Jaremen, Daria Elżbieta

Article

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Provided in Cooperation with:
Czech journal of social sciences, business and economics

Reference: Jaremen, Daria Elżbieta (2016). Advantages from ICTS usage in hotel industry.

This Version is available at:
http://hdl.handle.net/11159/637

ADVANTAGES FROM ICT USAGE IN HOTEL INDUSTRY

Daria Elżbieta Jaremen
Wrocław University of Economics

Abstract

This paper discusses the usage of information and communication technologies (ICT in the hospitality sector. A particular attention is paid to the ICT application benefits for hotel enterprises. The paper focuses on the hotel industry in one of the most popular tourist destination in Poland – Karkonosze and Izery Mountains.
Our findings show that the majority of interviewed hotels apply ICT. Their managers are deeply aware of the ICT implementation importance for the development of hotel industry. The most often noticed advantage from ICT usage is improving service quality and speed. Even though, the level of ICT usage is not as high as expected. It becomes apparent that ICT implementation encounters numerous barriers, among which the major one is the capital intensity of ICT solutions.

Introduction

The tourism is an information-intensive industry (Cox et al., 2009) with a quite long value chain (Stiakakis and Georgiadis, 2011), in which information plays irrefutably important role. Creating, seeking, storing, retrieving and transfer of information is core activity of all tourism enterprises. The tourism economy in present world is driven by information technology (IT) and telecommunications. All of the tourism companies such as tour operators, travel agencies, rental agencies, cruisers, and hotels undergo the growing impact of this which is commonly known as information and communication technology (ICT). ICT (ICT notion is more popular in Europe, than in USA, where the term IT is more often used) is often considered an extended synonym for information technology (IT). Majority of innovations in information technology sector can be changing the way in which hotel and other tourist companies conduct their business. These changes are also forced by the tourists' behavior which also transform under the influence of information technology. The tourist service buying process bases on information gathering through many different channels, such as travel agency, brochures, word-of-mouth and today more and more important websites of tourist service suppliers. The consumer decision making process in tourism transforms into online decision making process and direct service booking becomes possible.

The application of information technologies in tourism, first in airline industry (the service booking system – Sabre) revolutionizes at present hospitality sector. ICT has considerably changed the role of each player in the value-creation process on the tourism and hotel market.

Evidence indicates that an effective application of information technology has turned out crucial for the competitiveness and prosperity of tourism enterprises, since it has influenced their ability to differentiate their offerings, as well as their production and delivery costs (Soteriades et al., 2004).

ICT application in tourism economy supports efficient functioning of enterprises, since it speeds up management procedures and upgrades both efficiency and quality of economic operations performed in an enterprise. The introduction of modern information technologies allows for taking better advantage of the resources at the disposal of a tourist enterprise, whereas their fast development imposes the need for reorganizing enterprises and making investments.

Insufficient adoption of information and communication technologies is considered as a barrier in providing equal opportunities for commercial activities: people and businesses without access to the Internet and the related technologies are incapable of benefiting from e-services provided and could be gradually driven out of competition from global markets (Pimenidis and Georgiadis, 2006; Strielkowski et al., 2012).

The presented paper discusses the theoretical framework of information and communication technology and the interactions between ICT and hotel industry. The research procedure consisted five steps: (1) literature review, (2) selection of the hotels (research sample), (3) standardized interview technique assisted by a questionnaire, (4) collecting substantial qualitative and quantitative data, (5) data analysis using an arithmetic mean, the median, the dominant and the percentage of structure index.

ICT(s): a theoretical context

The term of ICT appeared as the consequence of information technology development and refers primarily to the application of computers and the Internet in transferring information at long distance (Unwin, 2009).

In our genealogic investigation, we recognized several definitions of ICT (Table 1).

Table 1: Definitions of IT and ICT

Definition	Metaphor
IT as the collective term referring to the most recent developments in the mode (electronic) and the mechanisms (computers and communication technologies) used for the acquisition, processing analysis, storage, retrieval, dissemination and application of information (Poon, 1993).	Electronic mode and mechanism used for handling of information
IT as 'the group of technologies revolutionizing the handling of information' which embodies the convergence of interest between electronics, computing and communication (Drew & Foster, 1994).	Group of technologies used for handling of information
ICTs include electronic networks (complex hardware and software) linked by a vast array of technical protocols (Mansell & Silverstone, 1996).	Electronic networks used for handling of information
ICTs encompass all those technologies that enable the handling of information and facilitate different forms of communication among human actors, between human beings and electronic systems, and among electronic systems. These technologies can be subdivided into: capturing technologies, storage technologies, processing technologies, communications technologies, display technologies. Nowadays digitalization remains the common feature of these ICTs (Hamelink, 1997).	All technologies used for handling of information
ICTs as electronic means for capturing, processing, storing and disseminating information (Duncombe & Heeks, 1999).	Electronic means used for handling of information
ICTs cover the Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centers, commercial information providers, network-based information services and other related information and communication activities (United Nations Economic Commission for Africa	Equipment and services for handling of information

