, visitor receives a voucher which is used as probation of the payment and guarantees availability of all selected services during her visit in the area.

2) Virtual tourism community (VTC -platform): This sub-system includes information and experience sharing component for peer-to- peer interaction for visitors of Pearl Lagoon area and feedback component for tourism enterprises. This component includes Frequently asked questions (FAQ) -service for the use of visitors.

Users of this sub-system are visitors, who want more information concerning of Pearl Lagoon area. They can make peer to peer comments or inquiries regarding their visit inside the IOIS, they can pass complaints to enterprises if there is a reason for that or they can make recommendations for newcomers. While using this component, tourism enterprises are collecting direct information about quality of their products and answering questions or recommendations made by visitors. This component provides the systematic collection of interactive visitor information and gives an opportunity for direct marketing -efforts.

User cases examples in industry functions dimensions are the following:

3) Consumer segmentation, product personalization and marketing sub-system is based in systematic consumer information collection. As a product example of the sub-system is periodical newsletter for selected customers and personalized tourism product packages for special groups, such as visitors of the third age, families with children and

handicapped persons. This component is necessary for identification of niche markets. Systematic collection and sharing of customer related business information requires co-opetition between tourism enterprises and utilization of information in unified marketing processes.

Users of the sub-system are managers and marketing responsible of hotel enterprises. Utilizing information systematically gathered from Virtual tourism community - platform, hotel reception books, tourism fairs and other sources they identify niche groups of visitors, analyze their special needs and make personalized marketing for these groups. Personalized products for special groups are made according to this information. The product of customer segmentation component is a unified list of visitors all hotels and possible visitors who are interested in Pearl lagoon area and the tourism-products provided by enterprises. List is analyzed, and special groups and niche markets are identified by hotel managers. Actual products are improved and new products are introduced accordingly.

4) E-learning component for personnel of tourism enterprises is aimed to improve and unify the quality of service of tourism enterprises. Shared e-learning platform for the use of receptionists, chiefs, guides and other professional groups is used to unify menus and restaurant services, unify reception procedures, tourism security practices and tour guides general knowledge of Pearl Lagoon area. The basic idea of sub-system is to create combined and shared learning strategies for personnel of the enterprises and unified capacity building system.

Users of the component are members of personnel of the hotels. Every professional group forms a virtual community of learning. Each group storages professional information to the platform and creates an info-structure based on their own knowledge and professional practices.

5) Edutainment platform -component for the use of visitors is based on cultural and environmental information sharing about the region. Information about local cultural events, way of living of different ethnological groups of the region and regions rich environmental features are gathered inside this sub-system in order to increase the interest of visitors. The information can be video-based, photos, images and stories in textual form.

Users of edutainment component are visitors or presumed visitors. It is used as a video-library of local culture. The basic reason for its existence is to use information sharing in order to lure new customers to the enterprises. The sub-system is used in the personal computers of visitors practically everywhere in the world. Maintenance and information updating processes are made by hotel management or they are outsourced to local ICT -

service provider. Critical system parameters are system updating and up-to-date information gathering for the platform.

User cases examples in technological innovation dimension are the following:

6) The basic idea of component is that information technology emerges as an "info-structure" of an organization that supports the entire range of internal and external communications and processes. ICTs are becoming a holistic integrated system of networked equipment and software, which enables effective data processing and communication for organizational benefit. User of this sub-system is basically hotel management and hotel personnel but some of its services are made to satisfy the needs of visitors. When visitor is chancing from one local hotel to another, she is able to gather updated information of new hotel in beforehand.

7) Stationary hot-spots -component is provided by hotels in order to satisfy local information sharing needs of personnel, visitors and locals. Component is based on local Internet access hot spots and wifi-based services. In this component information such as real time schedules of airplanes and motor-boats and tour group's formation are provided. Users of this component are visitors and local inhabitants, who are using their personal lap-tops or mobile devices. Maintenance and updating of information is made by individual hotels and their management. Critical feature of sub-system is the easy to use -factor. Updating must be so easy and automatized, that it does not require much time. Using of sub-system must be designed for the mobile devices.

8) Internet cafe services -component for local communities and visitors of enterprises is extra-service of hotels. Users of sub-system are visitors of the hotels, who doesn't possess own ICT device. From the other hand, the users are local inhabitants, who are using hotel infrastructure to satisfy their own needs and provide moderate incomes to the hotels.

7.2. Architectural and structural requirements

From the point of view of enterprises, the basic idea IOIS is that information technology emerges as an "info-structure" of an organization that supports the entire range of internal and external communications and processes. ICTs are becoming a holistic integrated system of networked equipment and software, which enables effective data processing and communication for organizational benefit.

Form the point of view of customers, the basic idea of IOIS is it nature of web-based service. This means that every individual but integrated sub-system of local e-Tourism platform is based on Server- Client infrastructure. All components are accessed through

web-browser and individual client-programs are not needed in any of its sub-systems or components. Enterprises shared info-structure -functions are available as a single information system and they are presented as an individual enterprise portal. Therefore none of the tourism enterprises are shown as a separated enterprise, but as a complete meaningful whole of tourism service providers.

From the other hand, IOIS is formulated for various different access categories: External users who are using system as a normal interactive web environment with no access to intra-net or extra-net services of IOIS. As users of intra-net services are included hotel management and hotel personnel. Users of extra-net services are the members of virtual tourism community members.

Use of open source solutions and interactive web publication platforms – such as Joomla, Drupal or Word-press – is highly recommendable as a core software for tourism enterprises Inter-organizational information systems for two reasons. Firstly when it comes to open source software investment costs, they are relatively low in comparison with so called commercial software solutions. Another reason is that OS web publication platforms possess high level of modularity and flexibility. Using these platforms, gradual development and implementation of new services and new components of tourism products is made possible. Many of web-publication platforms possess a high quality user-management or even customer relation management (CRM) components (such as Community builder -component in Joomla -system), which makes possible high level personalization and individualized user categories for different user groups. The publication systems possess separated modules for flexible reservation systems including a third party's payment methods embedded. The virtual tourism community -platform is a combination of community builder -type component, instant messaging system (such as UDDE –Instant messaging system in Joomla OS) and advanced discussion forum -system (such as Kunena -forum in Joomla OS). Whole structure of IOIS can be built as a combination of publication systems' core elements and a set of advanced components provided by different open source development groups. As a negative factor of using OS publication platforms as a core of hotel IOIS is the lack of general support channels for IOIS as a whole. Splattered and separated support and maintenance systems for core element and each of the separate components makes system maintenance and system software updating demanding and time consuming task during the life cycle of the IOIS.

7.3. Behavioral, functional and performance requirements

Services provided by IOIS need to be utilized through a set of different medias: such as stable Internet connections, WIFI -services, mobile Internet -services (3G, 4G-telephone networks) and they need to have flexibility to be used with a set of devices, such as PCs,

Tablet computers, intelligent Internet telephones. This kind of demand in flexibility of devices and Medias requires a special design and programming skills from the developer and makes a construction process of IOIS challenging task.

Utilization environments of IOIS are multiple: 1) Hotel receptions use IOIS to fulfill their everyday tasks, 2) visitors use IOIS provided services in their personal computer, laptop, tablet computer or cell phone, regarding to the task they are performing and the place where they are located. 3) Hotel management use IOIS in their personal computers in management -related tasks such as marketing, design of tourism products and information sharing and retrieval. 4) Local inhabitants and visitors use IOIS provided services in Internet cafe -environments in order to maintain connected with their relatives and to perform their every-day tasks and activities.

Life circle of the first version of IOIS –once designed and implemented -- is designed to be five years. The first phase of design and implementation process takes 1 year's period of time. During this time, participatory design process is accomplished. IOIS design process proceeds according to principles of agile computing and prototyping. Each subsystem is taken into testing process and implementation individually, even if the general interface of IOIS is designed and implemented during in the beginning of the design circle -process.

7.4. Design requirements

Web design in both functionality and usability senses is also becoming of critical importance. Travelers expect websites to be informative, interactive, and attractive (Chu, 2001). Kim and Lee (2004) classified web service quality into six dimensions, namely: ease of use, usefulness, information content, security, responsiveness, and personalization. In Law and Cheung's (2005) study on customers' weighting factors on hotel website contents, they found that reservation information was the most important dimension. A successful website should therefore take customers' interest and participation into consideration, to capture information about their preference, and to subsequently use the information to provide personalized communications and services.

Outsourcing of design, implementation and maintenance of e- tourism services in business environment in developing countries is necessary, because of the need of special technological and administrative skills required for this task. The most recommendable strategic structure is co-opetition between tourism-oriented enterprises and a web design and Maintenance Company, what takes responsibility of technological issues such as web server installations, user rights, Internet -safety related issues and design and installation of new e-Tourism product components. Designer's responsibilities are to take in

use web service quality dimensions, too. When it comes to design of desired IOIS, special challenges of developing economies business environment have to take into careful consideration. These performance gaps are related to poor information structures and relatively poor level of skills and learning. Much attention must put to the learning process and inclusion of capacity building in every level of IOIS users.

