

The Impact of Knowledge Management Processes on Service Innovation in International Airports in the Kingdom of Saudi Arabia

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Abstract

Purpose The purpose of this study is to examine the impact of knowledge management processes on service innovation in international airports in the Kingdom of Saudi Arabia.

Approach The study applied a quantitative method to collect data via a questionnaire. A total number of 1493 questionnaires were distributed by two methods: 785 were paper copies and 708 online google forms. Out of 708 electronic questionnaires, only 85 were returned, while out of 785 paper-based questionnaires, 230 were collected.

Results The results showed that knowledge management processes (creating, sharing, and application) have a positive and significant impact on service innovation. Also, results showed that knowledge management processes (creating, sharing, and application) have a positive and significant impact on organizational creativity. Furthermore, organizational creativity acts partly as a mediator between knowledge management creation and service innovation. The results support the main role of knowledge management processes as a catalyst of knowledge-based innovation in Saudi international airports.

Recommendations Finally, the research recommends conducting such a study on airports in other countries in the GCC. Moreover, the study recommends building the capacity of human capital and to motivate employees to enhance organizational creativity in the airport sector.

Originality Developing and testing a new model that links knowledge management processes and organizational creativity with services in the GCC context.

Keywords: Knowledge Management, Service Innovation, Organizational Creativity, International Airports.

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Introduction

Due to the digitization and rapid growth of information, it is imperative to harness knowledge management (KM) to foster knowledge integration and organizational learning, which in turn affects organizational innovation. Innovation capital in organizations refers to key competencies to transform ideas into products and services by harnessing knowledge and learning capabilities (Parlby & Taylor, 2000; Cardinal et al., 2001; Harkema, 2003; Adams & Lamont, 2003, Gloet & Terziovski, 2004). An organization's capacity to innovate is a function of knowledge management processes [hereafter KMP] (Dalkir, 2013). Knowledge management [hereafter KM] also helps an organization to arrange its knowledge resources in effective and efficient ways. Innovative organizations have the capacity to develop information assets and manage knowledge efficiently and effectively (Omotayo, 2015). Therefore, the determining factor that supports innovation is a fundamental shift from just holding physical resources to managing knowledge resources.



Nowadays, it is imperative for organizations to generate and manage knowledge to address environmental complexity and to sustain innovation capability (Shani et al., 2003; Cavusgil et al., 2003). Having KM creates a culture that supports creativity and plays a vital role in supporting innovation and creativity to ensure a sustainable innovation process (Gloet & Terziovski, 2004). KM has a sequential lifecycle of activities including absorptive capacity and transformative capacities which refer to the organizational ability to make best use of creative ideas. Drivers to apply KM for innovation include the role of knowledge as a mechanism to address complexity and as an enabler to develop a competitive advantage. KM refers to sharing and codifying tacit knowledge which are critical for fostering innovation capability (Cavusgil et al., 2003). Leveraging knowledge is viewed as an organizational asset that is underpinned by people, process, culture, and technology.

The core goal of Saudi Arabia's vision 2030 is to make a major shift from a resource-based (oil-based) economy to a knowledge-based economy by harnessing science, technology, and innovation (Al Surf & Mostafa, 2017). A resource-based organization relies on available resources to improve its performance (Kozlenkova, Samaha & Palmatier, 2014). In essence, the resource-based theory [RBT] considers both intangible and tangible resources key to boost organizational performance. KM resources can be tangible (explicit knowledge) and intangible (tacit knowledge); however, there is no agreement in the KM literature on the key components that constitute knowledge management processes (KMP). Some authors proposed that KM Processes include knowledge creation, organization, and conveying (Choi & Lee, 2002), while others argued that KMP is linked to knowledge distribution, organization, identification, application, acquisition, creation, and adaptation. Moreover, according to Lachachi et al. (2013), knowledge processes include knowledge sharing, creation, implementation, storage and assessment. This led to vague and mixed results in the studies that attempted to explore the relationship between KMP and innovation.

Innovation is defined as the capability of the organization to utilize newly developed knowledge and to incorporate it in business processes (Alegre & Chiva, 2008), while other scholars view innovation as the method of coming up with something new (Hajir et al. 2015). Innovation plays a vital role in improving organizational performance and productivity (Caputo, Lamberti, Cammaran & Michelino, 2016). Innovation also increases the worker's ability to deliver more quality work within the specified time (Kotsemir et al., 2013). A plethora of studies have explored the relationship between KMP and innovation in a variety of contexts. However, none of the previous studies addressed the relationship between KMP and service innovation in international airports. Therefore, this study is conducted to fill this knowledge gap in the literature by examining the impact of KMP on service innovation in international airports in the Kingdom of Saudi Arabia.

Research Problem

Air transport sector in Saudi Arabia has exhibited a steady growth in recent years. This is due to investment, economic stability and innovation strategy as reflected in the GCC vision 2030. The senior management of Saudi airports are mindful of the barriers and complexity of administrative processes. Therefore, plans are devised to enhance airport management by making a transition from governmental organizations to

or completely private organizations.

The rationale for this shift is to utilize Big Data and intellectual assets to meet customers' expectations and face unprecedented competitions. Therefore, this study investigates the current status of KMP and its impact on service innovation and organizational creativity in key KSA airports. From the above problem, the following questions can be formulated as follows:

1. What is the impact of knowledge management processes (creation, sharing, and application) on service innovation in international airports in the Kingdom of Saudi Arabia?
2. What is the impact of knowledge processes (creation, sharing, and application) on organizational creativity in international airports in the Kingdom of Saudi Arabia?
3. Does organizational creativity play a mediating role in the relationship between knowledge creation and service innovation in international airports in the Kingdom of Saudi Arabia?