(1999).	
ICTs as referring to technologies that can process different kinds of information (voice, video, audio, text and data) and facilitate different forms of communications among humans, humans and information systems, and among information systems. They are used for capturing, storing, processing, sharing, displaying, protecting and managing information (Chowdhury, 2000).	Technologies used for handling of information
ICT represents the technology required for information processing and transfer: innovative tools which form an integrated system of software and networked equipment that facilitates data processing, information sharing, communication, searching and selecting from the existing range of products and services used for an organization's benefit. It is an umbrella term which refers to any product that stores, retrieves, manipulates, transmits and receives digital data and how these various applications work with each other (Buhalis, 2003).	Technologies used for handling of information
ICT means the entire spectrum of technologies designed to access, process and transmit information in relation to text, sound, data and pictures. ICT covers the whole range from traditional, widely used devices such as radios, telephones or television to more sophisticated tools like computers or the Internet (Weigel, 2004)	Spectrum of technologies used for handling of information
ICT (information and communications technology – or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning (http://www.techtarget.com/contributor/Margaret-Rouse/2005).	A communication device or application used for handling of information
A branch of engineering dealing with the use of computers and telecommunications equipment to store, retrieve, transmit and manipulate data. (Daintith, 2009).	A branch of engineering
ICT as a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information. Thus, ICT refers to the forms of technology that are used to transmit, store, create, display and exchange information by electronic means [Badnjevic & Padukova, 2006, Mahajan et al., 2011].	Set of technological tools and resources used for handling of information
ICT as an approach which involves all types of knowledge employed in order to craft, store, transact and retrieve information in all forms. ICT engages computer-related technologies capable of communication, processing and transmission of information in an electronic way (Osman, 2005).	All types of knowledge employed in handling of information
ICT as an umbrella term for all of the various media employed in communicating information, e.g. computers, the Internet, television broadcast and even printed and handwritten notes (Chandler & Munday, 2011).	All of the various media employed in handling of information
ICT is the digital processing and utilisation of information by the use of electronic computers. It comprises the storage, retrieval, conversion and transmission of information. (Ifueko Omoigui Okauru, 2011)	Digital processing and utilisation of information
ICT covers all forms of computer and communications equipment and software used to create, design, store, transmit, interpret and manipulate information in its various formats. Personal computers, laptops, tablets, mobile phones, transport systems, televisions, and network technologies are just some examples of the diverse array of ICT tools (http://www.uq.edu.au/ICT/what-is-ICT , 2012)	All forms of computer and communications equipment and software (used for handling of information)

Source: Own compilations.

These terms often frame ICT as an technology used for generating, storage, retrieval, conversion and transfer of information in a digital or electronic way. Some of ICT definitions are not restricted to computers and also cover other information distribution technologies, such as television, telephones and other telecommunication equipment (telephones, cameras etc.). One should, however, notice that currently ICT is more often associated with digital solutions rather than traditional information transfer technologies (e.g. radio, TV or snail mail). It takes place due to the rapidly advancing digitalization of the so far analogue data transfer.· Sometimes it happens that in order to distinguish the traditional information technologies from ICT based on computer or the Internet, the latter are referred to as the new

information-communication technologies. One should also expect the evolution of ICT definition, which results from an ongoing and exceptionally fast development of new concepts, methods, solutions and facilities supporting data processing and transfer.

The definitions above are not very different each other. In general, the definitions share a similar explanation. Information is processed and transmitted with the use of computers and telecommunications equipment (tablets, mobile phones, printers, radios, etc.). In conclusion, nowadays ICT as a general term means all forms of computer and communication tool as well as software supporting the process aimed at creating, modifying, storage, transmission of information in various formats.