7.5. Derived Requirements

Participative design and adaptation process of IOIS revealed that many necessary or even crucial business processes are only partially identified or executed in tourism enterprises. While owners and managers of enterprises have to describe their actual state of their business processes towards findings in conducted literature review, it was clearly demonstrated that many of those processes are attended and mentally processed for the first time. Hotel managers need to address demands of modern era and actual strategic state of enterprise is not ready to challenge these emerged demands. Tourism organizations need to recognize these changes and to develop personalized services to address individual needs. Proactive services may be offered based on the anticipated needs resulted from known/declared or previously experienced customer profiles. Reactive services should be designed to meet the needs of customers following incidents or external environment factors. In order to achieve customer centricity, organizations need to integrate all their systems and develop mechanisms for both recording customer reaction to stimulus and also for providing suggestions to both employees and the customers themselves. Equally requests and concerns during the reservation process should be passed on to the personnel that are developed for product delivery.

Strategic outcome of this evaluation process is that whilst tourism enterprises desire to take a giant step ahead by implementation of shared IOIS and take a step toward strategic co-opetition, they must re-establish new way of thinking about business processes in their own enterprises. Once IOIS is implemented, hotels and tour-operators must be able to respond to the increased efficiency and emerged demands of new international consumers of tourism their products. This means complete restructuring of almost all of their critical business -processes, standards of quality, capacity building of their personnel and business environment included in their enterprise culture. While making a desired change towards e-Tourism, enterprises are obligated to change dramatically by themselves, which was unexpected and somehow unpleasant result for the most of the hotel managers and other stakeholders of local tourism industry.

8. RESULTS

Systematic literature review of research demonstrates the contribution to knowledge, theory and professional practice resulting from these publications as well as exploring future prospects for the research area and the interdisciplinary contributions.

The research provides a comprehensive review to the key ICTs in Tourism industry (or e-Tourism in short). As a result of the study principle dimensions of the e-Tourism research are provided. Three main themes are identified as the main axes of e-Tourism research, namely: 1) Consumers and demand factors, 2) Technological Innovation -factor, which means the supply of tourism products in enterprises and 3) Industry functions -factor, which means technology utilization in enterprises. In this study, themes are analyzed towards actual reality of tourism enterprises in the business environment of developing economies. The study provides managerial implications whilst suggesting strategic and operational solutions of implementation e-Tourism services for the small scale tourism industry. As practical recommendations, the study provides an IOIS description and requirements specification designed for small international tourism oriented enterprises in Nicaraguan Caribbean Coast.

Requirement elicitation process: Assessment of consumers and demand -dimensions reveals that there is a need to develop Hotel's knowledge base to improve their management and marketing functions, systematic marketing processes and management procedures based on shared knowledge-base. Sharing critical business information between enterprises is a deep strategic decision towards co-opetition, which must be made by hotel owners and managers. Once this step is taken, IOIS can be utilized as a base of standardization of management procedures and marketing and distribution. Web marketing is considered as mainstream of all marketing of tourism enterprises. Design of segmentation and definition of target groups and identification of niche markets are seen as a prior performance gaps. Tourism product design, by enhancing the quality of the final e-Tourism product and it's fitness to purpose, needs to be re-evaluated. Frequent measuring and improvement system of tourism products and their productivity need to be designed for enterprises. Tourism enterprises' shared IOIS offers a good platform for this purpose.

In IOIS development process for hotel enterprises the following requirements have been identified in consumers and demand factor: 1) Direct interaction and information exchange with consumers was seen as a powerful tool in IOIS by hotel managers and they ranked it as the most important item. Systematic consumer information collection enables product customization and personal product design. Virtual travel community for visitors in Pearl Lagoon basins area enables sustainable and cost-efficient marketing processes of tourism products and information sharing between enterprises and con-

sumers. On-line reservation and payment system creates direct increase of incomes and gives a trustworthy opportunity for consumer to design their own traveling budgets, evaluate destinations and compare prizes. Consumer feed-back system gives a change to collect information about consumers' expectations and assessment of offered tourism products and therefore improve tourism products quality and create products that are better suited to consumer's expectations and that directly measures quality of service - performance. 2) Consumer segmentation and marketing is based on systematic consumer information collection. Segmentation can be made by language, origin, age, special interest and special needs of consumer. It enables "to the point -marketing" and periodical electronic newsletter. Tourism product design can be more accurate when customer segmentation is made properly. 3) New interaction channels with customers are considered to be of great importance for hotel managers. They are identified as web 2.0 solutions or so called Social Media utilization in information sharing and marketing.

Requirements specification process reveals that in Industry functions -dimension following needs and requirements have been specified: 4) Tourism product bundling: consumers can build their tourism experience by bundling their products dynamically. Actually this kind of service doesn't exist but hotel managers considered it as a base of tourism services. Consumer makes own tourism service package in Internet and it will be delivered by different individual enterprises in co-opetition -basis. 5) Consumer's enhanced opportunities to make direct comparison between tourism services, enterprises and regions. As a vision of co-opetition strategy adopted by hotel managers, comparison will be made between international tourism regions –for example between Nicaragua and Costa Rica – not between tourism products and tourism enterprises inside the own region. 6) Tourism oriented e-learning is seen as a common effort in order to improve quality of service of tourism enterprises. Use of Internet for publishing and disseminating learning materials for personnel was seen as a key to enhance quality of tourism products. 7) Cultural and environmental edutainment platform for consumers was seen of great importance. This requires systematic collection of cultural and nature information of region and cooperation with local and international universities and other educational institutes.

When it comes to IOIS and technological innovations utilization following requirements have been identified and accepted as a base of IOIS by hotel managers: 8) Construction of shared info-structure is taken positively by hotel management. Creation of shared info-structure is marked as a cornerstone of enterprise's shared vision of future business processes and product design. Hotel managers stated that in design of shared IOIS actual state of enterprises reduced capacity in technology adaptation has to be taken account. 9) Enhanced use of multimedia was seen as a key area by hotel managers. Multimedia solutions such as animations or video clips of destinations were mentioned as desired

feature for product designing, marketing and e-learning environments for personnel. Videos were seen as a key element for edutainment -component for consumers.

Hotel managers rejected many of advanced ICT solutions. Their attention was put merely basic Internet technology, such as building and enhancing interoperability inside and between enterprises. Stationary hot-spots provided by hotels was a feature, what was widely understood and valued by hotel managers. Stationary Internet access hot spots and Internet cafe -facilities for consumers' and personnel's' use were widely accepted as a component of IOIS. This component contains local information sharing, such as time tables of boats and airplanes, restaurant menus and other up-to-date information of enterprises business functions.

IOIS requirement specification process revealed that many necessary or even crucial business processes are only partially identified or executed in tourism enterprises. While owners and managers of enterprises have to describe actual state of their business processes towards findings derived from literature review, it was clearly demonstrated that many of those processes are attended and mentally processed for the first time. Hotel managers need to actualize strategic structure of their business. Enterprises need to recognize changes provided by adaptation of e-Tourism and adopt vision of personalized services addressed to customers' individual needs. Proactive services may be offered based on previously experienced customer profiles. Reactive services should be designed to meet the needs of customers following incidents or external environment factors. In order to achieve customer centricity, enterprises need to integrate all their systems and develop mechanisms for both recording customer reaction to stimulus and also for providing suggestions to both employees and the customers themselves.

Despite the aforementioned benefits, as of now the eTourism virtuality is still primitive. This jeopardizes the opportunities for tourism corporations to develop credible interfaces with other members of the value-chain, and thus, it prevents them from developing their virtuality further. A number of organizations fail to appreciate the benefits of co-opetition and co-destiny, when organizations collaborate with stakeholders that they would normally regard as competitors.

9. DISCUSSION

The technological revolution experienced through the development of the Internet has changed dramatically the market conditions for tourism organizations. ICTs evolve rapidly providing new tools for tourism marketing and management. They support the interactivity between tourism enterprises and consumers and as a result they re-engineer the entire process of developing, managing and marketing tourism products and destinations. Increasingly the impacts of ICTs are becoming clearer, as networking, dynamic interfaces with consumers and partners and the ability to redevelop the tourism product proactively and reactively are critical for the competitiveness of tourism organizations.

When organizations take use new technologies they are to gain new perspectives for their activities or products. From the other hand, the research shows clearly that the usage of new technologies have a direct impact to organizations themselves. This means changes in their behavior, practices and performance. New technology requires a new way of strategic decision making and new organizational culture. This is maybe direct impact of this research in tourism enterprises in Nicaraguan Caribbean coast. When the design process of new technology usage took place in nine enterprises, they started to change strategically, operationally and mentally. Hotel managers gain different perspective towards their business *per se*. The boost for the tourism business with the usage of emerging technology evolved, and it will affect directly enterprises internal processes. When it comes to renewing business culture and tourism service production, quality standards definition and even entire vision and mission of tourism enterprises, the impact of shared IOIS in tourism enterprises is notorious.

Increasingly ICTs will provide the "info-structure" for the entire industry and will overtake all mechanistic aspects of tourism transactions. It is evident, however, that the future of eTourism will be focused on consumer centric technologies that will support organizations to interact with their customers dynamically. Consumers are becoming incredibly powerful and are increasingly able to determine elements of their tourism products. They are also much more sophisticated and experienced and therefore are much more difficult to please. Innovative tourism enterprises will have the ability to divert resources and expertise to servicing consumers and provide a higher value added transactions.

