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Emerging Technologies and Their Impact on the Future of the Tourism and Hospitality Industry

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ABSTRACT

The evolution in technology has become a strategic choice to develop every organization and its existence in the future. The tourism industry is not an exception. This study highlights the development of technologies and the impact of their integration in the field of tourism. Furthermore, it discusses their influence on the quality of the touristic products. This study focuses on how the emerging technology can improve the tourism industry and the most usable information systems that are used in this domain. The purposed model has been designed to investigate the effect of adopting the technology among tourism agencies. A sample of 72 tourism agencies in Jordan has been surveyed and discussed by using structural equation modeling. The results reveal that efficiency, productivity, profitability, effectiveness, and marketing are improved after employing new technologies. Therefore, it can be concluded that the integration of technology in tourism is unavoidable for the continued existence of service providers in the market.

KEYWORDS

Computer Reservation Systems, E-Payment, E-Tickets, E-Tourism, Emerging Technology, Tourism Information Systems

1. INTRODUCTION

Nowadays, it is clearly noted the involvement of technology in all aspects of our lives, especially in the commercial and services sectors. Emerging technologies have changed the way of communication among people, and allowed them to communicate in virtual and more socialized way. This technological development has become very effective in the national economy of any country worldwide (Pascali, 2017). The tourism industry is a very important tributary and vital source for the global economy. So, it is considered as one of the most significant factors for economic growth, improves infrastructures and services, and helps diversify the local economy (Rega & Inversini, 2016). The rapid development of Information and Communication Technology (ICT) and its applications has led to a huge upgrade in the tourism industry.

Moreover, the presence of networks and Internet allow completing many business processes like buying, selling and paying money in a safe and fast way which is so-called now as the Electronic Commerce (e-commerce), which means supply, sale and purchase of goods, services and information

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through an electronic system between the producer, supplier, and consumer (Setiawan et al., 2020). Actually, companies which are using e-commerce get many benefits such as marketing becomes more active and widespread, reducing the employment expenses, and communicating effectively with other companies and customers wherever they are (Ikumoro & Jawad, 2019). On the other hand, customers also get benefits from dealing with the companies using the e-commerce, for instance: saving time and effort, protecting products and funds, and getting the freedom to choose the item and the price and to take advantage of competing companies and their offers.

The domain of tourism is a cooperation between many branches and has deep relations with many commercial aspects, such as management, services and facilities, promoting and marketing, security, ICT, and more. Definitely, the adoption of ICT in tourism through providing its products and services would be a key factor for its success. The term "*E-Tourism*", or "*Online Tourism*", as a part of the e-commerce, should implicitly contain virtual entities of whole touristic content, travel agencies, airlines, hospitality, transportation services, operators, tourism related data, tourism market stakeholders and special authorities of organizing the tourism activities (Kazandzhieva & Santana, 2019). For more clarity, e-tourism will reengineer the process of the traditional tourism services providing by redefining the relationship between the organization and all of its stakeholders (Azouri et al., 2016).

The success of e-tourism can be measured by the degree of ease with which individual can find the tourist services electronically without the need to physically visit a tourist services provider (Tfaily, 2018). Access to tourism services has become easier by using the tools of modern technology. You can, from your home or office, move easily through websites which offer tourist services over the Internet and make a convenient decision for booking an airline ticket or a hotel room and even to pay the value of related invoices in an easy and secure way.

The importance of this article lies in that it has identified and explained the main areas of employing the ICT in the tourism industry. This article focused on the most important and effective elements of a technological product to be adopted in tourism, and that its impact can be tangible on the behavior of tourists, in addition to the beneficial effects of its adoption on the producer of the tourism products and the tourists themselves, as well. Moreover, the role of social media in tourism and its impact on the future of technological applications and services that can serve the global tourism and hospitality services.

Thus, this study aimed to answer the following questions: Does the integration of emerging technologies improve the businesses of tourism agencies? Will the failure to keep pace with technology influence the success, and even the existence, of these businesses in the future? Therefore, this study empirically discussed the effect of the integration of ICT on tourism agencies. It proposed and discussed through its research model the effect of technology adoption on the following determinants: efficiency, productivity, profitability, effectiveness, and marketing. The results revealed that the aforementioned determinants are significantly influenced by integrating ICT in tourism agencies and affected their continuity in the domain. This research work is identified as being of importance to all tourism industry stakeholders and researchers in tourism development field for providing them with the necessary background towards the role of technology and its effect on their businesses

2. THE INTEGRATION OF ICT

At the time being, it is clear to perceive the rapid changes and developments in ICT. The increasing number of people who own smart devices leads to increase in the growth of e-commercial applications over the world. The variation in people's interests and their ways to use the technology explains the current massive diversity of online services (Momani, 2021a). The current fierce competition between companies providing touristic services makes the viability of these companies very hard without a continuous evolvement of their marketing tools and strategies (Bethapudi, 2013). By taking into consideration the rapid development in telecommunication and web technologies to keep pace with

the development has become a persistent need. The integration of ICT should be orientated for both operational and strategic management (Momani, 2015). It directly impacts on the competitiveness of these companies and improves the service quality.