Literature Review

Research and case studies have been conducted to measure the impact of knowledge management on innovation in various national and international airports (Zaim, Bayyurt, Tarim, Zaim, & Guc, 2013; Atalay & Sarvan, 2014; Cegarra-Navarro, 2015). The main factors that influence knowledge management and innovation in organizations include human resources management, information technologies, organizational culture, leadership, learning, information technologies, processes, and organizational structure. In addition, some of the knowledge management factors that affect innovation include knowledge management processes (identification, creation, use and acquisition) as well as knowledge management strategy/ies (Girniene, 2013). According to Bawazeer (2018), knowledge management plays a major role in the aviation industry by raising the efficiency of organizational performance. The goal of that study was to elaborate on the implementation of knowledge management in the aviation industry as well as the way it affects the performance of pilots. The study found that aviation industries have good technological infrastructures that are not fully utilized. The importance of knowledge management is not reflected in most organizational structures, especially in the aviation sector. In a research conducted by Tubigi and Alshawi (2015) on the effect of the processes of knowledge management on the performance of an airline industry, it was found that knowledge management had a great influence on performance. The authors identified knowledge usage as the most essential aspect of knowledge management that influences performance. The results revealed that most organizations, especially those related to aviation employ knowledge transfer as the common process of knowledge management. Islam et al. (2017) conducted a case study on the relationship between strategic knowledge management with innovation and organizational performance in Saudi airlines. They found that strategic knowledge management had a positive effect on the performance and innovation airlines within the Kingdom of Saudi Arabia. Alsayadi and Algarni (2017) supported the idea of (Islam et al., 2017) on the importance of enterprise social network in knowledge management in aviation industries within the Kingdom of Saudi Arabia. They found that enterprise social networks were one of the efficient knowledge management techniques in harnessing the employees' intellectual capital. Employees' intellectual capital constitute of the skills that employees acquire and co-develop to drive the organization towards innovation and performance. Through enterprise social networks, employees can share their knowledge and devise solutions to emerging problems. Al-Qadhi et al. (2015) also commented that knowledge sharing can easily be achieved through social networks. Within the current literature, the development of effective knowledge management having a beneficial outcome for organizational innovation is not new (Nonaka & Takeuchi, 1995; Plessis, 2007; Lin & Lee, 2005; Darroch & McNaughton,

2003; Li, Tsai & Huang, 2009 in Kor and Maden 2013). Under the umbrella of organizational innovation are the product/service areas, technology, and administrative spheres of the organization and all types of organizations realize that knowledge and the vital management of knowledge is one of the most critical resources (Chen, Huang & Cheng, 2009, as cited in Vu-Thi & Stenberg, 2017), which is critical to foster competitive advantage. Empirical evidence shows that knowledge management (KM) and organizational learning are strongly correlated with organizational innovation and are linked with a set of enablers, processes, outcomes, and performance (Lee and Choi, 2003; AlRubaiee et al., 2015). KM is viewed as an input and organizational learning as a process and organizational innovation as an output (Liao and Wu, 2009). Besides, KM Processes play a key role in organizational innovation, performance, and service delivery (Kasemsap, 2017). However, many factors influence the ability of an organization to manage innovation. These factors include management style and leadership, KM, resources, organizational structure, corporate strategy, technology, organizational culture, and innovation process (Mills & Smith et al., 2011). Alrubaiee et al. (2015) showed a positive and strong effect of KM Processes on organizational innovation and organizational performance. Besides, organizational creativity is underpinned by a set of factors and enablers which include variety, culture integration and shared mental models that are embedded in sense making and cognition (Borghini, 2005). Several studies addressed the relationship between KM, organizational learning, and service innovation in airports (Losekoot & Wright, 2013; Price et al. 2013). They concluded that many factors which include historical development, geographical location, ownership structure, and the airport's role contribute to service innovation (Losekoot & Wright, 2013). Airports act as cities embodying organizational creativity and new business models (Price et al., 2013). Studies have shown that KM has a positive effect on organizational learning and that organizational learning has a positive effect on innovation (Nouri et al., 2017). Zia & Shafiq (2017) studied the relationship between KMP and innovation and the role of organizational culture in fostering innovation. The authors concluded that all modes of knowledge creation are positively associated with product and process innovation. Also, he conceptualized that organizational culture moderates the relationship between KMP and innovation. On the other hand, Kor and Maden (2013) examined the relationship between KMP and innovation types. He viewed that innovativeness has a mediating effect between KMP and innovation types and concluded that KMP is positively related to innovativeness. The role of knowledge precincts at international airports was investigated by Yigitcanlar et al. (2008) showing the impact of airports in fostering knowledge-based development in cities. WEI & XU (2013) studied the obstacles to innovation management in airports including low employee engagement, limited budget, slow upgraded technology, and low degree of communication. Besides, Albeshr and Ahmad (2015) documented a case study on service innovation at Dubai airport focusing on the role of customer service and quality in service innovation. Information technology and e-services play a key role in service innovation in airports as illustrated by Malagas et al. (2013) where they examined a case study on the impact of IT migration in a state-owned airline. Moreover, airport design is correlated with service innovation as addressed by Medvedev et al. (2017) where they showed that airport management processes influence efficiency in aircraft operation, safety of aircraft and security of passengers. The concept of Multi-Airport Systems propose a set of airports to absorb traffic congestion (Bonney et al., 2010). An emerging trend for focused specialization in airport operations (cheap fare, cargo, and intercontinental) is a model for airports of the future (de Neufville, 2003). Service innovation is associated with engineering design, human capital, and technology (Augustyn et al., 2010; Casaca et al. 2015). However, most empirical studies on this subject were conducted at western airports. Therefore, to address

this knowledge gap, there is a need to conduct empirical studies to assess the impact of knowledge management on innovation in the Gulf Cooperation Council (GCC) countries