The development of new and more powerful ICT applications empowers both suppliers and destinations to enhance their efficiency and re-engineer their communication strategies. Innovative technologies will support interoperability, personalization and constant networking. Agile strategies are therefore required at both strategic and tactical management levels to ensure that the ICT driven opportunities and challenges are turned to the advantage of tourism organizations towards enhancing their innovation and com-

petitiveness. In Nicaraguan tourism enterprises, all these challenges are multiplied by challenging business environment. Therefore they have to be taken seriously into consideration in order to guarantee sustainable modern business processes and when it comes to satisfy increased needs and demands of European and North American consumers.

Constraints and limitations of research

Observing time line of the research, it possesses limitations in the both ends of time line. When data collection process started, observed enterprises have already created a shared view of limited co-operation or coopetition – as it is nominated in the research. Therefore, even if it was an essential part of research process, evolution of strategic coopetition between enterprises is not widely focused. In the end of research time line, the specification of requirements for shared supportive information system was researched. The construction and implementation process was excluded from this study and considered merely as a future research topic.

In this case study, data collection and interpretation were made with carefully selected enterprises. Therefore the direct fit with recommendations and conceptual design of desired IOIS is present only in these selected enterprises. Conceptual design and requirement analysis of IOIS was created in order to gain sustainable benefit and competitive advantage for these small tourism enterprises. Anyhow, the results of the research are highly useful for any tourism enterprise in developing economies business environment as a blueprint when designing other parallel local IOIS's. Further research is required in order to gain a solid fit for other kind of competitive situations.

Future research proposals

Design and implementation processes of IOIS into chosen enterprises are time consuming and challenging task and requires a participative documentation and research process. This process offers a good opportunity of case study which focuses into the accessibility and usability of information system and gives unusual insights when pondering educational and psychological barriers to the use of information systems and computer illiteracy in developing countries.

Life circle analysis of IOIS in researched enterprises in context of developing economies is one of the research topics that deserve more attention. The benefits archived, costs of design, implementation and maintenance of IOIS and sustainability of emerged business processes and strategies in the longer run need to be re-entered in the future.

Developing economies challenges, when it comes to adaptation of modern information systems are not widely researched. Anyhow, some sectors of developing economies are growing fast – as this study demonstrated from the part of tourism industry. Therefore modern technology implementation can offer a boost for sustainable incomes and welfare for local communities, enterprises and societies. When it comes to utilization and deployment of modern technology, developing economies are not globally the easiest environment and therefore they offer challenging opportunity to researchers and practitioners.

REFERENCES

Abad, M., Sorzabal, A.A. & Linaza, M.T. (2005). NOMENCLATOR-Innovative Multilingual Environment for Collaborative Applications for Tourists and Cultural Organizations. In A.J. Frew ed). Information and Communication Technologies in Tourism 2005: 79-89. New York.

Agarwal, S, Handschuh, S. & Staab, S. (2003). Surfing the Service Web. Lecture Notes in Computer Science, 2870: 211-226.

Albrecht, K. & Zemke, R. (1985). Service America! Doing business in the new economy. Homewood, IL: Dow Jones-Irwin. Alfaro, I., Nardon, M., Pianesi, F., Stock, O., & Zancanaro, M. (2005). Using cinematic techniques on mobile devices for cultural tourism, Information technology & Tourism, 7(2): 61-71.

Allison, A., Currall, J., Moss, M. & Stuart, S. (2005). Digital Identity Matters. Journal of the American Society for Information Science and Technology, 56(4): 364-372.

Alter, S. (2008), Defining information systems as work systems: Implications for the IS field, European Journal of Information Systems 17(5): 448-469.

Anderson, R.E. & Srinivansan, S.S. (2003). E-satisfaction and e-loyalty: A contingency framework. Psychology and Marketing, 20(2): 123-138.

Bai, B., Hu, C., Elsworth, J. & Countryman, C. (2004). Online Travel Planning and College Students: The Spring Break Experience. Journal of Travel & Tourism Marketing, 17(2/3): 79-91.

Bakos, J.Y. (1997). Reducing buyer search costs: Implications for electronic marketplaces. Management Science, 43(12): 676-692.

Bakos, J.Y. (1998). The emerging role of electronic marketplaces on the Internet. Communications of the ACM, 41(8): 35-42.

Bauernfeind, U. & Zins, A., (2006). The perception of exploratory browsing and trust with recommender websites. Information Technology & Tourism, 8(2): 121-136.

Baum, T. & Sigala, M. (2001). E-learning in hospitality and tourism. Education, Singapore's Knowledge Industry Journal, December: 32-34.

Benbasat, I. & Zmud, R. W. (2003), The identity crisis within the IS discipline: Defining and communication the discipline's core properties, MIS Quarterly 27(2): 183 – 194.

Berger, S., Lehmann, H. & Lehner, F. (2003). Location-Based Services In The Tourist Industry. Information Technology & Tourism, 5(4): 243–256.

Bieger, T., Beritelli, P., Weinert, R. & Wittmer, A. (2005). Building Trust and Identity on the Web — New IT Transaction Platforms to Overcome Psychological Barrier to Rent. In A. Frew (Eds.). Information and Communication Technologies in Tourism 2005 — Proceedings of the International Conference in Innsbruck: 296-305. New York.

Bonn, M.A., Furr, H.L. & Susskind, A.M. (1998). Using the Internet as a pleasure travel planning tool: An examination of the sociodemographic and behavioral characteristics

among Internet users and non-users. Journal of Hospitality & Tourism Research, 22(3): 303-317.

Braun, P. (2002). Networking Tourism SMEs: E-Commerce and E-Marketing Issues in Regional Australia. Information Technology and Tourism, 5(1): 13-23.

Brynjolfsson, E. & Smith, M.D. (2000). Frictionless Commerce? A comparison of Internet and conventional retailers. Management Science, 46(4): 563-586.

Buhalis D., & O'Connor, P. (2005), Information Communication Technology - Revolutionising Tourism. Tourism Recreation Research, 30(3): 7-16.

Buhalis, D. (1998). Strategic use of information technologies in the tourism industry. Tourism Management, 19(5): 409-421.

Buhalis, D. (2003). eTourism: information technology for strategic tourism management, Pearson (Financial Times/Prentice Hall): 228-249.

Buhalis, D. (2004). eAirlines: Strategic and tactical use of ICTS in the Airline Industry. Information & Management, 41(7): 805-825.

Buhalis, D. & Licata, M. C. (2002). The Future eTourism Intermediaries. Tourism Management, 23(3): 207-220.

Buhalis, D. & Zoge, M. (2007). The Strategic Impact of the Internet on the Tourism Industry, in Sigala, M., Mich, L., Murphy, J. (Eds.), Information and Communication Technologies in Tourism 2007: 481-492.

Chan, Y. E., Huff, S. L., Barclay, D. W. & Copeland, D. G. (1997). "Business Strategy Orientation, Information Systems Orientation and Strategic Alignment," Information Systems Research 8(2): 125-150.

Chan, Y. E., Sabherwal, R. & Thatcher, J. B. (2006). "Antecedents and Outcomes of Strategic IS Alignment: An Empirical Investigation," IEEE Transactions on Engineering Management 53(1): 24-47.

Chen, C. (2006). Identifying significant factors influencing consumer trust in an online travel site. Information Technology & Tourism, 8(2): 197-214.

Chen, J.S. & Hsu, C.H.C. (2000). Measurement of Korean Tourists' perceived images of overseas destinations. Journal of Travel Research, 38(4): 411-416.

Cheng, C. & Piccoli, G. (2002). Web-Based Training in the Hospitality Industry: A Conceptual Definition, Taxonomy and Preliminary Investigation, International Journal of Hospitality Information Technology, 2(2): 19-33.

Cho, Y. & Fesenmaier, D.R. (2001). A new paradigm for tourism and electronic commerce: Experience marketing using the virtual tour, in Laws, E., and Buhalis, D., (Eds), tourism distribution channels: practices, issues and transformation: 351-370.

Chu, R. (2001). What online Hong Kong travelers look for on airline/travel Websites? International Journal of Hospitality Management, 20(1): 95-100.

Clemons, E.K., Hann, I.-H. & Hitt, L.M. (2002). Price dispersion and differentiation in online travel: An empirical investigation. Management Science, 48(4): 534-549.

Collins, C., Buhalis, D. & Peters, M. (2003), Enhancing Small Medium Tourism Enterprises' business performance through the Internet and e-learning platforms. Education & Training, 45(8/9): 483-494.

Connolly, D., Olsen, M. & Moore, R. (1998). The Internet as a Distribution Channel, Cornell Hotel and Restaurant Administration Quarterly, 39(4): 42-54.

Cotte, J., Chowdhury, T.G., Ratneshwar, S. & Ricci, L.M. (2006). Pleasure or utility? Time planning style and Web usage behaviors. Journal of Interactive Marketing. 20 (1): 45- 57.

Dagnino, G.B. & Padula, G. (2002). Coopetition strategy - a new kind of interfirm dynamics for value creation. EURAM – The European Academy of Management Second Annual Conference - "Innovative Research in Management" Stockholm, 9-11 May 2002.

Daniele, R. & Frew, A. (2005). Using Concept Maps to Examine Business Models and Drivers of Competitive Advantage for Travel eMediaries, In Frew, A. (ed), Information and Communication Technologies in Tourism 2005: 497-507.