Benefits of ICT' application in hotel industry

The advantages resulting from ICT application in travel and tourism sector have been confirmed by an extensive number of studies, referring e.g. to the obliteration of traditional barriers, such as time and geographical limitations, which are overcome by using the Internet in searching for information and purchasing tourist services on-line (Buhalis and Main, 1998). Thanks to ICT the impact of online reviews (an electronic form of word-of-mouth - eWOM) on hotel consumer behavior among hotel selection factors can be bigger. ICTs enable two-way communication between the hotel industry and consumers, so they have a growing impact on hotel promotion and sales (Buhalis and Jun, 2011; Jenčková and Abrhám, 2015). Hotel services are better advertised via the Internet rather than published brochures, leaflets, or catalogs. Multimedia message is more attractive to customers. ICTs allow also to recognize consumers' profiles and offer personalized services.

Many of researchers consider advantages associated with new information and communication technology to include reduction of operational costs for business, convenience for consumers, and rapid speed of transactions (Parsons and Oja, 2013; or Abrhám et al., 2015). It enables spreading the marketing message rapidly at a minimum cost. The use of ICT results in a significant cut on transaction costs for hospitality sector enterprises and eliminates the geographical barriers created by distance (through accumulating, processing and distributing proper data), which were necessary to control business processes and, in that sense, the healthy development of a company (Buhalis and Law, 2008; Minghetti and Buhalis, 2009; Ma, Buhalis and Song, 2003). Information and communication technologies offer a wide spectrum of solutions influencing the increased efficiency level of economic processes in the area of marketing and sales.

ICT usage supports efficient functioning of enterprises, since it speeds up management procedures and upgrades both efficiency and quality of economic operations performed in an enterprise. The introduction of modern information technologies allows for taking better advantage of the resources at the disposal of a hotel enterprise, whereas their fast development imposes the need for reorganizing enterprises and making investments. In the opinion of M. Porter major advantage of ICT is establishing more effective connections between diverse processes and supply chain links by offering easy access, in real time, to data processed in the particular chain components (Porter, 2001). Information technologies influence the efficiency of particular economic processes, alter the nature of connections between the chain links and ultimately open new possibilities for meeting customers' needs, both in terms of the product and the price (representing the customer's expense), exchange (responsible for the purchase convenience) or promotion (constituting the form of an enterprise communication with the market and the method for supplying information to consumers) (Kotler, 2005). Therefore, e-technologies are important in improving the product form usefulness, as well as place and time of its purchase. ICT adaption supports the value creation processes through the merchandising solution based on Dynamic Packaging Tool. This solution offers to hotel

customer an opportunity to design their tourist product (e.g. hotel service package) in accordance with their individual preferences. Dynamic packaging is based on an individual consumer request, including the ability to combine multiple components like staying time, type of hotel room, special wants associated with facilities in room, special food needs and any other hotel related component in the real and extremely short time (5-15 seconds), and provides a single, fully priced package, requiring only one payment from the consumer and hiding the pricing of individual components (Schmeing, Cardoso and Femandes, 2006).

For contemporary customers, the Internet is becoming an increasingly important source of knowledge about a product, the enterprises which do not provide any information about their offer on the virtual market (value in the form of information) lose their competitive position quickly. The development of the Internet, as the means of communication opened opportunities as a result of which the message provided by advertising gained new functionality and hence attractiveness, which, in consequence, equals effectiveness (Fedorowicz, 2009).

The new information and communication technology has measurable impact on hotel productivity, employee satisfaction, service quality and innovation. So, they provide greater competitive advantage into hotel enterprises. Within corporate environment, characterized by an increasing competition, ICT makes an impression of the crucial factor responsible for permanent competitive advantage and a powerful defensive mechanism for a corporation (Buhalis and Deimezi, 2003; Buhalis, Leung and Law, 2011; Buhalis and Kaldis, 2008; Strielkowski, 2012). The ICT-based competitive advantages can be achieved by hospitality companies through unique viral marketing campaigns, maintaining effective communication with various organizational stakeholders and in a number of other ways (Michalić, Praničević and Arnerić, 2015).

The subject literature argues that tourism cannot develop without the support of ICT [inter alia Buhalis, 1998; Yuan, Gretzel and Fesenmaier, 2006). ICTs bring in the new potential for hotel business competitiveness. They also provide both opportunities and challenges for the entire hotel companies.