The integration of ICT in the area of providing tourism and hospitality services is perceived to be an important source of revenue for companies by allowing an efficient recovery of investments. ICT has been recognized as a key source of innovation, which can generate growth and add value (Momani, 2020; Tfaily, 2018). In the era of digitalization, the digital economy has become the driver of the economy worldwide (Azouri et al., 2016; Rondović et al., 2019). The following sub-sections represent the most important aspects which ICT has been integrated in the domain of tourism and hospitality.

2.1 The Influence of Innovation and ICT

Generally, in services sector, the importance of innovation has long been underestimated. The effect of ICT on innovation and its effectiveness on the development of the tourism has changed the scene, which proves that it is an enabling environment for technology implementation.

The fierce competition prevails the rapidly growing global market. This competitiveness forces companies over the world to pay close and serious attention to innovation in order to gain business benefits by increasing their market-share and breaking into new markets (Rajamohamed, 2016). In the tourism and hospitality industry, innovation can generate superior touristic products, whether in tourism guidance, accommodation, or transportation, or any other touristic services. Innovation is the method of disseminating new ideas in the commercial activity. Innovation could be in presenting or providing new services, or modifying the way of providing a service (Li & Lin, 2021). It could have the ability to change the way of consumers' thinking, decision making, or consumption behavior.

The employment of ICT and the adoption of e-business in the tourism services industry does not only contribute to the e-tourism evolution, but it also creates new providers for these services. Travel recommendation sites (Skyscanner, Expedia, Orbitz, etc.), travelers' reviews (Lonely Planet, TripAdvisor), full travel packages (including flights, accommodation, food, car rental, etc.), economic aviation, all these are examples of the effect of ICT and its contribution in tourism sector in general.

2.1.1 Tourism Information Systems (TIS)

One of the most important examples on the management information systems used in tourism is Tourism Information Systems (TIS). TISs are a very substantial factor in determining the characteristics of tourism which reflect the true image of the real situation of tourism and the impact of it on the economy of any country. TISs are the result of all data related to the tourism sector and its transactions, such as market structure, customer needs, number of tourists entering and leaving the country, the rate of expenditure, the rate of accommodation bookings, the number of touristic facilities, and other data relating to the tourists and tourism product in one single electronic platform (Hughes & Moscardo, 2019).

The process of tourism management depends basically on the touristic information provided, and this would lead to selecting the right decision achieving desired goals from the process of developing and upgrading tourism. Effective knowledge management leads to a more efficient understanding of the current tourism activity situation, and as a result, a more useful application of the TISs (Kulkarni & Bharathi, 2020). As reported by Hallin and Marnburg (2007), knowledge management is especially relevant for building up a competitive advantage by making the best use of knowledge. Therefore, these TISs are utilized to show the importance of knowledge in the process of planning and management of tourism and its marketing, as well (Rajamohamed, 2016).

The stakeholders in tourism and hospitality sector are able to access and process detailed consumers' information by studying the consumers' behaviors and needs, and tracking the changes could happen (Babu & Subramoniam, 2016). This could be happened by employing the Consumer Relationship Management (CRM) database systems in order to manage a company's interaction with

the current and potential customers, and propose some personalized solutions for their individual needs (Maggon & Chaudhry, 2015). One of the most effective information systems which has been used by the tourism companies is the Global Distribution System (GDS). It is a computerized network system that enables transactions of inventory and rates between tourism industry service providers; hotels, airlines, car rental companies, and travel agencies (Borovčanin, 2014).

2.1.2 Online Travel Agencies (OTA)

Recently, a lot of travel agencies have adopted the use of the Internet as a means of tourism marketing. Now, it is easier for any customer to perform all processes like communicating with the agencies concerned and request the desired service in addition to executing payment for that service electronically. Most airline companies furnish the global specialized companies over the world with online reservation systems which allow customers to make their online reservation process easy and flexible (Bezvesilnaya et al., 2020). With this development, the term (e-ticket) has appeared and widely prevailed and has been adopted by many airlines in the world (Wu et al., 2012). The e-ticket is the airline ticket that has been issued in electronic form via a Computer Reservation System (CRS) after completing the online booking process, which is equal in value and use to the regular ticket that is issued by any airline or travel agency. Amadeus, Saber, and Galileo reservation systems are from the widely used GDSs over the world in most travel agencies that perform the online reservation of flight tickets (Vázquez et al., 2016).

Generally, OTAs are companies operating websites that allow consumers to book various travel related services directly via the Internet. They play the role of third party agents reselling trips, hotels, car rental, flights, vacation packages, etc. (Zsarnoczky, 2018). They are online platforms for purchasing travel services and allow them to customize the offered services as well, without any limitations of time and place. Nowadays, several OTAs available on the Internet offers varied trip services worldwide such as: Expedia, Agoda, Priceline, and Orbitz.

2.1.3 Hotel Management Systems (HMS)

The hospitality industry is considered the fastest sector which adopting automation for information processing and management in all operations related to hotel management, such as reservations, payments, ordering food and drinks, staff management attendance, inventory, and audits. (Akazue, 2016). This rapid development has provided the software market with various applications and tools in either online or desktop platforms. HMSs are computerized information systems that contain a comprehensive database of reservations, guests' information, rooms, staff, and services provided by the hotel in order to efficiently manage the hotel assets (Momani, 2012). OPERA, which was developed by MICROS Systems Inc., is one of the leading HMSs and wildly used in modern hotels over the world.

2.1.4 Social Media

The emergence of social media came with the development of the Web 2.0 technology. It gives the social media its real existence. Web 2.0 technology is a dynamic platform that gives users the possibility to control their data. This technique is called as: "user generated content". It is read/write web pages with interactive data (Zimeo et al., 2013). It allows the interaction among users themselves and between them and the website to encourage participation, collaboration, and information sharing, and among users with each other (Beyari & Abareshi, 2016; Mata & Quesada, 2014; Rad & Benyoucef, 2010). Blogs, wikis, and social networks are examples on Web 2.0 (Azouri et al., 2016).

Nowadays, the massive popularity of social networks gives a precious opportunity to tourism industry stakeholders to advertise their services and collect the largest number of followers and audiences. This cheap and popular advertising medium can be the best choice for accommodation services providers. Platforms like Booking.com can compatibly work with social networks by mapping their consumers and provide them with convenient up-to-date offers (Momani et al., 2017).

It is obvious the success of Uber in transportation services and Airbnb in accommodation as examples of community-based services, especially with the increase of the Internet-connected mobile devices and the development in the e-banking and e-payment solutions (Mensah et al., 2021). Thus, it leads to increase the number of travelers around the world.

2.1.5 Geographic Information Systems (GIS)

GIS are widely known as valuable tools and extensively utilized for analyzing, planning, managing, and displaying large volumes of different data relevant to many local and regional planning activities (Nistor & Nicula, 2021). GIS in tourism is used in the analysis and management of tourism through the provision of the necessary maps for touristic sites and the topography of the surrounding in general, in addition to its applications in planning for the under constructing tourism projects (Zheng et al., 2019). It is worth to know that these systems offer many advantages such as: (1) the ability to search for a specific site, like searching for restaurants in the city, or restaurants offering a distinctive dish of food or how to reach the nearest restaurant in the neighborhood, (2) giving the convenient path to be followed either on foot or by car or bus to reach the desired destination (Szark-Eckardt, 2017). Moreover, the modern GISs have benefited from the applications of artificial intelligence (AI) to provide users with an exceptional experience of roaming the touristic sites by employing the technology of virtual reality (VR) and augmented reality (AR). The tourist can perform a 3-dimensional tour with 360 degrees' view of the site while he/she is on their couch. Google Earth/Maps are a pioneering example of this technology.

2.2 Future of Tourism

The rapid development in ICT is significantly influencing on current tourism. While the development in emerging technologies will not stop, its effect on tourism will continue significantly affect and change the way and the method of services' delivery (Januszewska et al., 2015). The following sections represent the most significant aspects which they could influence on the tourism for the near future. These technologies absolutely will make a difference in the tourism services presentation, providing, suppling and delivery.

2.2.1 Cloud Technology

There are several web platforms that utilize the cloud-based technologies to aid consumers to make reservation operations for hotels, flight tickets, car rental, tourist trips, and many other tourist products. Websites such as Skyscanner and Traveloka search among a huge number of flights worldwide to provide the consumer with the best deal. The same for online hotel reservation services, Booking.com and Trivago are examples.

The innovative idea of storing data in a virtual environment "Cloud" and processing it everywhere is starting to attract attention in the world of entrepreneurship. Cloud-based technologies have been embraced by multiple innovative business ideas (Daniel, Durga & Vijila, 2021). In the hospitality sector, HMSs are one of these applications that could be improved by the cloud-based technologies (Gulmez et al., 2015). Several websites offer accommodation services not only for hotels or resorts, even for hostels, students' dormitories, and private furnished apartments in the form of peer-to-peer sharing (Sundararajan, 2014). It is a part of sharing economy, represents the ability or the preference of one to share, borrow, or rent goods, assets, or services rather than buying or owning them. The sharing economy leads to more efficient use of resources of the society. For instance, students' dormitories could be a reasonable accommodation for economic tourism throughout the academic year (Zsarnoczky, 2018). Web platforms like Booking.com and Airbnb are examples of these websites, where the consumers are as partners in business activities.

The benefits of adopting cloud technology by touristic companies could be characterized by many factors, for instance: (1) Efficiency: by avoiding wasting time and resources on technical issues and focusing on innovation and development to the business. (2) Performance: by providing high

speed operations process and secured unlimited storage space for the data related to these operations which led to improving the scalability of the services in future. (3) Cost effectiveness: by reducing the operating infrastructure costs.

2.2.2 Big Data

Big data refers to a huge amount of data sets in which normal computers are unable to view, manage, modify, search, analyze, transfer, or keep them secure. Within this time, organizations and individuals generate a huge amount of data within every single second. The wide spread of portable devices (tablets, mobile phones), emails, instant messaging apps, cloud technology, and social networks are significantly influencing the inflation in the volume of data generated (Babu & Subramoniam, 2016). In data science, this huge data could be texts, images, videos, databases, statistics, reports, maps, and GPS data, etc., from both structured and unstructured data.

In the tourism sector, these big data can be generated from the massive amount of records related to airline ticketing, hotel reservation, tourists check-in points via GPS, their social media posts, tourist statistics done by institutions and organizations concerned with tourism and its economic effect. This miscellaneous data can be more helpful and more effective in decision making if it gets analyzed and classified smartly (Aksoy & Kose, 2020). The application of the artificial intelligence and data analytics concepts and aspects definitely will be the best method. Thus, in the upcoming years, who owns data, own the power for competition in the market. So, the utilization and the adoption for some IT tools and solutions like Hadoop platform for analyzing, storing, and inquiring big data will become a mandatory choice for all tourism organizations and service providers in near future.

2.2.3 Artificial Intelligence (AI)

AI is considered to be one of the most innovative additions to the tourism. It can help in offering some personalized tourist services and products by employing its creative solutions to ensure that the tourist service is provided with regards to the tourist's personal preferences (Wei et al., 2021). Decision Support Systems (DSS) are one of the AI applications. DSS is a package of mathematical operations and computer algorithms with relational databases that allow decision makers in the tourism and hospitality companies and tourists to deal directly with the computer to make useful and influential decisions about the tourism situation or service (Momani, 2021b). These systems aim to improve the effectiveness of the decision making process, such as, the decisions based on the expectations of the volume of rooms' occupancy, or the volume of sales of food and services, in addition to the decisions relating to the tourism services offered to the tourists.

Years ago, consumers' decision making process towards travelling was done by a physical visit to a travel agency, for reviewing their offered programs, and then, taking a decision, either choosing one of their offers or plan to visit some other agencies for reviewing other offers that may be approved by the customer to launch his trip. Nowadays, this process has been wholly different and became shorter. With this massive development in telecommunication services and smart devices, the searching, decision making, ordering, and paying can be completed "*electronically*" within a couple of minutes (Zsarnoczky, 2017). Online travel agencies played a significant role in this domain. Websites like Expedia, Orbitz, Hotels, TripAdvisor have made the decision making process much easier for the consumers.

It is worth mentioned here that the efficiency of the DSS increases the competitiveness among the tourist services providers. For instance, the online booking systems of flight tickets have made this competition harder by the comparability of prices, especially with the rise of the economy airlines. Therefore, the companies that couldn't keep up with the rapid evolution of the industry were forced out of the market (Zsarnoczky, 2017).

One of the most exciting, promising, and constantly improving fields of AI is Robotics. Many experiments over the world have been done to introduce the use of robots in providing tourism and hospitality services. It can be applicable in hotels for room service, concierge services, cleaning

and luggage handling. Within restaurants, robots can play a role in food preparation and catering services. In travel agencies, they can be used to provide information upon request, and in tourism guidance as well. In addition to their important role in airport security. Robots can be used to detect concealed weapons, detect and recognize faces. It is worth to mention here that the brilliant future and promising usage of robots has been manifested clearly during the COVID-19 crisis, while they have actually the potential to reduce the human-to-human contact.

From different perspective, and as one of the most attractive technologies of AI, Virtual Reality (VR) plays a big role in modern tourism. With special glasses, the individual can look "*virtually*" into a tourism destination or a heritage site, and roam around and through. It is a computer generated three-dimensional environment that offer an experience to be part of this virtual environment (Huang et al., 2016).

Augmented Reality (AR) is a different technological solution, where digital elements are projected into a real life space, so it is used to enhance our present/real environment. Unlike VR, which totally transmits the individual from the real environment to a whole new environment, AR only augments the surroundings by adding some type of graphics, sounds, videos, text, etc. For tourism applications, AR can be helpful in presenting all needed information about artifacts in a museum by using smartphone camera, instead of waiting for a guide to explain each and every one (Camps-Ortueta et al., 2021). Therefore, increasing the use of wearable devices for tourism purposes will open the road for a new generation of employing technological mediation in tourism experiences (Tussyadiah et al., 2017).

2.3.4 Alternative Payment Options

Nowadays, global commerce faces a new revolution in the money transactions, transfer, and cash-flow concept. The existence of the cryptocurrency underestimates the role of banknote money. Certainly, the emergence of "Bitcoin" and the other cryptocurrencies, in addition to the innovation in the electronic payment systems affect dramatically on tourism in general and over the world, as well.

Blockchain, also, is playing a big role in this digital transformation. Blockchain is a new innovative payment system consists of a shared database for all transactions done by cryptocurrency for a massive amount of users. This emergent technology provides the user with a higher level of encryption that ensures intervention free transactions and safer data handling, while these transactions cannot be modified in any way. This technology operates the transactions without any intermediate agent. This method benefits in providing better security and eliminating any additional transaction costs. Obviously, this evolution will significantly effect on different parties in tourism. The largest service intermediators like Airbnb and Booking.com will be the most affected. They are at risk of losing a large market share, while tourists and service providers are dealing with their transactions directly.

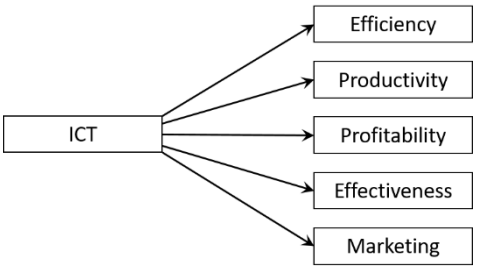
3. RESEARCH METHODOLOGY

3.1 Research Hypotheses

The research hypotheses of this study assess the effect of integrating the emerging technologies on tourism agencies and hotels. All hypotheses have to be tested statistically depending on the quantitative research method. The proposed research model (Figure 1) consists of five determinants as follows: efficiency, productivity, profitability, effectiveness, and marketing. Accordingly, this study examined the following hypotheses:

H1: The integration of ICT has a significant effect on the efficiency of tourism agencies.
H2: The integration of ICT has a significant effect on the productivity of tourism agencies.
H3: The integration of ICT has a significant effect on the profitability of tourism agencies.
H4: The integration of ICT has a significant effect on the effectiveness of tourism agencies.
H5: The integration of ICT has a significant effect on the marketing of tourism agencies.

Figure 1. The research model



3.2 Research Instrument's Design

This research requires a survey questionnaire to enable collecting the needed data obtained from a random sample of tourism agencies allocated in several cities in Jordan. This survey was distributed to the amount of 72 tourism agencies from the biggest four cities (see Table 1). As mentioned before, the research model of this study has five major determinants, or constructs, to determine the performance and the business activities of tourism agencies. Efficiency, productivity, profitability, effectiveness, and marketing are influenced by the adoption and the application of ICT. Each determinant was tested within the questionnaire by four statements (Table 2). These statements were evaluated by five-levels of agreement depending on five-point Likert-type scales (Chomeya, 2010; Pallant, 2005).

4. DISCUSSION

4.1 Reliability Test

Reliability analysis is an important step in any questionnaire analysis. It is the degree of accuracy of collected data and the consistency of measurements. For this study, the most popular technique was used which is the Cronbach's coefficient alpha (α) (Field, 2009; Pallant, 2005). As mentioned by Hair et al. (2009), Cronbach's α values close to 1.0 are excellent reliability, over 0.8 are good, in the range of 0.7 are acceptable, and below 0.6 are considered to be poor. Accordingly, as shown in Table 3, all Cronbach's α values of each variable are above 0.7, and from the acceptable to the excellent level of reliability. These results indicate that the statements of each measurement item were positively correlated to one another, and they are independent measures for the measurement item.

For other evidence to the questionnaire reliability, another measure was used to assess the internal consistency, which is the inter-item correlation. Inter-item measurement measures the correlation among statements for each item (Hair et al., 2009). The correlation value from 0.10 to 0.29 is considered to be small correlation, from 0.30 to 0.49 is medium correlation, and from 0.50 to 1.0 is large correlation, all these considerations are for both positive and negative correlations (Pallant,

Table 1. The distribution of the research survey over the cities

City	No. of participated tourism agencies
Amman	36
Irbid	17
Zarqa	12
Aqaba	7
TOTAL	**72**

Table 2. The complete statements of the research questionnaire of this study

Efficiency (EFC)
EFC1: Do you agree that the integration of ICT is improving service quality? **EFC2:** Do you agree that the integration of ICT is improving the company image? **EFC3:** Do you agree that the integration of ICT is enhancing the customers' satisfaction? **EFC4**: Do you agree that visual tours attract tourists and improve their background knowledge about the place they are going to visit, in addition to improving their planning for the tour?
Productivity (PRD)
PRD1: Do you agree that the integration of ICT is enhancing the daily productivity of your employees? **PRD2:** Do you agree that the innovative practices of ICT enable you to achieve a competitive advantage over other competitors in the market? **PRD3:** Do you agree that the integration of ICT helps in building channels with the suppliers (Airlines, hotel chains, and car rentals) and improve the core business? **PRD4:** Do you agree that the innovative mobile communication and apps are going to be the next high-demand tool to facilitate service provide?
Profitability (PRF)
PRF1: Do you agree that the integration of ICT is improving the company's profitability? **PRF2:** Do you agree that the integration of ICT is reducing the business operating costs? **PRF3:** Do you agree that e-banking services and online payment is a useful and secure medium of transactions? **PRF4:** Do you agree that the suppliers (airlines, hotel chains, and car rentals) are distributing their products through online reservation platforms (e.g. booking.com), or directly through their websites will negatively affect your business?
Effectiveness (EFV)
EFV1: Do you agree that the integration of ICT is effectively enhancing the tourism service providing in general? **EFV2:** Do you agree that well-designed websites and updated web and social media contents would affect positively on your business? **EFV3:** Do you agree that adopting TIS (Tourism Information Systems) is effectively improving your strategic planning and taking the correct decisions in your business activity? **EFV4:** Do you agree that using CRM (Consumer Relationship Management) is effectively enhancing the quality of your customer care?
Marketing (MRK)
MRK1: Do you agree that the integration of ICT is opening new markets for the company? **MRK2:** Do you agree that social media is an effective medium of marketing and promotion online to your target groups of tourists? **MRK3:** Do you agree that online (Web, social media) promotions should be given more priority over the traditional way of marketing (TV, newspapers)? **MRK4:** Do you agree that marketing through search engines (e.g. Google SEM) has a greater impact on your target customers?

2005). The inter-item correlations' values are represented in Table 3. It is clear that all the values are above 0.3. These results supported the results of Cronbach's α. And as a result, these values suggest that the questionnaire was reliable research instrument and measurement tool.

4.2 Validity Test

The validity of a scale refers to the degree to which it measures what it is supposed to measure. Construct validity is the degree of the relation between the operational measure with theoretical concept being investigated (Sekaran, 2003). It is used to ensure that the instrument truly measures what it is intended to be measured. Factor analysis is mostly associated with the construct validity. It is usually used for empirically examining the relations between items and determining the variation between them in order to recognize the goal from existing the factor as a measure in the instrument (Pallant, 2005). There are two main approaches to factor analysis which they are: exploratory and confirmatory (Bacon, 1997). The author mentioned that the exploratory factor analysis (EFA) is often

Table 3. Cronbach's alpha and inter-item correlations reliability results

Measurement items	No. of statements	Cronbach's α	Inter-item correlation
Efficiency	4	0.846	0.515 – 0.723
Productivity	4	0.920	0.658 – 0.746
Profitability	4	0.735	0.335 – 0.467
Effectiveness	4	0.853	0.493 – 0.706
Marketing	4	0.833	0.540 – 0.754

used in the early stages of research to gather information about (explore) the interrelationships among a set of variables. While the confirmatory factor analysis (CFA) is a more complex and sophisticated set of techniques used later in the research process to test (confirm) specific hypotheses or theories concerning the structure underlying a set of variables (Suhr, 2005). Within this study, the EFA was used so as to examine the correlation coefficients for all instrument's scales. After that, the convergent and discriminant validity for all instrument's scales was also examined by using the CFA.

The EFA is a successful technique to assess the relationships among variables for exploring the construct validity of the instrument's scale. Herein, the SPSS statistical package was used to analyze the five scales of the proposed model of this study. According to the test for the significance of the items of scale, the Cronbach's α test in case of item deleted was applied. Table 4 presents the value of Cronbach's α if any one of the items is deleted. It shows clearly that the Cronbach's α decreases with deletion. Which means that all items for each scale are significant and they achieve the reason form their existence, and deleting any one of them will not increase the scale's validity.

The EFA is a useful preliminary technique for assessing the construct validity, but it does not provide a complete view for the assessment of the measurement. For this study, the CFA approach was applied in order to examine the convergent and discriminant validity. Sekaran (2003) mentioned that convergent validity and discriminant validity involve the evaluation of measures against each other instead of against an external standard.

Convergent validity is established when the scores obtained with two different measurement scales which are measuring the same concept with high correlation (Hair et al., 2009). The author also stated that the convergent validity suggests that all items for a specific construct should converge

Table 4. Cronbach's (α) if item deleted estimates

	Cronbach's α	Cronbach's α if item deleted			
Efficiency	0.846	EFC1	EFC2	EFC3	EFC4
		0.842	0.816	0.802	0.809
Productivity	0.920	PRD1	PRD2	PRD3	PRD4
		0.906	0.859	0.893	0.877
Profitability	0.735	PRF1	PRF2	PRF3	PRF4
		0.673	0.747	0.744	0.695
Effectiveness	0.853	EFV1	EFV2	EFV3	EFV4
		0.809	0.723	0.803	0.814
Marketing	0.833	MRK1	MRK2	MRK3	MRK4
		0.835	0.822	0.769	0.764

Table 5. Factor loading of the model's measurement scales

	Factor Loading				AVE	CR
Efficiency	EFC1	EFC2	EFC3	EFC4	0.668	0.889
	0.842	0.816	0.802	0.809		
Productivity	PRD1	PRD2	PRD3	PRD4	0.781	0.934
	0.906	0.859	0.893	0.877		
Profitability	PRF1	PRF2	PRF3	PRF4	0.512	0.807
	0.673	0.747	0.744	0.695		
Effectiveness	EFV1	EFV2	EFV3	EFV4	0.621	0.867
	0.809	0.723	0.803	0.814		
Marketing	MRK1	MRK2	MRK3	MRK4	0.637	0.875
	0.835	0.822	0.769	0.764		

high proportion of variance in common. For CFA, the Average Variance Extracted (AVE) should be used in order to test the convergent validity. AVE is used to calculate the explanatory power for all variables in the instrument to the average variation. Higher result for AVE means higher reliability and higher construct validity. Byrne (2010) mentioned that the constructs have convergent validity when the composite reliability (CR) exceeds the value 0.7 and the AVE is above 0.5. Herein, the AMOS statistical package was used to analyze the factor loading of the five scales of the proposed model. The items with values below 0.4 are considered to be low-loaded (Hair et al., 2009). Table 5 presents the factor loading values of all scales, in addition to the results of AVE and CR. It is clearly shown that all of the factor loadings are resulting values above the minimum value of 0.4. Additionally, all values of AVE are exceeding the minimum limit of 0.5 and CR values exceeding 0.7, which means that there is no overlap among the measures in this study. According to that, these results are supporting the instrument's adequate convergent validity.

Discriminant validity is established when two variables are predicted to be uncorrelated, and the scores obtained by measuring them are indeed empirically found to be so (Sekaran, 2003). Discriminant validity is a part of construct validity. According to Hair et al. (2009), discriminant validity can be tested through the inter-factor correlations by comparing the AVE of each factor with the square values of inter-factor correlations of other factors. The AVE values should be greater than the square values of the correlations in order to satisfy discriminant validity requirements, and as a result, to be supported (Pallant, 2005; Sekaran, 2003). For this study, the discriminant validity was tested by comparing the square values for correlations between constructs with the belonging values of AVE as presented in Table 6. These results showed that all square values of inter-factor correlations are less than the AVE values (the diagonal cells). It means that the constructs are confirming adequate discriminant validity.

4.3 Results Discussion

The Structural Equation Modeling (SEM) is a general structural modeling technique which is widely used in behavioral sciences, especially in information technology researches. It describes the structural relationships among the constructs in the model. Skrondal and Rabe-hesketh (2005) mentioned that SEM contains two types of models, the measurement model and structural model. Measurement model relates the observed responses to the latent variables. Structural model then specifies the relations between the latent variables and regressions of the latent variables on the observed variables in order to describe how the constructs are related to other constructs in the model (Awang, 2012). These two models were applied within this study by using AMOS.

Table 6. The results of discriminant validity test

	EFC	PRD	PRF	EFV	MRK
EFC	**0.668**				
PRD	0.527	**0.781**			
PRF	0.524	0.312	**0.512**		
EFV	0.182	0.192	0.063	**0.621**	
MRK	0.170	0.265	0.323	0.189	**0.637**
Note: *AVE values are on the diagonal (in bold font); all other entries are the correlations' square values.*					

1. *Measurement model assessment:* Hair et al. (2009) recommended using the goodness-of-fit (GOF) measures in order to evaluate the measurement model. Several tests were applied, and the results showed that the model is from acceptable to good level of fit with values as follows: Chi-square (χ^2=429.145), degree of freedom (*df*=246), the relative Chi-square (χ^2/df=1.744), Comparative Fit Index (CFI=0.949), Tucker-Lewis Index (TLI=0.932), Incremental Fit Index (IFI=0.948), and Root Mean Square Error of Approximation (RMSEA=0.051). All results were in good level of fit, Chi-square (χ^2) was greater than the degree for freedom (*df*), CFI, TFI, and IFI indices were above 0.90, finally, RMSEA was less than 0.08.
2. *Structural model assessment:* Within this step, the hypothesized model and its entire relations among constructs were evaluated. GOF tests' results were as follows: χ^2=531.125, *df*=292, χ^2/df=1.819, CFI=0.9356, TFI=0.926, IFI=0.931, RMSEA=0.052. All results were in good level of fit. Furthermore, the standardized coefficients were presented in Table 7. It is clear that whole standardized path coefficient values were in the acceptable range (above 0.30). Accordingly, these results showed a good level of fit to the model, and as a result, all path coefficients (hypotheses) were statistically significant.

SEM gave a result indicating that the ICT is affecting the whole of the proposed factors (efficiency, productivity, profitability, effectiveness, and marketing) which represent the performance and business activities in tourism agencies in Jordan. This result supports the proposed hypotheses and supports the research model. Depending on these findings, it can be concluded that the research model is viable after an examination. It can be concluded that adopting the ICT, and emerging technologies in general, are a key factor for the future presence of the company in the market and its ability to compete. The reported results of this study reveal that the ICT is significantly affecting the business of tourism agencies in whole the five determinants examined through this study. The following is a summary of these results:

Table 7. The structural model assessment findings

Hypothesis	Path	Standardized path coefficient	Hypothesis testing result
H1	ICT →EFC	0.44 ***	Supported
H2	ICT → PRD	0.62 ***	Supported
H3	ICT → PRF	0.37 ***	Supported
H4	ICT → EFV	0.41 ***	Supported
H5	ICT → MRK	0.53 ***	Supported
Note: **** $p < 0.001$*			

1. **Efficiency**: The integration of ICT is improving the efficiency of tourism agencies. It doesn't affect on the service providing quality only, but even affects on the quality of the service itself which leads to an increase in the the customers' satisfaction. Tourists will be able to discover the place they are planning to visit, improving their background knowledge about it, and improving their planning for the tour as a whole. This integration will positively enhance the image of the company in the market, as well.
2. **Productivity**: Employing ICT in the workplace will definitely improve the productivity of the employees and total business activity. Tourism agencies agreed that the computerized solutions and telecommunication technologies will improve their relationship with the tourism service providers and suppliers, and open new markets that could not be reached before. They, also, agreed that the future of service providing will depend on smart applications and online payments.
3. **Profitability**: Digital transformation, directly or indirectly, will improve the profitability by reducing business operating costs. Online payment tools and modern e-banking services have made money collecting easier, faster, more accurate, and safer. Tourism agencies are blaming the massive distribution of the online reservation systems. Their usability and accessibility features attract and allow the tourists to plan, reserve, and pay for a complete tour by themselves without any interference from the tourism agencies. This may negatively affect the agencies' profits and general revenues.
4. **Effectiveness**: The results confirmed that the complete content and well-designed websites and social media profiles of the tourism agencies are positively and effectively affecting on their businesses. The utilization of computerized information systems and tools such as: TIS, CMS, and HMS, will improve the management operation of the tourism industry in general.
5. **Marketing**: They agreed that successful marketing and advertisement plans will improve their competitiveness and existence in the market. It will open new markets which can be reached remotely. No one denies that social media plays a big role in this marketing as a new, rapid, and freely accessible way of communication without any barriers of time, place and culture.

5. CONCLUSION

Tourism activity is business-to-consumer (B2C) which targets a group of individual consumers. Thus, individuals have become an integral part of the business model. At present, emerging technologies have become involved in all aspects of our lives, personal and business. It affects the economies of all countries over the world. While the technology is the backbone of innovation and drives its development, including the tourism and hospitality industry as well. The developers of information systems keep providing the market with new, creative and innovative solutions. Therefore, this digital transformation and the adoption of ICT, in addition to the networks technology and Internet, lead to a huge upgrade in the tourism industry and improve the organizational and administrative practices in tourism management in general.

The integration of ICT in tourism and hospitality becomes the future of the tourism industry. This evolution can be concluded as a new era of electronic services providing in the field of tourism called "e-tourism", which promises to open new horizons in tourism. Many innovative applications such as: computer (online) reservation systems (CRS) in aviation and hospitality, the spread of social media applications and marketing through them, community-based services (Uber, Airbnb), artificial intelligence applications, interactive technologies, GPS services, in addition to the new alternative electronic payment options through cryptocurrencies, blockchain applications, and others. This development in e-ticketing and e-payment creates some new positive features in the world of tourism and travel, and makes the travel services and their related promotion and marketing easier and faster.

The empirical study conducted through this research work had been done over 72 tourism agencies from different cities in Jordan. The results of this study revealed that integration of ICT in the tourism industry improves the efficiency of the services providing by the tourism service providers,

suppliers, and distributes, which will efficiently improve customers' satisfaction. The productivity of the employees in the tourism agencies is improved by adopting ICT which will improve in building wider channels with the suppliers of tourism services. The profitability of tourism agencies is affected, as well. Employing ICT reduces the business operating costs in general. It was noted that tourism agencies are blaming the self-reservation by customers via online reservation platforms or directly through the suppliers' websites that it is negatively affecting their businesses while the customer can finish his/her planning for a tour (traveling, transportation, accommodation) without any interference from the agencies.

From a different perspective, the integration of ICT is effectively enhancing the tourism service providing in general. Using some computerized solutions such as TIS or CRM definitely will effectively improve their business and positively affecting their customers' satisfaction. From a marketing perspective, utilizing ICT tools will positively be enriching their marketing mediums and more spreading their advertising campaigns. Without a doubt, web 2.0 technology and social media apps play the biggest role.

Depending on the aforementioned results, it can be concluded that the integration of emerging technologies improves the businesses of tourism agencies. The failure in keep-pace with technology influences the success and existence of these businesses in the future. It means that both research questions have been accomplished. Therefore, the integration of the emerging technologies is unavoidable for the continued existence of service providers in the market. It has been revealed that the world is heading towards a technological transformation, while tourism is not an exception. This evolution in emerging technologies and the digital transformation reflected from this development will not stop. The development in IT services will continuously effects on the method of delivering tourism and hospitality services. AI applications and cryptocurrencies will play a big role in the future of tourism.

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