Eisenhardt, K.M. & M.E. Graebner, (2007), Theory building from cases: Opportunities and challenges, Academy of Management review 50(1): 25-32.

Emmer, R.M., Tauck, C., Wilkinson, S., & Moore, R.G. (1993). Marketing hotels using global distribution systems. Cornell Hotel and Restaurant Administration Quarterly, 34(6): 80–89.

Fawcett, S. L. & Lockwood, A. (2000), Improving the learning environment for the development of hospitality accountancy skills using computer simulation gaming. Tourism and Hospitality Research, 2(3): 262-276.

Fesenmaier, D. R., Werthner, H. & K. W. Wöber (2003). Travel Destination Recommendation Systems: Behavioral Foundations and Applications, CAB International, London: 670-698.

Fesenmaier, D., Gretzel, U., Hwang, Y.H. & Wang, Y. (2003). The Future of Destination Marketing: e-Commerce in Travel and Tourism. International Journal of Tourism Science, 3(2): 191-200.

Fesenmaier, D., Leppers, A. W. & O'Leary, J.T. (1999). Developing a Knowledge-Based Tourism Marketing Information System. Information Technology and Tourism, 2(1): 31-44.

Fiore, A.M., Kim, J. & Lee, H. (2005). Effect of image interactivity technology on consumer responses toward the online retailer. Journal of Interactive Marketing, 19(3): 38-53.

Flouri, E. & Buhalis, D. (2004). Wireless Technologies for tourism Destinations. In A.J. Frew (ed). Information and Communication Technologies in Tourism 2004: 27-38. New York.

Fodness, D. & Murray, B. (1997). Tourist information search. Annals of Tourism Research, 24(3): 503-523.

Fodor, O. & Werthner, H. (2005), Harmonise: A step toward an interoperable eTourism Marketplace. International Journal of Electronic Commerce, 9(2): 11-39.

Gelb, B.D. & Sundaram, S. (2002). Adapting to "word of mouse." Business Horizons, 45(4): 15-20.

Graeupl, A. (2006). 'Silver Surfers' and their Online Information Search Behaviour. In M. Hitz, M. Sigala, & J. Murphy (Eds). Information and Communication Technologies in Tourism 2006: 236-247. New York.

Gregor S. & D. Jones (2004), The formulation of design theories for information systems, In Linger, Fisher, Wojtkowski, Zupancic, Vigo and Arold (Eds.), Constructing the infrastructure for the knowledge economy: Methods and tools, theory and practice: 83-93, Kluwer Academic, New York.
Gregor S. & D. Jones (2007), The anatomy of a design theory, Journal of the Association for Information Systems 8(2): 312-335.

Gretzel, U., Mitsche, N., Hwang, Y.-H. & Fesenmaier, D. (2004). Tell me who you are and I will tell you where to go — Use of Travel Personalities in Destination Recommendation Systems. Information Technology & Tourism, 7(1): 3–12.

Gretzel, U., Yuan, Y.L. & Fesenmaier, D.R. (2000). Preparing for the New Economy: Advertising Strategies and Changes in Destination Marketing Organizations. Journal of Travel Research, 39(2): 146-156.

Gursoy, D. & McCleary, K. (2004). An Integrative Model of Tourists' Information Search Behaviour. Annals of Tourism Research, 31(2): 353–373.

Hevner, A.R., March,S.T. & J. Park (2004), Design science in information systems research. MIS Quarterly, vol. 28: 75-105.

Inkpen, G. (1998). Information technology for travel and tourism, 2nd ed, Addison Wesley Longman, London. ISTAG, 2003, Ambient Intelligence: from Vision to reality. Information Society Technologies: 239-240.

Iveroth, E. (2010). Inside Ericsson: A Framework for the Practice of Leading Global IT-Enabled Change. California management review Vol. 53(1): 176-193, Fall 2010, Cmr Berkeley edu.

Jakkilinki, R., Georgievski, M. & Sharda, N. (2007). Connecting Destinations with an Ontology-Based e-Tourism Planner. In M. Sigala, L. Mich, & J. Murphy (Eds). Information and Communication Technologies in Tourism 2007: 21-32, Springer-Verlag Wien.

Jang, S.C. (2004). The Past, Present, and Future Research of Online Information Search. Journal of Travel & Tourism Marketing, 17(2/3): 41-47.

Jeong, M., Oh, H. & Gregoire, M. (2003). Conceptualizing Web site quality and its consequences in the lodging industry. International Journal of Hospitality Management, 22(2): 161-175.

Kim, C. & Mauborgne, R. (2005), Blue ocean strategy: from theory to practice, California management review Vol. 47(3): 105-121.

Kim, E., Nam, D. & Stimpert, J.L. (2004). The Applicability of Porter's Generic Strategies in the Digital Age: Assumptions, Conjectures and Suggestions, Journal of Management, 30(5): 569-589.

Kim, W.G., & Lee, H.Y. (2004). Comparison of Web Service Quality between Online Travel Agencies and Online Travel Suppliers. Journal of Travel & Tourism Marketing, 17(2/3): 105-116.

Klein, S. (2002). Web impact on the distribution structure for flight tickets. In K.W. Wöber, A.J. Frew, & M. Hitz (Eds). Information and Communication Technologies in Tourism 2002: 219-228. New York.

Kolsaker, A., Lee-Kelley, L. & Choy, P.C. (2004). The reluctant Hong Kong consumer: Purchasing travel online. International Journal of Consumer Studies, 28(3): 295-304.

Laplante, P.A., Hoffman, R., Klein, G. (2007). Antipatterns in the creation of intelligent systems.Intelligent Systems, January/Feburary: 91-95.

Laudon, K. & Laudon, J. (2007). Management Information Systems, 10th ed, Prentice Hall, New Jersey.

Law, R. & Cheung, C. (2005). Weighing of hotel website dimensions and attributes. In A.J. Frew (Ed). Information and Communication Technologies in Tourism 2005: 327-334. New York.

Law, R. & Jogaratnam, G. (2005). A study if hotel information technology applications. International Journal of Contemporary Hospitality Management, 17(2): 170-180.

Leung, R. & Law, R. (2007), Analyzing Research Collaborations of Information Technology Publications in Leading Hospitality and Tourism Journals: 1986–2005, in Sigala, M.

Li, L. & Buhalis, D. (2005). Predicting Internet Usage for Travel Bookings in China. Information and Communication Technologies in Tourism 2005: 429–439. Wien.

Loh, S., Lorenzi, F., Saldana, R. & Licthnow, D. (2004). A Tourism Recommender System Based on Collaboration and Text Analysis. Information Technology & Tourism, 6(3); 157-165.

Luo, M., Feng, R. & Cai, L.A. (2004). Information Search Behavior and Tourist Characteristics: The Internet vis-à-vis Other Information Sources. Journal of Travel & Tourism Marketing, 17(2/3): 15-25.

Lyytinen, K. & J. Damsgaard, (2011), Inter-organizational information systems adoption – a configuration analysis approach, European Journal of Information Systems, doi:10.1057/ejis.2010: 71-90.

Maedche, A. & Staab, S. (2002). Applying Semantic Web Technologies for Tourism Information Systems: 311-319. In Wöber, K.W., Frew, A.J & Hitz, M. (Eds) Information and Communication Technologies in Tourism 2002. ENTER 2002 Proceedings. New York.

Maedche, A., & Staab, S. (2003). Services on the Move: Towards P2P-Enabled Semantic

Web Services: 124-133. In Frew, A., O'Connor & Hitz, M. (Eds) Information and Communication Technologies in Tourism 2003. ENTER 2003 Proceedings. New York.

Main, H. (2001). The expansion of technology in small and medium hospitality enterprises with a focus on net technology. Information Technology & Tourism, 4(3-4): 167-174.

Manes, G. (2003). The Tetherless Tourist: Ambient Intelligence in Travel and Tourism, Information Technology and Tourism, 5(4): 211–220.

Marcussen, C. (1999b). The effects of Internet distribution of travel and tourism services on the marketing mix: No-frills, fair fares and fare wars in the air. Information Technology & Tourism, 2(3/4): 197-212.

Markus, M. L. (2004), Technochange management: using IT to drive organizational change. Journal of Information Technology 19(1): 4-17.

Mattila, A.S. & Mount, D.J. (2003). The impact of selected customer characteristics and response time on e-complaint satisfaction and return intent. International Journal of Hospitality Management, 22(2): 135-145.

Mazanec, J.A., Wöber, K.W. & Zins, A.H. (2007). Tourism Destination Competitiveness: From Definition to Explanation? Journal of Travel Research, 46: 86-95.

Mills, J.E., Ismail, J.A., Werner, W.B., & Hackshaw, K. (2002). Cyber Crimes and the Travel and Tourism Consumer. In K.W. Wöber, A.J. Frew, & M. Hitz (Eds). Information and Communication Technologies in Tourism 2002: 197-206. Springer-Verlag Wien.

Minghetti, V. (2003). Building customer value in the hospitality industry: towards the definition of a customer-centric information system. Information Technology and Tourism, 6 (2): 141–153.

Morrison, A. M., Jing, S., O'Leary, J. T. & Lipping, A. C. (2001). Predicting Usage of the Internet for travel bookings: an exploratory study. Information Technology & Tourism, 4(1): 15–30.