Methodology and results

The study focuses on hotels (i.e. commercial establishments providing lodging, meals and other guest services, and offering no less than 10 bedrooms, the most of which are single or double) located in one of the most popular attractive ski and tourist destinations in Poland – Karkonosze and Izery Mountains. Among 61 chosen for research units 40 represent 3-star hotels, 9 – 4-star, 8 – 2-star and 1 – 1-star facility (the hotels in Poland are classified according to their standards into five categories from 1* to 5*). All of them represent small and medium enterprises (empolying no more than 249 people). They were situated in nine localities, i.e.: Jelenia Góra (12), Karpacz (18), Szklarska Poręba (12), Świeradów-Zdrój (9), Podgórzyn (4), Mysłakowice (2), Piechowice (2), Kowary (1) and Stara Kamienica (1). In the process of selecting the entities for research purposes the following sampling criteria were used: (a) operational time – opened all year-round, (b) availability – currently opened, (c) localization, (d) standards and (e) consent (agreement) for research. The researcher planned to cover all 61 hotels in Karkonosze Mountains. Ultimately the owners or managers of 28 hotels agreed to participate in the research and were interviewed. The response rate was quite high almost 50%. In the end, the sample characterized by following features:

1) the hotel category: five 4-star hotels, seventeen 3-stars hotels, four 2-stars hotels and two units during the classification process,

2) the number of employee: eleven hotels (employs to 10 people), six hotels (11-30 people), eight hotels (31-49 people) and 3 units (more than 49 employees),
3) the number of rooms: six hotels (10-20 rooms), seven hotels (21-50 rooms), ten hotels (51-100 rooms) and five units (more than 100 rooms),
4) the locations: five hotels in Jelenia Góra, ten hotels in Karpacz, seven hotels in Szklarska Poręba, three in Świeradów Zdrój and three in other location.

The primary research was conducted using standardized in-depth and semi-structured open-ended interviews. The questionnaire consisted of 9 essential and 5 metrics questions. The research focused on the identification of researched hotel managers' and owners' opinions regarding the following issues:

1) the awareness of power and the importance of ICT impact on hotel business and its innovation level (graph 1 i 3).
2) the awareness of the importance of ICT among clients' expectations (graph 2).
3) the importance of ICT in exerting impact by the analyzed hotels on the value for customers and ICT share in innovations they implement (graph 4 i 5).
4) the level of ICT application in the analyzed hotels (tab. 6).
5) advantages related to ICT use by the analyzed hotels (tab. 2).

The majority of interviewed managers and owners of hotels declared that ICTs have great impact on running a business in tourism sector (graph 1). More than 25% of total respondents fully agreed (14,3%) or agreed (10,7%) with the above statement (20% of the fully agreed respondents represented 4*, 20% of them − hotels with over 100 rooms and 33% − chain hotels). In case this question median and dominant value was the response "I tend to agree".

**Graph 1**: ICT impact on our business is very big
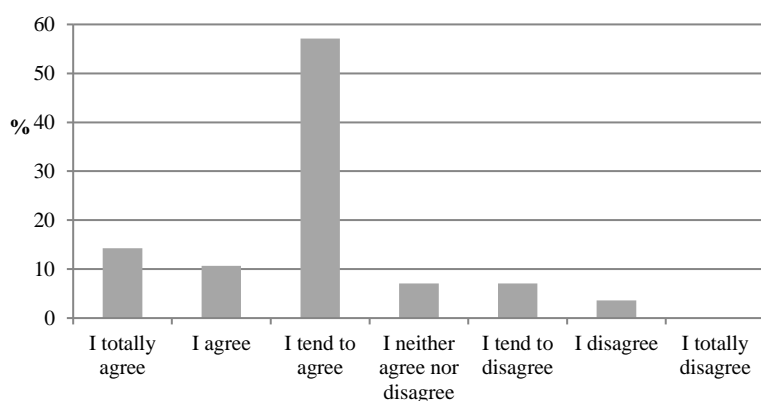
Source: Own calculation based on interview answers.

In opinion above 46% of all researched people customers expect ICTs application by hotel companies (graph 2), but almost 43% of all respondents did not have any opinion about client expectations (median and dominant value was the response "*I neither agree nor disagree*"). This answer was the predominant one in case of 4* hotels (60% of 4* hotels) with over 100 rooms (60%) at their disposal. In case of chain hotels, the dominant (D) and median value (M) was the response "*I agree*".