Knowledge Management Processes and Service Innovation

Market competition forces organizations to be customer-centric and innovative so as to provide quality and complete services (Meyer & DeTore, 2001). Knowledge is correlated with service innovation since the development of services depends on operations, practice, and human interaction (Itami & Rohel, 1987). Zia and Shafiq (2017) studied the relationship between the knowledge creation process (KCP) and innovation. He concluded that the knowledge creation process is positively associated with product and process innovation. Service innovation includes a set of dimensions, such as service products and delivery, business and revenue models. Besides, service innovation is associated with organizational structures and processes (Hauknes & Nordgren, 1999; Metcalfe & Miles, 2000; Miles, 2001; Gallouj, 2002). Many service innovations are enabled by changes in markets and information technology (IT). These innovation attempts are targeted to improve the quality of service production and products to improve cost efficiency, as well as to develop new service concepts (Kuusisto & Meyer, 2003). Airport industry is a knowledge-intensive firm that is related to a set of factors including internal R&D, technological exploration, and internal systems. Research revealed that practice-based knowledge is critical for service innovation. Also, specialized and practice-based knowledge displays strategic value for service organizations (Clayton, 2003) (John & Storey, 1998). Ozeren et al. (2013) extended the knowledge creation model by Nonaka and Takeuchi's (1995) and showed that internal and external knowledge act as a tool for service innovation. Moreover, they asserted that any knowledge intensive business service is key to enhancing innovative capability (Muller & Zenker, 2001). Besides, Hurnonen et al. (2016) concluded that service innovation development is supported by choosing relevant knowledge integration practices. Nawab et al. (2015) concluded that knowledge management processes are contributing in the enhancement of innovation in banking industry. Schilling (2011) studied the organizational practices and competences supporting service innovation. Leiponen (2005, 2006) found that organizational knowledge is statistically associated with service innovation. Rasulzada and Dackert (2009) showed a significant relationship between organizational creativity and innovation. They concluded that organizational climate and work resources are significantly related to organizational creativity which in turn influences individual behaviors (Amabile, 1996). Based on the above argument, the first hypothesis can be formulized as follows: ***H1: Knowledge management processes have significant impact on service innovation.***

Knowledge Management Processes and Organizational Creativity

Amabile and Pratt (2016) presented a revised model of creativity and innovation in organizations that focus on individual-level psychological processes. Ahmed et al. (2016) examined relationships between knowledge management strategy, knowledge management process capabilities, organizational creativity and organizational performance. KM process capabilities which include externalization and internalization have significant positive impact on organizational creativity. Besides, Sohn and Jung (2010) proposed a conceptual model to analyze the effects of basic skills, compensation systems, and external environment factors on creativity, as well as the effects of creativity factors on the innovative performance of an organization. Pérez-Luño et al. (2016) used the Resource-Based View of KM to study the effect of knowledge on innovation. They found a positive linear effect of tacit knowledge on innovation and a curvilinear relationship between knowledge exchange as well as

combination and innovation. Danish et al. (2016) showed the significant impact of intellectual capital on organizational creativity through the mediating role of technical innovation. Sarooghi, Libaers, and Burkemper (2015) conducted an empirical research to study the impact of creativity on innovation. They found that there is a strong positive relationship between creativity and innovation, at the individual level. Also, they found moderating effects in which the relationship between creativity and innovation is stronger for large firms, process innovations, and low-tech industries relative to small firms, product innovations, and high-tech industries. Based on the above arguments, the second hypothesis can be formulated as follows:
H2: Knowledge management processes have positive impact on organizational creativity.

Organizational Creativity and Service Innovation

Organizational creativity is underpinned by organizational climate (Ekvall & Ryhammar, 1999) and leadership (Mumford, Connelly & Gaddis 2003). Del-Corte-Lora et al. (2015) showed that creativity is the mechanism through which the different sources of knowledge influence innovation. Ghosh (2015) examined the impact of self-leadership on employee creativity and workplace innovative orientation moderated by the creativity climate of the organization. He explored the dimension of self-leadership in connection with employee creativity, creativity climate and workplace innovation preparedness. He concluded that there are positive significant relationships among self-leadership, employee creativity, creativity climate and workplace innovative orientation. However, the critical question for practitioners is how come organizational creativity and enhanced service innovation did not grab the attention of researchers until recently? (Giannopoulou, Gryszkiewicz & Barlatier, 2014). According to the Oslo Manual (OECD and EUROSTAT, 2005), service innovation is defined as “a type of product innovation involving the introduction of a service that is new or significantly improved with respect to its characteristics or to its intended uses”. This definition highlights two important aspects of service innovation which are called “newness” and “significant improvement” implying that service innovation is underpinned by continuous creativity activities and practices (Giannopoulou et al., 2011). In general terms, creativity is “the production of novel and useful ideas in any domain” (Amabile et al., 1996), and its successful implementation in an organization represents innovation (Amabile et al., 1996). Thus, creativity enables airports to increase their service efficiency, effectiveness, and quality. Creativity does not only enhance the speed delivery of current services but also encourages airports to develop new services on continuous basis. Without creativity, innovation in services will not be possible. None of the previous studies have explicitly targeted how organizational creativity supports service innovation in airports, in general, and in GCC airports, in particular. Based on the above arguments, the third and fourth hypotheses can be formulated as follows:
H3: Organizational creativity has a significant impact on service innovation.
H4: Organizational creativity mediates the relationship between knowledge management processes and service innovation .

Research Methodology

This study aimed to investigate the impact of knowledge management processes on service innovation through organizational creativity in international airports in the Kingdom of Saudi Arabia. In light of the research objective and due to the nature of the research variables; i.e, knowledge creation, knowledge sharing, knowledge application, organizational creativity, and service innovation that have been well established in the literature, this study adopted a quantitative approach since it is the most appropriate approach to achieve the study objectives. The descriptive analytical approach method

was used to collect and analyze the data to know how knowledge management processes impact service innovation in international airports in the Kingdom of Saudi Arabia. A questionnaire survey that reflects the quantitative approach was formed and distributed to the targeted sample in the international airports in the Kingdom of Saudi Arabia (Dammam airport, Riyadh airport and Jeddah airport). A decision was made to exclude airlines companies, basic government agencies employees such as emigration, general investigation department (GID), police, customs and Royal Saudi Air Force (RSAF) for security and privacy issues. In addition, collecting data from these sectors require the prior consent of the competent authorities, and this will take more time. The questionnaire was adopted from several previous studies of research in the field and illustrated in Appendix A.

Research Framework

The research framework was built with full consideration to the related literature and consisted of five factors namely, knowledge creation, knowledge sharing, knowledge application, organizational creativity, and service innovation. Knowledge creation, knowledge sharing, and knowledge application were independent variables. Knowledge acquisition was included in the combination and internalization processes. Therefore, to avoid duplication in the questionnaire questions, knowledge acquisition was excluded from the research model. In addition, international airports depend on creating specific knowledge tailored to their specific contexts and customers' needs. Organizational creativity was a mediating variable, whereas service innovation was the dependent variable. Figure 1 depicts the presumed relationships and hypotheses between research variables.

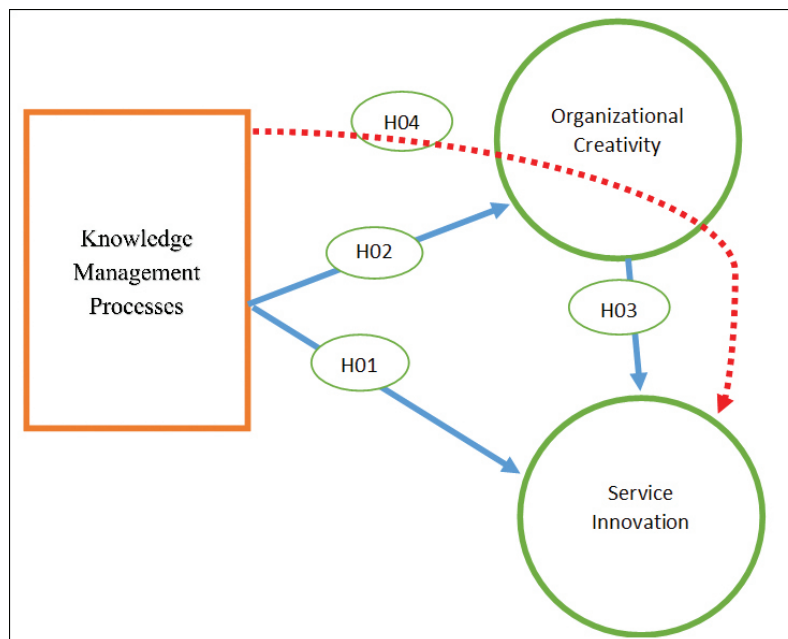


Figure 1. Conceptual Framework

Instrument, measures, population, and sample

The main tool to collect data was the questionnaire. The questionnaire was designed after thorough research and review of literature. The questionnaire consists of two sections: **Section One:** demographic variables which are designed as close-end questions through five factors including gender, age, educational level, years of experience and occupational level. **Section Two:** This section was divided into three parts. Part One: Measured the knowledge processes through three factors (Creation, Sharing, and Application); part one contains (35) items as follows: The knowledge creation was measured through four dimensions (knowledge combination, knowledge internalization, knowledge externalization, and socialization) knowledge combination was measured by seven items adopted from (Lee & Choi, 2003; Easa, 2012), knowledge internalization was measured by four items adopted from (Lee & Choi., 2003), knowledge socialization was measured by five items adopted from (Lee & Choi., 2003), knowledge externalization was measured by four items adopted from (Lee & Choi., 2003), knowledge sharing was measured by eight items adopted from (Numair, 2012), knowledge application was measured by seven items adopted from (Numair, 2012). Part Two: This part was measured based on the organizational creativity as in five items adopted from (Lee & Choi., 2003). Part Three: This part was measured by the service innovation through two factors (Smart airport transport and parking services, Smart airport processes); this part contains (11) items as follows: The Smart airport transport and parking services were measured by seven items adopted from (Chen & Batnasan, 2015; Fattah et al., 2009). Smart airport processes were measured by four items adopted from (Chen & Batnasan, 2015; Fattah et al., 2009). The questions were designed in a quantitatively measurable method by using Likert scales, checkboxes and open-ended questions. The questionnaire aimed to enable respondents to think about factors of knowledge and innovation to address key issues, challenges, complexities and risks that hinder or pose barriers to the challenges of Saudi airports. The total number of airports in the Kingdom of Saudi Arabia is 27 airports (4 international airports, 23 domestic airports). Data were collected from 3 international airports in the Kingdom of Saudi Arabia to yield valuable data. The target population consists of all managers and employees working at these 3 international airports. For security and privacy reasons, a convenient sample was chosen to answer the questionnaire. The questionnaire items were anchored on five point likert-scale ranged from 1 highly disagree, 2 disagree, 3 neutral, 4 agree, 5 highly agree. The questionnaire were distributed to 1493 respondents in three main international airports in the Kingdom of Saudi Arabia namely Dammam airports company, Riyadh airports company and Jeddah airport, eventually 315 responded to the questionnaire, with 180 rejections because questionnaires were not completed. For content validity, the questionnaire was checked by a group of academic experts who are interested in understanding how knowledge management affects service innovation. The academic reviewers were offered valuable insights in terms of rewording, deleting, and adapting measurements' questions to fit local context. The validity of the truth was assessed by presenting the sample of the initial questionnaire to six experts and academics in order to take their views on the appropriateness of the questionnaire to achieve the objectives of the research and to know their opinions regarding the clarity of the wording of the questionnaire items. Some items were updated and reformulated to become more accurate to enhance the research instrument and a new version of the questionnaire was developed. To check reliability, Cronbach's alpha test was used. All Cronbach's Alpha values were above the acceptable threshold 0.70 (Sekaran, 2015), indicating a high level of reliability for the research measurements, which implies that and if the study is repeated, it is expected that similar results will be obtained.

Data analysis and hypotheses testing

Data Analysis

The descriptive statistics was used to understand the nature of the research sample and its credibility to be the key source of data. The demographic variables include age, education level and years of experience. The tables below highlight the distribution of each variable from the viewpoint of research sample. The demographic characteristics of the (315) respondents who answered the questionnaire are categorized into five: gender, age, nationality, educational level and the departments. Table 3 shows the distribution of respondents based on the gender. The Table shows that (92.1%) of respondents were male while only (7.9%) were female. This result indicates that the dominant gender working at international airports is male and this might be due to the nature of the airports activities that are based on three shifts (A, B, and C) which may not be suitable for female employees. In addition, jobs in some airports require hard work that does not suit the female nature.

Table 1 shows the sample distribution in terms of age groups. The highest percentage of the employees falls into the age group of (2635- years old), representing (45.1%) of the participants, followed by those who are (3645- years) at (30.5%), then those who are above (46 years) for (16.2%), and the lowest (8.3%) is for the ages from (1825- years). This result indicates that nearly half (45.1%) of the respondents are less than (35 years), and more than two thirds (75.6%) are less than (45 years) which indicates that the respondents are mainly youth. Therefore, this age group is likely to be open for new learning and technology adoption.

Table 1: *Distribution of the respondents according to demographic variables*

Variable	Details	Frequency	Valid Percent
Gender	Male	290	92.1%
	Female	25	7.9%
Age	18 - 25 years	26	8.3%
	26 - 35 years	142	45.1%
	36 - 45 years	96	30.5%
	46 years and above	51	16.2%
Education level	High school or less	35	11.1%
	Diploma level	56	17.8%
	University level	171	54.3%
	Graduate studies level	53	16.8%
Experience	Less than 5 years	65	20.6%
	years 10-5	93	29.5%
	years 15-11	58	18.4%
	More than 15 years	99	31.4%
Occupational level	Employee	201	63.8%
	Supervisor	82	26%
	Director	31	9.8%
	CEO	1	0.3%

Table 1 demonstrates that more than half of the respondents (54.3%) hold a university degree, while (16.8%) of the respondents hold a graduate studies degree. Diploma level degree holders resemble a percentage of (17.8%), and (11.1%) have a high school certificate or lower. This result indicates that the research respondents are well educated. Nearly two thirds of the respondents (71.1%) have a bachelor's degree and above which indicates that the research respondents are capable to answer the questionnaire and are fully aware of the importance of the accuracy. This implies that this category is likely to apply KM Processes in airport context.

Table 1 shows the distribution of the respondents according to the years of experience. Most of the respondents have an experience of (15 years) and more with a percentage of (31.4%), followed by (29.5%) with an experience of (5 to 10 years), while (20.6%) of the respondents hold less than (5 years) experience and (18.4%) for (11 to 15 years) of experience. Half of the respondents (49.8%) have more than (11 years) of experience indicating that they have good knowledge about knowledge management practices, innovativeness, and service innovation in the international airports

Table 1 shows that (63.8%) of the respondents are employees, followed by (26%) of respondents working as supervisors, while (9.8%) of them work as directors, and (0.3%) work as CEOs. Nearly (89.8%) of respondents work at lower managerial levels (employees and supervisors) and practice knowledge management processes aiming towards achieving high levels of innovativeness and service innovation.

Hypotheses testing

To test the research hypotheses, two assumptions must be maintained. First, there is a significant relationship between the research variables. Second, the data should be normally distributed. Table 2 shows that the results of testing the correlation coefficient is positive and statically significant at level (0.01) thereby we have (99%) confidence to support all the factors. The factors knowledge process, knowledge sharing, and knowledge application have a moderate correlation with service innovation at the values (0.565, 0.531) and (0.543) respectively, while the correlation between the factors of knowledge process, and knowledge sharing have a moderate correlation with organizational creativity at the values (0.671), and (0.697) respectively. The correlation between the factor knowledge application shows a strong positive correlation with organizational creativity at the value (0.715). Moreover, the correlation between organizational creativity and service innovation are moderate with the value of (0.474). The normal distribution test Kolmogorov-Smirnov for normality was not significant for all the research constructs.

Table 2: Pearson's correlation Matrix of all the dimensions

Dimension	Knowledge creation	Knowledge sharing	Knowledge application	Organizational creativity	Service innovation
Knowledge creation	1	**0.740	**0.716	**0.671	**0.565
Knowledge sharing		1	**0.759	**0.697	**0.531
Organizational creativity				1	**0.474
Service innovation					1

** . Correlation is significant at the 0.01 level (2-tailed).

To test the first hypothesis that states **H1: Knowledge management processes have significant impact on service innovation**, Multiple Regression test was used. Table 3 shows the results of the multiple regression of knowledge management processes on service innovation.

Table 3: Multiple regression analysis of the impact of knowledge creation (combination, internalization, externalization, and socialization), sharing and application on service

Factor	B	Std. Error	Beta	t	Sig
(Constant)	0.71	0.20		3.64	0.00
Knowledge Creation	0.37	0.09	0.31	4.26	0.00
Knowledge Sharing	0.15	0.08	0.14	1.81	0.07
Knowledge Application	0.23	0.08	0.22	2.94	0.00

* *Dependent variable: Service Innovation*

Table 3 shows the highest impact was for knowledge creation with (31%) of the total impact, and followed by knowledge application with an impact of (22%) of the total impact, then knowledge sharing rated (22%) on service innovation. The table shows that all the knowledge processes have significant impact on service innovation apart from knowledge sharing. This indicates the first research hypothesis is partially supported as the T values were significant for all the knowledge processes except knowledge sharing.

H2: Knowledge management processes have positive impact on organizational creativity.

The Multiple regression test was used to test hypothesis Table 4 shows the results of the multiple regression of knowledge management processes on organizational creativity.

Table 4: Multiple Regression analysis of the impact of knowledge creation, sharing and application on organizational creativity.

Independent variable	Model Summary				ANOVA	Standardized Coefficients	Coefficients	
	R	R2	Adjusted R2	Standard error	F value	Beta	T	T Sig
Knowledge Creation	0.72	0.51	0.51	0.78	326.71	0.22	3.83	0.00
Knowledge Sharing	0.75	0.57	0.56	0.73	204.09	0.26	4.20	0.00
Knowledge Application	0.77	0.59	0.58	0.72	146.89	0.36	5.97	0.00

* *Dependent variable: Organizational Creativity*

Table 4 shows that knowledge management processes as well as knowledge creation (combination, internalization, externalization, and socialization) have statistically significant impact on organizational creativity at a significant level $\alpha \leq 0.05$. In addition, F value reached (326.71) by statistically significant (0.00). R value reached (0.72), and R2 value reached (0.51), which means that the value of (51%) of changes in the organizational creativity resulted from changes in the knowledge creation (combination, internalization, externalization, socialization). Besides, there is a statistically significant effect at level $\alpha \leq 0.05$ of knowledge sharing on organizational creativity, where «f» value reached (204.09) by statistically significant (0.00) R value reached (0.75), R2 value reached (0.57), which means that the value of (57%) of changes in the organizational creativity resulted from changes in the knowledge sharing. Then statistically there is a significant effect at a significant level $\alpha \leq 0.05$ of knowledge application on organizational creativity, where F value reached (146.89) by statistically significant (0.00). R value reached (0.77), R2 value reached (0.59), which means that the value of (59%) of changes in the organizational creativity resulted from changes in the knowledge application.

H3: Organizational creativity has a significant impact on service innovation. Simple regression test was used to test hypothesis 3. Table 5 shows the results of the simple regression of organizational creativity on service innovation.

Table 5: Simple Linear Regression of the impact of organizational creativity on service innovation.

Hypotheses	R	R^2	Adjusted R	F	Sig
H3	0.47	0.23	0.22	90.78	0.00

Simple regression analysis was used to test hypothesis (3). The results in table 5 showed that there is significant positive relationship between organizational creativity and service innovation ($R=0.47$) which indicates that there is a moderate correlation between organizational creativity and service innovation. In addition, the adjusted ($R = 0.22$) which indicates that (0.22) of variance in service innovation can be attributed to organizational creativity while (0.78) of the variance attributed to other factors. Thus, we accept hypothesis (3) that states that there is positive impact for organizational creativity on service innovation which is moderate correlation.

H4: Organizational creativity mediates the relationship between knowledge management processes and service innovation. In order to test hypothesis (4), the hierarchical regression test was used to test the hypothesis in order to estimate the direct and indirect effect and its significance using the Sobel test (Sobel, 1982). Testing the hypothesis can be done in two stages: first, test the direct effect of knowledge creation on service innovation as shown in figure.2. Second stage is testing the indirect effect of knowledge creation on service innovation through organizational creativity as shown in figure.3. Figure 2 shows that there is a positive significant relationship between knowledge creation and service innovation ($\beta = 0.57$; $p=0.000$). Figure 4.3 shows that there is positive relationship between knowledge creation and organizational creativity ($\beta = 0.67$; $p=0.000$), and there is a positive relationship between organizational creativity and service innovation ($\beta = 0.17$; $p=0.000$). Figure 3 shows that the strength of relationship between knowledge creation and service innovation reduced from ($\beta = 0.57$; $p=0.000$) to ($\beta = 0.45$; $p=0.000$) which indicates that organizational creativity plays a mediating role between knowledge creation and service innovation. However, Figure 3 does not show whether organizational creativity plays partial or full mediating role between knowledge creation and service innovation. To do so, Sobel test was used to test the indirect effect of knowledge creation on service innovation through organizational creativity.

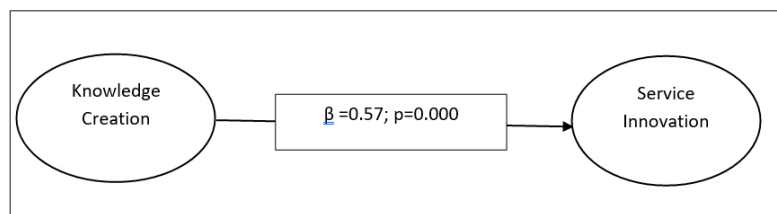


Figure 2: The direct effect of knowledge creation on service innovation

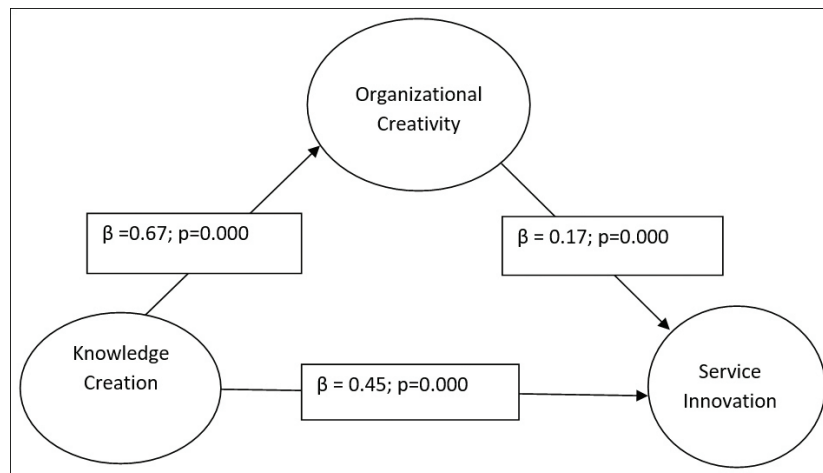


Figure 3: The indirect effect of knowledge creation on service innovation through organizational creativity

To test the significance of indirect effect, Sobel test was used. The results indicated in figure 3 show that the Direct effect = 0.449, and indirect effect = $0.671 \times 0.173 = 0.1166$, Total effect = Direct effect + Indirect effect = $0.449 + 0.1166 = 0.5656$ are used as inputs for Sobel test in table 6 as follows: Direct effect = 0.449, and indirect effect = $0.671 \times 0.173 = 0.1166$ Total effect = Direct effect + Indirect effect = $0.449 + 0.1166 = 0.5656$ Table 6 shows that the Sobel, Aroian, and Goodman tests are statistically significant ($p=0.000$) indicating that organizational creativity mediates the relationship between knowledge creation and service innovation. To determine the nature of the mediating role, the Z value should be calculated. The Z-value above equals 2.49 which indicates that organizational creativity partially mediates the relationship between knowledge creation and service innovation.

Table 6: Sobel test for mediating effect of organizational creativity on knowledge creation and service innovation

Test	T value	Standard error	P-Value
Sobel	8.1314743	0.04771828	0.000
Aroian	8.1196517	0.04778776	0.000
Goodman	8.1433487	0.0476487	0.000

Sobel test equation:

$$z\text{-value} = a \cdot b / \text{SQRT}(b^2 \cdot sa^2 + a^2 \cdot sb^2)$$

$$z\text{-value} = 0.55 \cdot 0.16 / \text{SQRT}(0.0256 \cdot 0.0064 + 0.3025 \cdot 0.0036)$$

$$z\text{-value} = 0.088 / \sqrt{0.00016384 + 0.001089}$$

$$z\text{-value} = 0.088 / \sqrt{0.00125284}$$

$$z\text{-value} = 0.088 / 0.0354 = 2.49$$

a = raw (unstandardized) regression coefficient for the association between IV and mediator.

sa = standard error of a.

b = raw coefficient for the association between the mediator and the DV (when the IV is also a predictor of the DV).

sb = standard error of b.

Results discussion, limitations, and future studies

This study aimed to examine the impact of knowledge management processes on service innovation in international airports in the Kingdom of Saudi Arabia. Besides, it is intended to explore the mediating role of organizational creativity in the relationship between knowledge management processes and service innovation. The results confirmed that there is statistical impact for knowledge processes (creation, application) on service innovation. This result is in line with previous studies agreed with a result of (Ugwu and Ekere, 2018) that confirmed that there is significant impact knowledge processes (creation, application) on service innovation, which lead to the acceptance of H1. On contrast, knowledge sharing does not show any impact on service innovation. This result is counterproductive as most of the literature showed all knowledge management processes have significant impact on service innovation. This result is different from the previous studies (Du Plessis, 2007; Ugwu & Ekere, 2018) which confirms the impact of knowledge (sharing) on service innovation; this variation is attributed to the fact that Ugwu and Ekere (2018) conducted their study in university libraries in Nigeria, while this study is conducted on international airports. This result might be due to the research sample that is somehow different from other service sectors. In addition, when an organization creates or obtains new knowledge, it is expected to share it within its boundaries. The results also confirmed that knowledge management processes have significant statistical impact on organizational creativity which support H2. This result is in line with the results of previous studies like Khuram et al. (2016) who confirmed that there are significant impact knowledge processes (creation, sharing, application) on organizational creativity. The results also confirmed that organizational creativity has a significant statistical impact on service innovation, which supports the acceptance of H3. This result conforms to the results of previous studies and is in line with the (Alegre & Chiva, 2008; Huang and Liu, 2019) results that confirmed when creativity is increased, shared values strengthen the relationship between knowledge acquisition and creativity thereby furthering and enhancing service innovation. Finally, according to Sobel test, the organizational creativity plays a partial mediating role in the relationship between knowledge management processes and service innovation, which supports the acceptance of H4. Although the researchers have done their best to avoid any source of bias and reduce limitations that may affect the generalization of results, this study is not free of limitations. First, the current study is a cross-sectional study and reflects the phenomena under investigation in a point of time. However, both contextualizing knowledge and leveraging innovation takes longer time that a cross sectional study can uncover. In addition, the current study only explored the opinions of personnel working at three international airport which is a limited population compared with the whole sector. Furthermore, the current study is questionnaire-based; however, other data collection methods may reveal that other elements and aspects cannot be explored by a single questionnaire. Thus, the results of this study should be taken and interpreted carefully, but this is not to down-grade the importance of the current research results more than opening new paths for future research. In fact, future research can explore the assumed relationships in a longitudinal study. Future studies also can explore the same phenomena at domestic airports which is a wider sector and in need for service innovation. Future research can use qualitative approach as knowledge processes and service innovation are inseparable phenomena from social interaction which may uncover other factors that play critical roles, other than organizational creativity, in this relationship. Not only can researchers benefit from the results of current study but also practitioners and decision makers. Practitioners can leverage service innovation by facilitating knowledge creation and application. If practitioners want to nurture organizational creativity, they have to focus on knowledge

processes by encouraging employees to create and share new knowledge on a continuous basis.

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Appendix A
Questionnaire items

Construct	items
Knowledge combination Process	<i>Q1: Our organization possesses and develops manuals and documents on products and services.</i>
	<i>Q2: Our organization develops and maintains databases of services.</i>
	<i>Q3: Our organization generates annual reports.</i>
	<i>Q4: Our organization classifies the existing information in databases, networks, and reports.</i>
	<i>Q5: Our organization considers information mentioned in databases, networks, and previous reports to develop its market assessment and strategies.</i>
	<i>Q6: Our organization collects, classifies, and informs its staff with reports and decisions issued by external bodies.</i>
	<i>Q7: Our organization depends on the relevant published research and reports to develop its policies.</i>
Knowledge Internalization Process	<i>Q1: Our organization coordinates team activities across departments.</i>
	<i>Q2: Our organization forms teams as a model, and conducts experiments, and shares results with entire departments.</i>
	<i>Q3: Our organization shares new ideas and thoughts.</i>
	<i>Q4: Our organization understands and shares management visions through communications with partners.</i>
Knowledge socialization process	<i>Q1: Our organization gathers information from sales and production sites.</i>
	<i>Q2: Our organization shares experiences with suppliers and customers.</i>
	<i>Q3: Our organization engages in dialogues with competitors.</i>
	<i>Q4: Our organization finds new strategies and market opportunities by wandering inside the firm.</i>
	<i>Q5: Our organization creates a work environment that allows peers to understand the profession and expertise.</i>
Knowledge externalization process	<i>Q1: Our organization conducts dialogues with stakeholders.</i>
	<i>Q2: Our organization uses models in concept creation.</i>
	<i>Q3: Our organization exchanges various ideas throw events and conference.</i>
	<i>Q4: Our organization conducts subjective opinions.</i>

Knowledge Sharing Process	<i>Q1: In our organization, there are processes for sharing knowledge into the design of new services.</i>
	<i>Q2: In our organization, there are processes for filtering knowledge.</i>
	<i>Q3: In our organization, there are processes for transferring organizational knowledge to individuals.</i>
	<i>Q4: In our organization, there are processes for absorbing knowledge from individuals into the organization.</i>
	<i>Q5: In our organization, there are processes for distributing knowledge throughout the organization.</i>
	<i>Q6: In our organization, there are processes for integrating different sources and types of knowledge.</i>
	<i>Q7: In our organization, there are processes for organizing knowledge.</i>
	<i>Q8: In our organization, there are processes for replacing outdated knowledge.</i>
Knowledge Application Process	<i>Q1: In our organization, there are processes for applying knowledge learned from mistakes.</i>
	<i>Q2: In our organization, there are processes for applying knowledge learned from experiences.</i>
	<i>Q3: In our organization, there are processes for using knowledge to solve new problems.</i>
	<i>Q4: In our organization, the sources of knowledge are matched to problems and challenges.</i>
	<i>Q5: In our organization, knowledge is used to improve efficiency.</i>
	<i>Q6: In our organization, knowledge is accessible to those who need it.</i>
	<i>Q7: In our organization, there are advantages of new knowledge.</i>
Organizational Creativity	<i>Q1: Our organization produces many novel and useful ideas.</i>
	<i>Q2: Our organization fosters an environment that is conducive to our own ability to produce novel and useful ideas.</i>
	<i>Q3: Our organization spends much time for producing novel and useful ideas.</i>
	<i>Q4: Our organization considers producing novel and useful ideas as important activities.</i>
	<i>Q5: Our organization actively produces novel and useful ideas.</i>

Service Innovation/ Smart airport transportation and parking services	<i>Q1: Saudi airports uses emerging technology capabilities and advanced web technologies to improve customer experience.</i>
	<i>Q2: Saudi airports provides details and flight status of all trip stages on a smartphone, or via an airport kiosk.</i>
	<i>Q3: Saudi airports provides location-based services and alerts to help passengers through the terminal to the gates, plus personalized hospitality and retail offerings.</i>
	<i>Q4: Saudi airports the location-based services when accessed on a mobile phone, it can operate as an e-boarding pass.</i>
	<i>Q5: Saudi airports keeps passengers informed of any travel problems and offer premium services, such as valet parking or route switching, if the passenger is at risk of being late.</i>
	<i>Q6: Saudi airports uses a location-sensitive solution that can track a traveler via a GPS-enabled smartphone and provide pre-trip travel information, route advice based on traffic conditions, and flight status.</i>
	<i>Q7: Saudi airports can track wheelchairs with RFID to help reduce the wait for incoming passengers requesting wheelchair support.</i>
Service Innovation/ Smart airport processes	<i>Q1: Saudi airports uses Location-based information and terminal zone, to direct people through the airport in a way that reduces stress, minimizes queues, and increases retail sales.</i>
	<i>Q2: Saudi airports uses RFID baggage tagging to detect luggage at a distance or out of sight, making it easier to find misplaced or missing bags and provide up-to-date location information to passengers.</i>
	<i>Q3: Saudi airports uses No-queue check-in solutions to speed passengers through the airport to their flights by using RFID-tagged boarding passes or mobile, smart-code-enabled phones.</i>
	<i>Q4: Saudi airports uses smart video surveillance and access control to ensure the highest level of security.</i>
	<i>Q5: Saudi airports uses Location-based information and terminal zone, to direct people through the airport in a way that reduces stress, minimizes queues, and increases retail sales.</i>

أثر عمليات إدارة المعرفة في ابتكار الخدمة في المطارات الدولية في المملكة العربية السعودية

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المُستَخَص

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تهدف هذه الدراسة إلى اختبار أثر عمليات إدارة المعرفة في ابتكار الخدمات في المطارات الدولية في المملكة العربية السعودية. طبقت الدراسة المنهج الكمي في جمع البيانات من خلال توزيع 1439 استبانة بطريقتين، 785 نسخة ورقية و 708 نسخة إلكترونية، حيث تم استعادة 230 استبانة. أظهرت النتائج أن عمليات إدارة المعرفة (خلق المعرفة، مشاركة المعرفة، تطبيق المعرفة) لها أثر إيجابي ومهم في ابتكار الخدمات. كما أظهرت النتائج أن عمليات المعرفة (خلق المعرفة، مشاركة المعرفة، وتطبيق المعرفة) لها أثر إيجابي ومهم في الابتكار التنظيمي. والأكثر من ذلك، أن الابتكار التنظيمي يقوم بدور وسيط جزئياً بين عملية خلق المعرفة وابتكار الخدمات. والنتائج دعمت الدور الرئيسي لعمليات إدارة المعرفة في الابتكار المبني على المعرفة في المطارات الدولية السعودية. وفي النهاية، أوصت الدراسة بعمل دراسة في المطارات في دول مجلس التعاون الخليجي الأخرى. وأيضاً، أوصت الدراسة ببناء قدرات رأس المال البشري وتحفيز العاملين من أجل تعزيز الابتكارية التنظيمية في قطاع المطارات.

الكلمات الدالة: إدارة المعرفة، ابتكار الخدمات، الابتكار التنظيمي، المطارات الدولية.