Morrison, A. M., Taylor, J. S., Morrison A. J. & Morrison, A. D. (1999). Marketing small hotels on the World Wide Web. Information Technology & Tourism, 2(2): 97–113.

Niiniluoto, I. (1993). The Aim and Structure of Applied Research. Erkenntnis 38 (1). University of Helsinki.

Niininen, O., March, R. & Buhalis, D. (2006). Consumer Centric Tourism Marketing. In D. Buhalis & C. Costa (Eds.), Tourism management dynamics: trends, management and tools: 249- 279. Amsterdam.

O' Connor, P., (2003), Room rates on the Internet – is the web really cheaper? Journal of Services Research. 1(1):57-72.

O'Connor, P. & Frew, A. (2002). The future of hotel electronic distribution: Expert and industry perspectives. Cornell Hotel and Restaurant Administration Quarterly. 43(3): 33-45.

O'Connor, P. & Frew, A. (2001). Expert perceptions on the Future on Hotel Electronic Distribution Sheldon,P.J., K.W. Wöber, & D.R. Fesenmaier (Eds). Information and

Communication Technologies in Tourism 2001: 346-357. New York.

O'Connor, P. & Frew, A.J. (2004). An evaluation methodology for hotel electronic channels of distribution. International Journal of Hospitality Management, 23(2): 179–199.

O'Connor, P. & Murphy. J. (2004). Research on information technology in the hospitality industry. International Journal of Hospitality Management, 23(5): 473-484.

Odinma, A.C., Oborkhale, L.I. & Kah, M.M.O. (2007). The trends in broadband wireless network technologies. The Pacific Journal of Science and Technology, 8(1): 118-125.

Oh, W. & Pinsonneault, A. (2007). "On the Assessment of the Strategic Value of Information Technologies: Conceptual and Analytical Approaches," MIS Quarterly 31(2): 239-265.

Oorni, A., & Klein, S. (2003). Electronic Travel Markets: Elusive Effects on consumer Behavior. In A.J. Frew, M. Hitz, & P. O'Connor (Eds). Information and Communication Technologies in Tourism 2003: 29-38. New York.

Orlikowski, W.J, & Iacono, C.S. (2001). Research commentary: Desperately seeking the "IT" in IT research - A call to theorizing the IT artifact. Information Systems Research, 12(2): 121-134.

Padula, G. & Dagnino, G.B. (2007): Untangling the rise of coopetition – The intrusion of competition in a cooperative game structure, International Studies of Management and Organization, Vol. 37(2): 32-52.

Paraskevas, A. & Buhalis, D. (2002), Web-enabled ICT Outsourcing for Small Hotels: Opportunities and Challenges, Cornell Hotel and Restaurant Administration Quarterly, 43(2): 27-39.

Patton, B.K., Aukerman, R. & Shorter, J.D. (2005). Wireless technologies, wireless fidelity (WI-FI) & worldwide interoperability for microwave access (WiMax). Issues in Information Systems, 6(2): 364-370.

Pechlaner, H., Rienzner, H., Matzler, K. & Osti, L. (2002). Response Attitudes and Behavior of Hotel Industry to Electronic info Requests. In K.W. Wöber, A.J. Frew, & M. Hitz (Eds). Information and Communication Technologies in Tourism 2002: 177-196, Springer-Verlag Wien.

Peterson, R.A., Balasubramanian, S. & Bronnenberg, B. (1997). Exploring the Implications of the Internet for Consumer Marketing. Journal of the Academy of Marketing Science, 25(3): 329-346.

Piccoli, G., Ahmad, R. & Ives, B. (2001). Web Based Virtual Learning Environments: A research framework and a preliminary assessment of effectiveness in basic IT skills and training, MIS Quarterly; 25(4): 401-427.

Plan Nacional de Turismo. Instituto de Turismo de Nicaragua, INTUR. Versión 6.0 October 2010.

Poon, A. (1993), Tourism, technology and competitive strategies, CAB International, Oxford.

Porter, M. (1979). How Competitive Forces Shape Strategy, Harvard Business Review, 57(2). 137-145.

Porter, M. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors, Free Press, New York.

Porter, M. (2001). Strategy and the Internet, Harvard Business Review, 79(3): 63-78.

Pouloudi, A., Vassilopoulou, K. & Ziouvelou, X. (2002). Considering the societal implications in the adoption of e-business models. In Proceedings of 6th International conference on The transformation of organizations in the information age: social and ethical implications (ETHICOMP' 2002) - Lisbon, Portugal, 13-15 November: 237-246.

Preece, J. (2000). Online communities: designing usability, supporting sociability. New York: John Wiley: 238-256.

Preston, D. S. & Karahanna, E. 2009. "Antecedents of IS Strategic Alignment: A Nomological Network," Information Systems Research (20:2): 159-179.

Rabanser, U. & Ricci, F. (2005). Recommendation Systems: Do They Have a Viable Business Model in e-Tourism. (pp. 160-171). In Frew, A. (Ed). Information and Communication Technologies in Tourism 2005. ENTER 2005 Proceedings. New York.

Raggam, K. & Almer, A. (2005). Acceptance of Geo-multimedia Applications in Austrian Tourism Organizations. In M. Sigala, L. Mich, & J. Murphy (Eds). Information and Communication Technologies in Tourism 2007: 163-174. New York.

Resnick, P. & Varian, H. (1997). Four text classification algorithms compared on a Dutch corpus. In International ACM-SIGIR Conference on Research and Development in Information retrieval (SIGIR'98) Melbourne: 369-370.

Ricci, F. (2002). Travel Recommender Systems. IEEE Intelligent Systems, November/December: 55-57.

Ricci, F. & Werthner, H., (2002), Case base querying for travel planning recommendation. Information Technology & Tourism, 3(3/4): 215-226.

Ricci, F. & Werthner, H., (2006), Recommender Systems, International Journal of Electronic Commerce, 11(2): 5-9.

Schertler, W. & Berger-Koch, C. (1999), Tourism as an information business: The strategic Consequences of e-Commerce for Business Travel, Buhalis, D. & Schertler, W. (eds), Information & Communication Technologies in Tourism 1999: 25-35.

Shea, L., Enghagen, L. & Khullar, A. (2004). Internet Diffusion of an E-Complaint: A Content Analysis of Unsolicited Responses. Journal of Travel & Tourism Marketing, 17(2/3): 105-116.

Shih, C.F. (1998). Conceptualizing consumer experiences in cyberspace. European Journal of Marketing, 32(7/8): 655-663.

Sigala, M. (2002), The Evolution of Internet Pedagogy: Benefits for Tourism and Hospitality Education. Journal of Hospitality, Leisure, Sport and Tourism Education, 1(2): 29-45.

Sigala, M. & Christou, E. (2002). Using the Internet for complementing and enhancing the teaching of tourism and hospitality education: evidence from Europe. In K.W. Wöber,

Snepenger, D., Meged, K., Snelling, M. & Worrall, K. (1990). Information Search Strategies by Information-Naive Tourists. Journal of Travel Research, 29(1): 13-16.

Solon, A., McKevitt, P. & Curran, K. (2004). TeleMorph: Bandwidth-determined Mobile Multimodal Presentation. Information Technology & Tourism, 7(1): 33-47.

Stepchenkova, S., Mills, J.E. & Jiang, H. (2007). Virtual Travel Communities: Self-Reported Experiences and Satisfaction. In M. Sigala, L. Mich, & J. Murphy (Eds). Information and communication technologies in tourism 2007: 163-174.

Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. Journal of Communication, 42(4): 73-93.

Tallon, P. & A. Pinsonneault, (2011). Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model. MIS Quarterly vol. 35(2): 463-486.

Tallon, P. P. (2008). "A Process-Oriented Perspective on the Alignment of Information Technology and Business Strategy," Journal of Management Information Systems 24(3): 231-272.

Tufte, B. & Rasmussen, J. (2003). Children on the Net – State of the Art and Future Perspectives Regarding Danish Children's Use of the Internet. European Advances in Consumer Research, 6: 142-146.

Van Aken, J. E. (2004). Management Research Based on the Paradigm of the Design Sciences: The Quest for Field-Tested and Grounded Technological Rules. Journal of Management Studies, 41(2): 219-246.

Vogt, C. A. & Fesenmaier, D. R. (1998). Expanding the functional information search model. Annals of Tourism Research, 25(3): 551-578.

Yami, S., Castaldo, S. & Dagnino, G. (2010): Coopetition. Winning strategies for the 21st century. Edvard , Elgar Pub: 235-256.

ANNEX 1:

HUMAN AND INSTITUTIONAL CAPACITY IMPROVEMENT -MODEL

Human and Institutional Capacity Development (HICD) is a model of structured and integrated processes designed to identify root causes of performance gaps in institutions, address those gaps through a wide array of performance solutions in the context of all human performance factors, and enable cyclical processes of continuous performance improvement through the establishment of performance monitoring systems. In the study following structure is utilized for gathering and interpretation data from tourism enterprises (Fig 1).

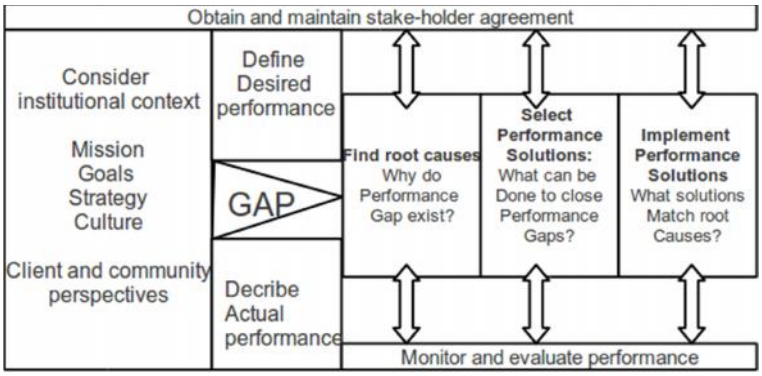

Figure 1*: HICD -model and its internal information flows*

Through a comprehensive analysis of organizational performance based on six performance factors, HICD identifies performance gaps and introduces performance solutions for performance gaps. Appropriate performance solutions are designed depending on which of the six performance factors lie at the root causes of the performance gap. Root causes of performance gaps are analyzed utilizing behavior engineering model which connects identified performance gaps to every day work flows of tourism enterprises.

The design and implementation strategy of the field work of is conducted with the following practical steps:

Step 1: Consider the institutional context of the performance problem and get stakeholder agreement. Examine the total performance in which the organization functions including its mission, goals, strategies, and culture of the organization, and the perspectives of the clients and communities. Foster and maintain stakeholder agreement on the objective of the HICD process and the plans for addressing performance problems.

Table* 1: Updated behavior engineering model*

Environmental	**Information**	**Resources and tools**	**Incentive**
	Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about the adequacy of performance	Materials, tools, expert support and time needed to do the job are present	Financial and non-financial incentives are present. Incentives and reward systems reinforce positive performance
	Clear and relevant guides are used to describe the work process.	Processes and procedures are clearly defined in reference documentation.	Jobs are enriched to allow for fulfillment of employees needs
	The performance management system guides employee performance and development	Overall physical and psychological work environment contributes to improved performance	Overall work environment is positive with an opportunity to succeed
Individual	**Knowledge and Skills**	**Capacity**	**Motives**
	Employees have the necessary knowledge, experience and skills to do the desired behaviors	Employees have the individual capacity to learn and to do what is needed to perform successfully	Motives of the employees are aligned with the work and work environment
	Employees are properly placed to use and share what they know	Employees are recruited and selected to match realities of the work situation	Employees want to perform the required jobs
	Employees are cross-trained to understand each other's roles	Employees are free from emotional limitations that would interfere with their performance	Employees are selected and recruited to match realities of the work situations

Step 2: Define desired performance in measurable terms if possible. Desired performance takes into account international or national standards and the perspective of stakeholders. The description of desired performance level creates a manageable set of objectives for the process.

Step 3: Describe actual performance. The description of actual performance as it relates to the defined performance is based on observations and interviews of personnel members and clients and on review of records and other documents.

Step 4: Measure or describe the performance gap. The difference between desired and actual performance is the performance gap.

Step 5: Find the root causes of the performance gap. Analyze the reasons for the gap and identify basic reasons, or root causes. Root causes should be linked to the performance factors that affect people in doing their work: Information; Resources; Incentives; Knowledge/Skills; Capacity; and motivation. Linking the root causes of performance gaps to specific factors helps HICD practitioners generate solutions that address the root causes.

Step 6: Select performance solutions. Consider recommendations for performance solutions to address the root cause of performance gaps and the related performance factors; then rank and select these solutions according to cost, benefit, or other criteria.

Step 7: Implement performance solutions. With support from Stakeholders, as needed, the partner organization implements the selected performance solutions maintaining an environment of transparency and managing the change process by consistently communicating the intended results with the HICD initiative to personnel and stakeholders.

Step 8: Monitor and evaluate performance. The partner organization in consultation with its Stakeholders keeps the solutions on track and evaluates performance on an ongoing basis to re-measure the performance gap and assess the effect of the solutions.

Planning the HICD initiative for tourism enterprises

Missions or other operating units wishing to implement HICD initiatives should plan the initiatives carefully in order to ensure successful processes. Once a partner organization is selected, it is important to document as much information as possible about the organization, the environment in which it operates, its mandate, outputs (products and services), constituents, and performance issues to be targeted as well as any technical assistance being provided to the organization by other external stakeholders including donors.

HICD initiatives should be carefully coordinated with activities of other external stakeholders to avoid conflicting or competing demands on the organization for its time and resources. Close coordination also provides an opportunity to leverage other resources if available. A desirable partner candidate will have a strong, stable leader who is committed to providing high quality services and products to the organization's constituents in accordance with the organization's mandate. Ideally, the partner organization has a well-articulated mandate, mission and vision with established and measurable performance goals. Many of partners are in the nascent stages of development and may be striving to achieve even these basic criteria. Such organizations may need some preliminary assistance to prepare them for an HICD initiative. Preparatory activities for such

organizations may include a workshop providing an overview of HICD, sessions with facilitators to work with the organization on developing or clarifying strategy and goals, or other preparatory activities.

Since the success of any HICD project is dependent on the extent to which the organization's management "owns" or "invests" the HICD process, it is imperative that the performance challenges identified by the partner, that is those areas where the organization is hurting the most, are the same performance challenges identified by the stakeholders, and the Mission who will be providing support in closing the performance gaps. In cases where there is significant discrepancy, a first step of HICD may be working with the organization to construct the value chain or total business performance system that identifies the services, products and other outputs produced by organization, organizations constituents, and performance measures that will reflect desired performance standards.

ANNEX 2:

IDENTIFIED PERFORMANCE GAPS IN SMALL TOURISM ENTERPRISES, THEIR ROOT CAUSES AND SUGGESTED SOLUTIONS FOR CUSTOMERS AND DEMAND -DIMENSION

Table 1/2: *Consumer behavior changes, actual performance and desired performance of enterprises.*

Identified changes in consumer behavior	Actual performance in case enterprises	Desired performance and SHARED VISION	Performance gap and its importance by Hotel Managers
1. Direct interaction and information exchange with consumers			
Use of (Online) reservation systems	No systematic reservation systems – made by phone	Pearl Lagoons tourism service reservation system by Internet, reservations purchased by bank transfer or credit card	Need to change charging and billing system in enterprises. On-line reservation system based on own IOIS (5)
Emerging (Virtual) Travel Communities (VTC)	Travel-communities are not reached actively	Pearl lagoons -friends own virtual travel community with connection of international travel communities	Use of IOIS for establishment of Pearl Lagoons visitors Travel Community (4)
Peer to peer consumer recommender system	Only in web-blogs of visitors, no active promotion by enterprises	P-to-P recommender system made through own virtual travel community with interaction to international ones	Use of IOIS for consumer recommender system (5)
Mechanism for consumers to air complaints and get advices	Complaints in paper or oral form, mainly by phone	Centralized complaints system and response to complaints system in Internet	Complaints must be collected electrically. Response for complaints is essential in IOIS. Change of attitudes towards consumer 's opinions (3)
Systematic information sharing with consumers	Occasionally made by leaflets and promoting material for tourism fairs	Internet based system through virtual travel community platform.	Tourism product design and documentation must be systematic. Distribution and sharing of tourism info is based to own IOIS (5)
Consumers requests and concerns of offered services	Received by phone – no systematic promotion	Internet-based FAQ-system as a part of Pearl lagoon VTC	No platform for gather and share systematically requests and needs. Change of attitudes (5). Own IOIS is a way to gather consumers requests and concerns

Table continues in the next page..

2. Consumer segmentation and marketing			
Consumer market segments in marketing	Some customer groups identified – no systematic segmentation of visitors	Full segmentation of all consumer groups by origin, language, interests and age	Every enterprise needs to share consumer information and gather it systematically. Consumer groups and segments are identified together for marketing reasons (5)
Collection of customer information at each stage of service	Mandatory (police - oriented) collection in paper – no systematic collection of info of visitors	Systematical shared Collection organized by VTCs, reservation systems and FAQ-systems in all enterprises	Customer information needs to be systematically collected in computerized form and gathered together for use for all enterprises (4)
Use of customers personal information	Practically none	Efficient use of collected visitor info by e-newsletters and personalized tourism products	There is no practical means to use of customers personal information. Importance of personal information is ignored (4)
Develop personalized services to address individual needs	Flexibility is obvious – special services arranged frequently, but not systematically	Systematic production of personalized services, collection of information for the use of other enterprises	There is no connection and interaction between hotel management and customer which make possible to personalize services (2)
Periodical newsletter to customers	Systematically none – some intents by email made	Monthly newsletter to all VTC-members and other visitors	Newsletter is not understood. No platform for it, no systematic gathering of useful information for customers (3)
Identified changes in consumer behavior	Actual performance in case enterprises	Desired performance and SHARED VISION	Performance gap and its importance by Hotel Managers

Table continues in the next page…

3. Adaptation of special groups of customers			
Children adaptation	No active attempt made	Creation of "children products" and local activities for children	Children are not understood as customers. Change of attitudes and preferences. (2)
Senior citizens adaptation	No active attempt made	Easy access – tourist products for elderly people	In all enterprises conditions, usability and easy access needs to improve. Commercialization of "Senior zitizen's tourism products" requires change of attitudes (4)
Special customer groups adaptation	No active attempt made. Vegetarian and diabetes -menus in some restaurants for special order	Easy access – tourism products for special groups. Systematic vegetarian and diabetes adaptation in all menus.	Special customer groups are not understood as consumers. Change of attitudes. Special menus and services need to emerge (3)
Profiling of customers	Some profiling of customers is made – mainly to experience and academic tourism initiatives	Active profiling of all visitors groups for marketing purposes and for service design	Make profiling systematic and make procedures for profiling. Internet platform helps to share info (3)
4. New interaction channels with customers			
Social networking integration	Only one enterprise has integration in Facebook	All web page activities are fully integrated and interactive with social media users	Own IOIS is understood as solution for SM integration. Facebook representative for all enterprises (5)
Instant response behavior	Only one enterprise has attempted to serve in Internet, others by phone. No delay times defined.	Response delay can't be longer than 24 hours, preferably 2-4 hrs. Responses preferably in written form by email or CRM -system	Change of attitudes. Centralized system makes it possible, but changes of personnel's capacity building must be done. IOIS is a base of this system (2)
Making websites more user-friendly	Four out of ten enterprises has used web pages; user friendliness has paid no attention.	Having user friendly IOIS with simple and unified tourism product pricing is crucial factor of co-opetition	Web pages must be done for majority of enterprises. Service prizing must be unified. IOIS is seen as answer for lack of visibility (5)

Table 2/2: *Performance gaps and their root causes*

Information	Resources	Incentives	Knowledge/skill	Capacity	Motives
1. Direct interaction and information exchange with consumers					
Lack of personal info of consumers	Only owner or manager is active	Personnel are not incentivized. Systematical assessment of performance	ICT -skills are undeveloped		
Tourism product is undefined or based in ad hoc improvisations	No platform for systemic information exchange, made by phone	Benefits for enterprise are not clearly identified	Business skills and attitudes for international tourism business need to improve	Capacity building in all levels for personnel needs to be systematized.	Motivation needs to be improved by measuring and benchmarking the results
2. Consumer segmentation and marketing					
Consumer info is not collected systematically	Lack of platform for systematical collection and sharing of consumer info	The value of segmentation is not fully understood by enterprises	ICT skills are not in adequate level	Capacity building in all levels for personnel needs to be systematized.	Motivation needs to be improved by measuring and benchmarking the results
3. Adaptation of special groups of customers					
No information for special groups	Special groups needs are not taken account in tourism products and infrastructure	The value of special groups as consumers is not fully understood	No skills to attend special groups	Capacity building in all levels for personnel needs to be systematized.	Motivation needs to be improved by measuring and benchmarking the results
Special groups are not considered as customers	Improvements of infrastructure and tours organization		Attitude change towards special groups as consumers	Attitude change towards special groups as consumers	Creation of special products for special groups
4. New interaction channels with customers					
Social media is not commercially utilized	Internet connection makes possible the usage of social media solutions	The value of social media interaction needs to be underlined	Social media importance as a channel of commercial information sharing is not fully understood	Capacity of use of social media exists but need to be improved	Change from personal use to professional use

Table 3/2*: Ranking and selection of performance improvement solutions*

COST	BENEFIT	OTHER CRITERIA
1. Direct interaction and information exchange with consumers		
Systematic consumer information collection	Enables product customization and personal product design.	Easy to provide as individual IOIS - component
Virtual travel community for Pearl Lagoon tourism consumers	Enables sustainable commercialization and information sharing with consumers cost-efficiently	Easy to provide as IOIS - component
Online reservation and payment system	Creates direct income for the enterprise and gives to consumer a chance of own travel design process	Easy to provide as IOIS - component
Consumer feedback system	Improves to make better tourism products	Easy to provide as IOIS component, needs investments of human resources
2. Consumer segmentation and marketing		
Consumer segmentation system as part of IOIS, by language, origin and special needs	Provides cost-efficient information exchange and commercialization -such as Newsletters for specific customer groups	Needs change in business processes of enterprises, strategic change towards co-opetition
3. Adaptation of special groups of customers		
Products for Children	Creates new consumer group but not economically desirable	In IOIS possibility to use games and other info in order to attract families
Senior citizen tourism products	Creates a willing to pay - consumer group	Needs improvements in infrastructure and in basic business processes
4. New interaction channels with customers		
Face-book and twitter integrations	Resource allocation: Who takes responsibility to be accessible 24/7	Easy to provide as IOIS-component but lacks human resources
Instant response behavior in IOIS	Needs at change of attitudes, but creates consumer satisfaction and trust	Easy to provide as own IOIS – component, but needs to improve human resources

ANNEX 3:

IOIS AND STRATEGIC CHANGES IN INDUSTRY FUNCTIONS -DATA TABLES

Table 1/3: *Performance gaps of tourism industry functions and business processes*

INDUSTRY FUNCTION	ACTUAL PERFORMANCE	DESIRED PERFORMANCE	PERFORMANCE GAP AND IMPORTANCE
1. MANAGEMENT PERSPECTIVE			
Improve knowledge of managers and operating personnel about ICT usage.	First steps taken. Not systematic approach but ad hoc interest	Systematic capacity building for ICT usage and eTourism service production	Design and implementation program for improve of ICT usage
Incorporate ICTs into enterprises efforts to improve service quality	Not yet started, but need is identified	IOIS as a corner stone of standards of service quality	Design of shared concept of service quality and IOIS as a platform
Develop regional Internet web site when the competitiveness of a tourism destination is evaluated	No regional tourism destination web-page created yet. Early stage initiatives	Operational an up to date tourism service web page of Pearl lagoon basin	Not considered as a goal of IOIS, but importance is identified and recognized
Outsourcing functions of eTourism services	E-tourism services are not created yet. Outsourcing is not actual but considerable option	E-tourism services can be managed by individual enterprise inside the regional tourism network	One of the enterprises in the regional network will be the hub of e-Tourism services
Rivalry among existing competitors	Actually competition is rule and in some cases it increases to the level of rivalry	Co-opetition among enterprises, rivalry can be avoided by contracts and strict organizational standards and rules	IOIS must support Co-opetition instead of competition

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2. CONSUMER PERSPECTIVE			
Consumers can build their tourism experience by bundling their products dynamically	Not available, but need is identified	Base of tourism services, consumer makes own package and it is delivered by different enterprises in co-opetition	Design of IOIS-based platform for product bundling
Special offers for selected consumers	Not available yet	Frequent special offers for selected groups	Identification of target groups and design of special offers
Tourism services – more choice and enhanced ability for consumers to make direct comparison	Comparison made by "jungle drum" and telephone	Comparison made between regions, not tourism products inside the own region	Coopetition based regional tourism services and their marketing
Depth of the available information	Very shallow	Up to date and of high quality	IOIS as a edutainment for customers
Dynamical package of individualized products by combining different travel products (accommodation, transportation etc.)	Occur in special occasions but not frequently	Base of tourism services, consumer makes own package and it is delivered by different enterprises in co-opetition	Design of IOIS-based platform for product bundling for consumers not only in hotels, but other stakeholders, too
3.MARKETING AND DISTRIBUTION -FUNCTION			
Develop Hotels shared knowledge base to improve their management and marketing functions	Identified but not done	Systematic marketing processes and management procedures based on shared knowledge-base	strategic decision, IOIS as a base of standardization of management procedures
Tourism enterprises direct dialogue with consumers	Only by phone, new consumers are not reached	Systematic IOIS-based system for dialogue and information sharing	Design of IOIS for support direct dialogue and info sharing

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Promotional activities	No promotional activities	Periodical promotions for special consumer sequences	Design of e-newsletters and systematic promotions for active consumers
Web marketing as mainstream of all marketing	No ability among the enterprises, but need is identified	IOIS-based active web-enabled marketing processes	Design of web marketing programs and inclusion to IOIS
Create themes or routes through the destination	Some routes are created but they are in initial stage. No marketing	Set of prepared tourism routes for different consumer segments, with proper web marking	strategic decision, IOIS offers a platform to marketing tourism routes
mass-customization of tourism products	Tourism product packages are made but not fully in use	Shared and integrated tourism product packages among enterprises	IOIS provide platform for product packages and their distribution
target niche markets of significant size in different geographical locations	University tourism is in initial level, but lack of identification and segmentation of consumer groups	Targeted marketing and products for special consumer segments	Design of segmentation and definition of target groups. Identification of niche markets. Product design
enhancing the total quality of the final product (fitness to purpose).	Not payed actively attention	Frequent measuring and improvement system for enterprises	Design of measurements of performance inside IOIS
4. DISTRIBUTION OF TOURISM PRODUCT THROUGH WIDE RANGE OF CHANNELS			
organizations had to reinforce their brands online and offline	No common brand, but some individual branding efforts have been made	Common brand for Pearl Lagoon tourism	strategic decision, co-opetition among enterprises and use of IOIS (technological innovation)
re-evaluate all partnerships and value chains.	Value chains are undefined	Definition of value chains and partnerships of enterprises	strategic re-evaluation of enterprises value chains and partnerships

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5. TOURISM ORIENTED E-LEARNING			
Tourism educators use Virtual Learning Environments (VLEs)	No active participation in educational efforts	Systematic capacity building system for managers and personnel	Motivate and incentivize participation in e-learning of tourism
Use of Internet for publishing and disseminating learning materials for personnel	Not available yet	Standard material available for different communities of practice (such as guides, chefs etc.)	IOIS design as a learning environment, capacity building for personnel to use of e-learning
Customized learning to the needs of individual learners.	Not available yet	With the time	Not in managers scope
e-learning aims at the personalization of online instructions	Not available yet	With the time	Not in managers scope
E-learning integrated into training strategy along with other methods of delivering training.	Not available yet	E-lerarning is essential part of capacity building	Construction of personnel training programs and virtual learning environment for tourism enterprises
E-learning material for visitors about cultural issues and environment	In one web page of hotel there is some culture related and nature related e learning material	Pearl lagoons cultural background is presented in e-learning platform for visitors	Design of edutainment platform for consumers. Systematic collection of cultural and nature information of region

Table 2/3: *Root causes of performance gaps* in industry functions

Information	Resources	Incentives	Knowledge/ skills	Capacity	Motives
1. MANAGEMENT PERSPECTIVE					
Co-opetition in tourism products design and delivery	Resources exist, but re-evaluation required	Knowledge is reduced but willingness to learn		Capacity building and mentoring leads to negotiations	Seen as a tool for visibility and improvement of quality of services
design and implementation of tourism IOIS-platform	Need to outsource no own resources	No skills or knowledge among enterprises		Capacity building need to effective use	Seen as a base of future business processes
2. CUSTOMER PERSPECTIVE					
consumers can build their tourism experience by bundling their products dynamically	No practical tools or environment use of IOIS when implemented	Expectation to modernize services,	Customers have skills, but enterprises need capacity building		Basis of customer behavior in future, seen as attraction for new segments of consumers
make direct comparison between tourism services, enterprises and regions	No practical tool or environment use of IOIS when implemented	Expectation to modernize services, trust and credibility	Enterprises need to improve their skills	Capacity is reduced, need to re-organize business processes	Basis of customer behavior in the future, competitiveness?
3.MARKETING AND DISTRIBUTION -FUNCTION					
systematic marketing processes and management procedures based on shared knowledge-base	No practical tool available, use of IOIS when implemented		Marketing is not systematical, shared knowledge - base needs to be designed		Basis of marketing behavior in the future, improves tourism visibility and service quality
Themes or routes through the destination.	Reduced resources		Reduced skills, knowledge exists	Capacity to fulfill consumer demands exists	Basis of marketing behavior in the future

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Targeted marketing and products for special consumer segments	use of IOIS when implemented		No consumer segmentation and no targeted marketing		Basis of marketing behavior in the future, attraction for consumer groups
4. TOURISM ORIENTED E-LEARNING					
Capacity building system for managers and personnel	No recourses dedicated, use of IOIS when implemented	Participation as a part of personnel performance during working time	Knowledge exists, but need to reorganize business processes		Seen as a way to improve quality of service and business processes and procedures
Edutainment platform for consumers	Some resources identified, use of IOIS when implemented		Knowledge exists, but need to reorganize	Co-operation with universities and education institutions	Seen as a attraction for new consumer segments

Table 3/3: *Solutions for tourism organizations performance gaps in industry functions*

COST	BENEFIT	OTHER CRITERIA
1. MANAGEMENT PERSPECTIVE		
Co-opetition in tourism products design and delivery	Visibility, large variety of tourism products, new customers groups, better quality of service	strategic decision, support of implementation of IOIS
Design and implementation of tourism IOIS-platform	Base of co-opetition strategy, base of multiple business processes.	Outsourcing process?
2. CUSTOMER PERSPECTIVE		
Consumers can build their tourism experience by bundling their products dynamically	Better services and new consumers	IOIS -module, electronic market place for tourism products
Make direct comparison between tourism services, enterprises and regions	New consumer groups and international visibility	No IOIS module needed, but information sharing of prices and services
3. MARKETING AND DISTRIBUTION -FUNCTION		
Systematic marketing processes and management procedures based on shared knowledge-base	Larger scale of tourism products and marketing information of consumers	Shared knowledge base is easy to create using IOIS
Themes or routes through the destination.	Better bundling of individual products	Component of IOIS
4. TOURISM ORIENTED E-LEARNING		
Capacity building system for managers and personnel	Improving quality of services and personnel satisfaction	Component of IOIS, but needs to consider material and info production
Edutainment platform for consumers	Improving information sharing with consumers and consumer satisfaction	Easy to collect info in IOIS, but production needs cooperation with universities

ANNEX 4:

IOIS AND TECHNOLOGICAL INNOVATION – DATA TABLES

Table 1/4: *Performance gaps in use of technological innovations*

TECHNOLOGICAL INNOVATIONS	ACTUAL PERFORMANCE	DESIRED PERFORMANCE	PERFORMANCE GAP AND IMPORTANCE
1. STRATEGIC BASIS OF IOIS IN TOURISM ENTERPRISES			
Info-structure" supports the entire range of internal and external communications and processes	Enterprises do not possess significant info-structure.	Idea is taken positively and creation of shared info-structure is marked as a cornerstone of shared vision	Info-structure must be designed and implemented as a technological innovation and strategic and operational decision making tool designed (5)
Building interoperability of enterprises	Interoperability is ad hoc basis and made by phone	Systematic interoperability based on shared IOIS and common tourism products	Technological innovation and strategic decision making processes (5)
Electronic market place: environments, contractual features and a set of institutional rules	Enterprises possess none	Shared market environments shared contracts and institutional rules as a base of business	Technological innovation and strategic decision making processes (5)
2. MULTIMEDIA AS A KEY AREA			
Animations or video clips of destinations	Actually very poor performance, only one of hotels possess this	Video presentations of all tourism products and facilities	Technological innovation and strategic decision making processes (5)
Simulation of real visits and virtual experience for visitors	Actually only one of the enterprises has virtual jungle simulation	Virtual trips design for all tourism products	(5)
Visualized tourism information from digital maps with aerial and satellite images	Actually only one of the enterprises has digital maps and satellite images of the region in use	Visualized tourism information of all enterprises and Pearl lagoon areas features	(5)
Tourist attractions can be presented dynamically by virtual characters in real time	Real time services don't exists (such as web-cams or similar	Usability not understood by hotel managers	(2)

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3 OTHER TECHNOLOGICAL INNOVATIONS IN ETOURISM			
Websites include option of telepresence	No telepresence, Skype is used for communication	Not common understanding by hotel managers	"Maybe in the future"(2)
Automated call center agent for hotels	No automated call centers	Not common understanding by hotel managers	"Maybe in the future" (1)
Customer personal profiles with special needs,			"Maybe in the future"(1)
Location based services (LBS).	2.0 services are not in common use	Hotel managers can imagine the usage, but not much motivation for implementation	"Maybe in the future"(2)
Stationary hot-spots for hotels and customers	Hot spots for consumers in two of the hotels, no services based on hot spots	Every hotel and tourism enterprise may provide hot-spot for its consumers and personnel.	Technological innovation and strategic decision making processes (5)

Table 2/4: *Root causes of performance gaps in use of technological innovations*

Information	Resources	Incentives	Knowledge/ skills	Capacity	Motives
1. STRATEGIC BASIS OF IOIS IN TOURISM ENTERPRISES					
Not too much information and understanding, but high hopes	Actually none, but readiness to invest by hotels	Corner stone for future business processes	Mostly very low level of knowledge – need to training and capacity building	Technological, and strategic capacity building needed	Better tourism services, more clients, more income for enterprises
2. MULTIMEDIA AS A KEY AREA					
Not too much information and understanding, but high hopes	Actually none, but readiness to invest by hotels	Corner stone for marketing processes	Mostly very low level of knowledge – need to training and capacity building	Technological, and strategic capacity building needed	Better tourism services, more clients, more income for enterprises
3 OTHER TECHNOLOGICAL INNOVATIONS IN E-TOURISM					
Not too much information and understanding, not considered important	Very often not considered important by hotel managers		Very low level of knowledge and skills even to estimate usability and benefits	Practically no capacity to utilize innovations	Far in the future
Hot spots for hotel consumers as only exception	Actually two of the enterprises has already hot spots, readiness for investment	None	Mostly very low level of knowledge – need to training and capacity building	Capacity building for personnel needed	More attractive and modern hotel environment for consumers

Table 3/4: *Solutions for performance gaps in use of technological innovations*

COST	BENEFIT	OTHER CRITERIA
1. STRATEGIC BASIS OF IOIS IN TOURISM ENTERPRISES		
Design, implementation and use of IOIS	Base for variety of business processes	Once investment is in full use, may provide larger incomes for tourism enterprises
Electronic market areas create high hopes for hotel managers. (both tourism products and as distribution channel of local products)	Base for use of co-opetition strategy	International visibility, Better standard of quality, attractive to consumers. Trust and confidence.
2. MULTIMEDIA AS A KEY AREA		
Not too much understanding, but high hopes are expressed	E-learning and edutainment for consumers and personnel	Virtual trips create trust and confidence. Information sharing is easier when consumer is more aware about the destiny
	Attraction for new consumer groups	University tourism, community edutainment, cultural rescue and documentation sharing
3 OTHER TECHNOLOGICAL INNOVATIONS IN E-TOURISM		
Hotel provides hot spots for consumers and personnel	Attraction for consumers, practical tool for personnel	Base of e-Tourism era service production. Standardization of Internet- cafe services
Newer technologies and innovations still too far ahead, no interest or motivation shown by hotel managers		