Graph 2: Our clients expect the application of new ICT technologies
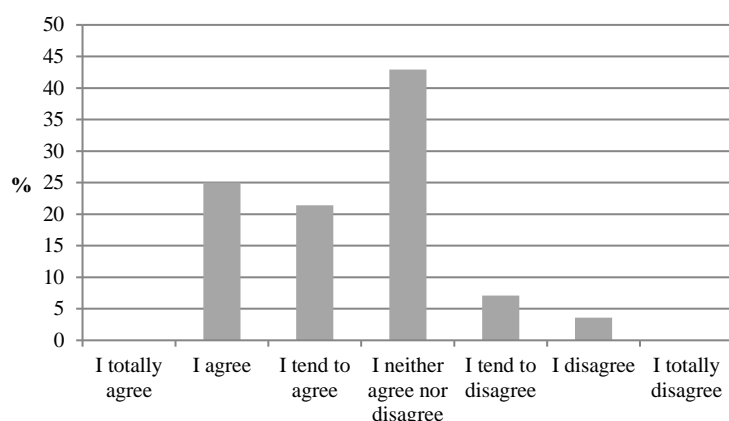
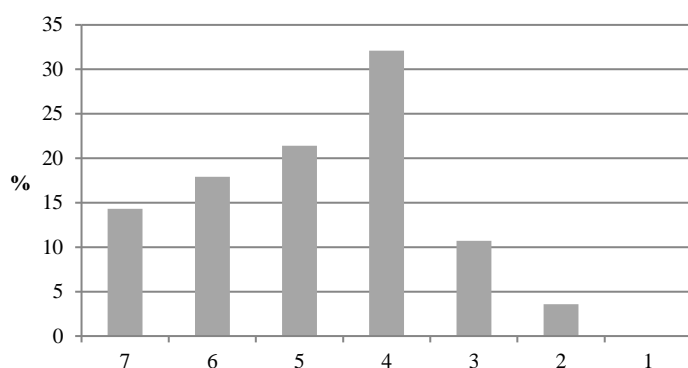**Source:** Own calculation based on interview answers.

Slightly over 46% of all respondents confirmed that the majority of innovations in tourism are based on ICTs (graph 3). Also in this case a relatively large number of respondents (7, i.e. 25%) adopted a neutral position. The dominant value was the response *"I tend to agree"*. 40% managers/owners of 4* hotels, 40% of hotels with over 100 rooms and 67% of chain hotels agreed with the opinion that "*the majority of innovations in tourism are based on ICT application"*.

Graph 3: The majority of innovations in tourism is related to ICT application
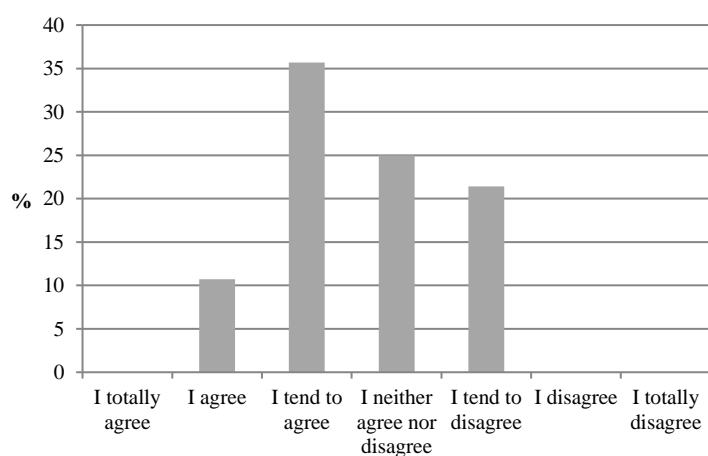
Source: Own calculation based on interview answers.

Majority of all respondents (over 53%) claim that ICTs exert strong impact on establishing value for customers by the company (above 4), with 14,3% respondents for whom this importance is very high (graph 4). The median value was 5 and the dominant was 4. In case of 4* hotels the dominating assessment remains at level 5, 7 – for hotels with over 100 rooms an 6 – in case of chain hotels.
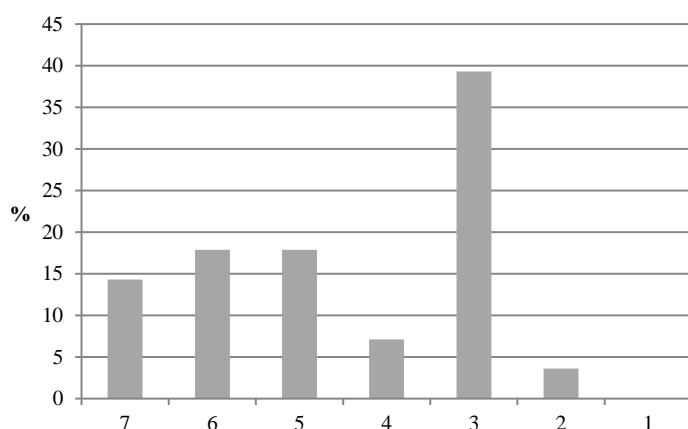
Graph 4: ICT importance in establishing value for a customer by a hotel company

Assessment in the scale from 1 to 7, where 7 refers to very high and 1 very low
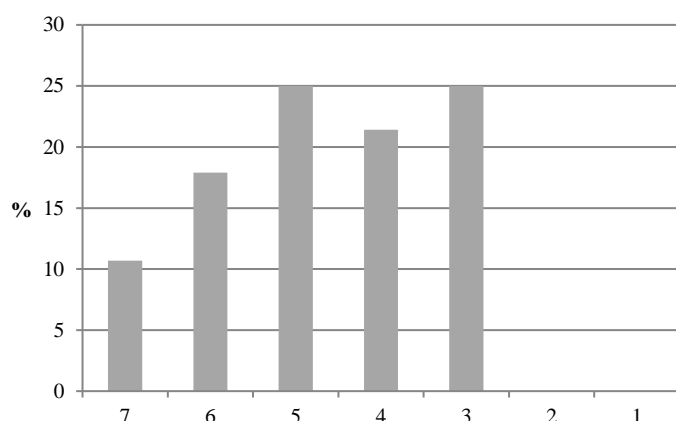**Source:** Own calculation based on interview answers.

Half of the respondents indicate that ICTs are responsible, to a great extent, for innovations implemented in their companies (graph 5). The median equals 4,5, whereas the dominant is 3, which is caused by the fact that almost 40% of all respondents identify rather low impact of ICTs on innovations. In case of 4* hotels this share is evaluated at higher level (M – 6, D – 5 and 6), similarly regarding chain hotels (D and M equal 6).

Graph 5: ICT share in the implemented innovations

Assessment in the scale from 1 to 7, where 7 refers to very high and 1 very low
Source: Own calculation based on interview answers.

In the hotel managers/owners' opinion, the level of ICT implementation advancement in their companies tends to be rather high, high or very high (53,6%, dominant and median values reach the level of 5) (graph 6). This is also the opinion expressed by the representatives of 4* hotels (dominant and median values reach 6), hotels with over 100 rooms (dominant and median values equal 5) and for chain hotels (the median value is 5).

Graph 6: The level of ICT usage in a company

Assessment in the scale from 1 to 7, where 7 refers to very high and 1 very low
Source: Own calculation based on interview answers.

During the interviews the most important benefits of ICTs implementation in hotel companies were recognized. The respondents noticed that ICTs:

- – primarily facilitates service quality and the speed of customer service (in a seven-level scale, where 7 refers to very high importance and 1 very low importance, an average assessment in both cases equals 5,71),
- – increases number of customers (5,36) and customers' satisfaction (5,32),
- – improves hotel image (4,93),
- – reduces business operating costs (4,86),
- – increases income (4,71),
- – gains new market (4,10).

The sequence of advantages for 4* hotels and hotels with over 100 rooms was very similar. The surveyed representatives of hotel companies noticed that the largest advantages of ICT usage is service quality improvement (the respective average values are 6,4 for 4* hotels and 5,2 for hotels with over 100 rooms) and the speed of customer service (6,6 & 5,2), whereas the lowest ones in relation to business operating costs (4,8 & 4,4) and winning new markets (4,6 & 2,8). In chain hotels case the faster service (7,0) came on the top of the advantages rank (just like in case of other hotels), business operating costs reduction (6,7) was ranked the second, while, the last place in the ranking was occupied by the new markets (4,3).

Conclusions

We are the witnesses to the revolution on the tourism and hospitality market by the information and communication technologies and the Internet in particular. ICTs seem to be the most important challenges for hotel industry. Among others (like innovation, co-petition, collaboration with customers) ICT conduct to design of new scientific paradigm of tourism development based on modern e-technologies.
The results of research show the awareness of the importance of ICT usage in hotel industry is quite high. The half of interviewed hotels apply ICT, but the level of ICT usage is limited to websites, online reservations systems (for example HRS), list of accommodation on the municipality website, fan page on social media and front office computer systems. The respondents noticed many advantages and benefits of ICT use in hotel operating and

management process, among them the most often indicated was service quality and speed improvement.

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Information about the author:

Daria Elżbieta Jaremen (daria.jaremen(at)ue.wroc.pl) is Ph.D. at Wrocław University of Economics, Faculty of Economics, Management, and Tourism at Jelenia Góra, Nowowiejska St. 3, 58-500, Jelenia Góra, Poland.

Acknowledgements: