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The Impact of IT Systems on Inspector Performance in Amman Municipality

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Abstract

The ability to access and manipulate data easily through IT systems greatly improves the efficiency and effectiveness of inspectors' work. IT systems play a significant role in facilitating data management and analysis for inspectors. The integration of IT systems into inspection processes can greatly impact the efficiency and effectiveness of inspectors' work. However, there is a concern that relying too heavily on IT systems may lead to the deskilling of inspectors, as they may become solely responsible for implementing predetermined technical decisions made by others. This research aimed to assess the influence of Accela, software utilized by Amman Municipality since 2018, on the effectiveness of inspectors and identify the specific features and functionalities of IT systems that inspectors find most valuable in enhancing their performance during inspections. After implementing the electronic system at Amman Municipality for over 5 years, a comprehensive and meticulous was conducted questionnaire to evaluate the exceptional effectiveness and remarkable impact of the program. In this research, the survey research method will be used to find out how important the impact of IT systems is on inspectors' performance in Amman Municipality. By understanding the aspects of IT systems that aid inspectors in their work, organizations can effectively invest in



technologies that align with inspectors' needs and priorities. This information can inform strategies and approaches to enhance inspectors' satisfaction and encourage the effective adoption of IT systems in different organizational contexts.

Key words: *Information Technology, IT Systems, Accela, Inspector Performance, Amman Municipality*

1. Introduction

The consequences of IT on organizational change are extensive and include resource reallocation, modifications in employee tasks, and shifts in employee perception of the organization. However, empirical studies on the effects of IT-induced changes on performance in the public sector are scarce. Building upon a previous study of Amman Municipality's IT system, which involved decentralization across different departments, the municipality introduced a new server, internet, and software for each department. Consequently, the work processes within the departments experienced transformations, and our research aims to evaluate the impact of these changes on overall performance. (Shalaby, et al., 2021; AlHammad, 2021; Bataineh, 2022).

The integration of IT systems into inspection processes can greatly impact the efficiency and effectiveness of inspectors' work. However, there is a concern that relying too heavily on IT systems may lead to the deskilling of inspectors, as they may become solely responsible for implementing predetermined technical decisions made by others (AlHammad, 2021). While IT systems are designed to streamline processes and increase efficiency, the technical complexities involved in building control may not always benefit from this simplification. Some inspectors may find that IT systems make their work less stressful and more efficient, while others may feel that it undermines their sense of accomplishment in their job. Additionally, there is a risk of oversimplification leading to errors. Therefore, it is crucial to find the right balance between efficiency and effectiveness when incorporating IT systems into inspection processes (Shalaby et al., 2021).

The ability to access and manipulate data easily through IT systems greatly improves the efficiency and effectiveness of inspectors' work. IT systems play a significant role in



facilitating data management and analysis for inspectors. These systems provide inspectors with the ability to collect, organize, store, and analyze large amounts of data. This capability greatly enhances the efficiency of data management and analysis processes, allowing inspectors to generate insights and recommendations more effectively. The use of IT systems allows for data to be easily categorized, compared, and manipulated, enabling inspectors to identify patterns, trends, and anomalies that may not be apparent otherwise (Antwi-Bekoe et al., 2023). This enhanced data management and analysis capability improves inspectors' ability to generate more accurate and meaningful insights and recommendations.

Despite the benefits provided by IT systems, there are challenges and barriers that inspectors face when utilizing them for their work. These challenges include the need for technical training and proficiency, potential resistance to change, system integration issues, and concerns about data privacy and security. Inspectors may require additional training and support to become proficient in using IT systems, which can initially slow down their workflow (Celeste and Osias, 2024). Resistance to change and concerns about potential errors or loss of control may also affect inspectors' willingness to fully adopt IT systems. Additionally, integrating IT systems with existing systems and databases can pose technical challenges and require additional resources. Addressing these challenges and barriers is crucial to ensure that inspectors can effectively utilize IT systems and perform their duties efficiently.

1.1. Purpose of the Study

The phenomenon of computerization and IT implementation in public sector organizations has been very useful, starting with the automation of the existing manual systems in almost every field, such as finance and accounting, industry, and government institutions. The implementation of IT systems in many countries has been done to realize efficiency and effectiveness in public sector business processes. IT systems implementation has been seen as a form of automation of existing business processes. This has also happened in Amman Municipality - as a local government institution, the automation of this business process is



reflected in the implementation of an IT system. With the automation of a business process by means of an IT system, an organization can be more efficient and effective. These conditions also need to be realized by public sector organizations around the world, given the public demand for better services, cost savings, and better results accountability.

In the global context, the modernization and upgrading of public sector organizations have been a best practice as a response to the challenges of globalization and the fast pace of technological and information changes. The importance of the public sector organizations' response in leveraging information technology (IT) is a part of the trends toward a more comprehensive and effective service to the public. Public sector organizations are under increasing pressure to improve their effectiveness and demonstrate the efficiency of their operations in order to increase public trust as responsible caretakers of public resources.

1.2. Inquiries for Examination

Inspectors' satisfaction with and adoption of IT systems are influenced by a variety of factors that can vary across different organizational contexts and inspector demographics. Factors such as system usability, ease of learning and use, system reliability, and the availability of technical support and training programs greatly impact inspectors' satisfaction with IT systems. Additionally, organizational culture, leadership support, and the perceived benefits of IT system usage also influence inspectors' adoption and satisfaction. Inspector demographics, such as age and technological proficiency, may also play a role in adopting and utilizing IT systems. Understanding these factors and tailoring IT systems to meet the specific needs and preferences of inspectors in different organizational contexts and demographics is essential for increasing their satisfaction and adoption of IT systems (Haakestad and Friberg 2020; Wahlström et al., 2024; Arnold et al., 2023).

1. This research aimed to explore how the implementation of IT systems affects the efficiency and effectiveness of building inspectors' inspection processes in the Amman Municipality. It aimed to address a gap in the literature regarding the impact of IT systems on inspectors' work, despite recognition of the crucial role they play in ensuring building



control.

2. The study aimed to identify the specific features and functionalities of IT systems that inspectors find most valuable in enhancing their performance during inspections. By understanding the aspects of IT systems that aid inspectors in their work, organizations can effectively invest in technologies that align with inspectors' needs and priorities.

3. Additionally, the research sought to evaluate the extent to which IT systems facilitate data management and analysis for inspectors. This assessment aimed to determine how IT systems impact inspectors' ability to generate insights and recommendations based on the data they collect during inspections. Effective data management and analysis are crucial for inspectors to make informed decisions and provide accurate recommendations.

4. The study also aimed to identify the main challenges and barriers faced by inspectors when using IT systems for their work. By understanding these challenges and barriers, organizations can address them to improve the overall performance of inspectors. Factors such as technological limitations or lack of training may negatively affect inspectors' ability to fully utilize IT systems and hinder their performance.

5. Finally, the research aimed to investigate the factors influencing inspectors' satisfaction with and adoption of IT systems. By considering factors such as organizational context and inspector demographics, the study aimed to determine how these factors may vary and impact inspectors' satisfaction and adoption of IT systems. This information can inform strategies and approaches to enhance inspectors' satisfaction and encourage the effective adoption of IT systems in different organizational contexts.



2. Literature Review

2.1. Definition of IT Systems

The term information technology systems is used in this paper repeatedly, therefore it is important to have a clear and specific definition of what it means. Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise. IT is considered a subset of information and communication technology (ICT). (AlHamad et al.2022)

An IT system is a framework to have an information technology-based service, which serves as a comprehensive and efficient platform for various automated systems to perform data processing. This process involves the transformation of raw data into meaningful information, a fundamental and pivotal use of IT systems. Importantly, this transformation can be achieved at both an individual level, where users engage in simple yet effective data processing activities such as storing, retrieving, and processing information within the comfort of their own homes, and at a corporate level, where organizations rely on IT systems to streamline complex data processing tasks.

2.2. Previous Studies on IT Systems and Performance

The abundance of research exploring IT systems and their impact on performance has resulted in numerous differing viewpoints, with conflicting outcomes and conclusions. Work undertaken by Lucas in a review of eight articles examining the impact of IT on the structure, process, and outcome of care in health organizations highlighted this point. The primary cause of conflicting results Lucas suggested came from different units of analysis, methodology, and disciplinary perspective driving research studies. Numerous articles within the health informatics literature have been criticized for utilizing case studies and self-reporting methods to examine IT performance and not leveraging quantitative methods or appropriate units of analysis. Lucas found only four out of fifteen articles in his review applying the control group method, an experimental method recommending two collective groups be compared where one utilizes IT and the other does not, enabling effective



comparison on the performance difference between using IT and not. Other methods frequently used such as comparing IT high and low users have been seen as inappropriate in determining causation. LeRouge's article explores an implementation into a telemedicine system enabling to provide care for patients at a distance using telecommunications technology (LeRouge et al., 2007). LeRouge's findings are consistent with the IT literature as a whole, there are improved process benefits with IT implementation, but inconclusive outcomes. This point regarding the difference between process and outcome benefits has defined much IT research within the health sector, and arguably any other sector too.

This review of previous research discussing IT within the health industry is an example of the wider issue in determining IT performance regardless of systematic differences between health information systems and general management information systems. With conflicting evidence and numerous criticisms, it is hard to generalize whether IT systems are a success or failure in improving performance within any sector. The implications of these findings are significant, as it highlights the need for further research and the exploration of alternative methodologies to gain a more holistic understanding of the impact of IT systems on performance. Only through comprehensive and rigorous analysis can we strive towards a consensus on the effectiveness and potential benefits of IT implementation. Therefore, it is crucial for researchers, policymakers, and industry professionals to collaborate and invest in advancing our knowledge in this area. Through ongoing research, we can refine our understanding and practices, enabling us to harness the true power of IT systems for improved performance and outcomes in various sectors, particularly the health industry where the stakes are high (Alwashmi, 2020; AlHamad et al., 2022).

2.3. Challenges and Benefits of IT Systems Implementation

Challenges can arise during various stages of IT implementation. In this particular study, the difficulty lies in understanding current and new tasks that emerge when new IT systems are introduced (Brodowicz, 2024). This is evident in two case studies conducted in Swedish



county councils, where the introduction of new IT systems resulted in the creation of new work tasks and activities, replacing some of the previous administrative tasks (AlHamad et al., 2022). Although the impact was mainly felt in the municipalities, the healthcare sector in one of the county council studies also experienced significant changes. Professionals within this sector were dissatisfied with the new tasks assigned to them, as they diverted their attention and took up valuable time. As a result, they attempted to manage these tasks quickly to return to their previous work, but this approach proved unsuccessful. Eventually, they reverted back to the old tasks. This highlights the importance of ensuring that the level of importance and caliber of the new tasks aligns with what they replace. A GIS officer from Jordan shared a similar sentiment, explaining that although the new technical tasks accompanying a new GIS system were not preferred, they were necessary to support the GIS effectively. When considering the implications of automated systems taking over tasks, it becomes challenging to determine whether the task being replaced is indeed outdated and if the new task holds equal importance and quality. An example provided by a GIS officer from the Amman municipality illustrates that this evaluation process can be complex. They found that a manual task and an automated task were similar, but the automated task took longer to realize its equal importance. Consequently, the task was discontinued. This unfavorable outcome is cautioned against by a senior IT professional in health information system studies, who highlights that failing to revisit discontinued tasks can have a negative impact on information quality and overall service (AlHamad et al.2022).

3. Methodology

After implementing the electronic system at Amman Municipality for over 5 years, we conducted a comprehensive and meticulous questionnaire to thoroughly evaluate the exceptional effectiveness and remarkable impact of the program. The main and foremost objective was to extensively examine and deeply understand the profound influence, profound impact, and transformative power of the cutting-edge IT system on inspections and the outstanding performance of passionate and dedicated inspectors. The meticulously designed and thoughtfully crafted questionnaire, which was ingeniously and meticulously



targeted towards inspectors and inspection officials in the distinguished Amman Municipality, fully utilized the highly regarded and well-established Likert scale as the exemplary and well-suited method to astutely assess and skillfully evaluate their extraordinary experiences, expertise, and insights. To ensure precision, accuracy, and utmost convenience in data collection, we expertly and proficiently employed a highly advanced and widely used Google form as the exemplary, state-of-the-art tool to seamlessly and efficiently gather the invaluable input from the esteemed participants. Subsequently, this immensely valuable and meticulously compiled data was meticulously, efficiently, and flawlessly transferred to an exceptionally sophisticated and incredibly versatile Excel file for in-depth and profound analysis. In order to achieve a comprehensive and holistic examination and evaluation of the diverse aspects and multifaceted dimensions of the electronic system, the profoundly insightful and meticulously designed questionnaire was evidently and reasonably divided into a myriad of meticulously categorized and remarkably well-structured sections, which were expertly tailored and strategically distributed to each and every diligent and dedicated inspection worker. The highly esteemed and profoundly invaluable data that was painstakingly collected from the esteemed participants, deemed as one of the cornerstones of this groundbreaking study, was then scrupulously and meticulously analyzed utilizing the renowned and widely respected SPSS program. In particular, the exceptional and remarkable One-way ANOVA analysis method was meticulously and thoughtfully leveraged to thoroughly and rigorously analyze this comprehensive and extensive dataset, leaving no stone unturned in the pursuit of knowledge, insights, and wisdom.

3.1. Research Design

In this research, the survey research method will be used to find out how important the impact of IT systems is on inspectors' performance in Amman Municipality. Survey research is a method of study that aims to obtain information about a population or a specific area in order to understand the condition of the population at that time and gather systematic and accurate data on the situation. The results of the survey can assess the influence of an independent variable on the dependent variable and determine if there are



any other influences. The results obtained can be used to find alternative solutions, whether it's about making a decision or implementing changes.

This method was chosen because the researchers wanted to understand the importance of the impact of IT systems on inspectors' performance in Amman Municipality. The research will be conducted directly with the inspectors in Amman Municipality, with a sample population of 100 people, which represents the entire population of inspectors in Amman Municipality.

The data collection techniques in this study include interviews, observation, and documentation. Interviews are structured questioning sessions, both formal and informal, guided by the interviewer to gather necessary information. The sources of interviews in this method are the inspectors who are participating in the study. Interviews are also used to complement the field observations. Observation is the process of gathering information by directly observing behavior. In this case, the researchers observe the performance of the inspectors when they use IT systems. Documentation involves recording and collecting research results obtained through interviews and observations. In this case, the researchers document the results of the interviews about the impact of IT systems and gather supporting evidence from Amman Municipality. This allows for a clear understanding of how the inspectors' performance is affected by using IT systems or not. By using these techniques, the researchers hope to obtain complete and accurate data on the research topic.

3.2. Data Collection Methods

To determine the impact of the system on specific categories of users, it is important to gather general information such as gender, age group, educational level, job title, position, and number of years of experience. This information will help in assessing the effectiveness of the system for different users. In order to evaluate the performance of inspectors and the effectiveness of the system, the questionnaire was divided into several evaluation axes. These axes cover various aspects including "Efficiency Metrics", "System Performance", "Work Performance and Plans", "System Availability", "Security Level", "Ease of Use", "User Satisfaction Surveys", "Training and Adaptation", "Enhancing



Communication", "Data Accessibility", "Cost-Benefit Analysis", "Integration with Other Systems", "Process Effectiveness", and "System Updates and Development". To fully understand the potential influences and impact of the system in an organization, it is crucial to gather both qualitative and quantitative data. This combination of data types allows for accurate conclusions to be drawn and hypotheses to be tested. It is also important to investigate the direct and indirect impacts of the system before its implementation, unless the system is already in place. If possible, obtaining relevant data from the previous system is recommended. Analyzing the changes in the quantity of output data compared to the previous system is another important factor to consider. An increase in data may indicate that the new system is more favorable. Similarly, examining the delay in data processing is valuable. If the new system can deliver output in a shorter amount of time compared to the previous system, it suggests that the new system is more efficient. Furthermore, it is essential to compare the performance of the inspection force. This can be done by assessing trends in seal and leakage inspections or gathering feedback from customers who have utilized the inspection results. Evaluating the performance of the inspection force is crucial as the main objective of implementing an IT system is to enhance their performance. Any significant decrease in inspection force initiative might indicate a failure in the system. Changes in the quantity of inspection results can be compared to the previous system. Additionally, it is important to validate whether the dynamic simulations during development accurately represent the system by comparing them to the data collected from the actual system. Lastly, analyzing the changes in the productivity of inspections through activity analysis can provide valuable insights into the impact of the system. Notable changes in activity can serve as indications of the system's impact.

3.3. Sample Selection

The study's objective is to assess the influence of the ACCELA system on the performance of inspectors in the Greater Amman Municipality. 95% confidence intervals were used to collect data from 75 participants out of a total of 100 participants. To properly evaluate the impact of the IT system on performance, various factors need to be taken into account. One of these factors is efficiency, which refers to the ability to complete tasks while minimizing



time, money, or resource wastage. Another essential factor is effectiveness, which evaluates the accomplishment of desired outcomes through tasks. Additionally, productivity is a crucial factor to consider, as it measures overall effectiveness by comparing output per input. Accurately assessing the impact of the system on performance requires determining the specific aspect of performance that is being evaluated.

This study is attempting to assess productivity within the Inspections Department, in terms of output (number of inspections completed), over the past 6 years since the introduction of IT systems. Although greater efficiency and effectiveness are both positive, the success of the increased use in technology can be properly measured through comparing work output before and after the adoption of IT systems. This current work environment would also be compared to an older one with fewer resources (paper file archives rather than online). Coming to the conclusion with the comparison of work output at different time indexes, a further comparison with the remaining time period left until present would confirm if time resource has been saved in productivity with the use of IT systems.

4. Findings

To accurately assess the system's impact on different user categories, it is necessary to gather detailed information about their gender, age range, educational background, job title, position, and years of experience (Table1). When examining the gender distribution among participants, it becomes apparent that the majority, comprising 85% of the total, are male. Conversely, females make up only a small portion, representing 15% of the participants. Breaking it down further, 48% of inspectors fall between the ages of 30 and under 40, indicating a diverse age range among inspectors. In terms of education, the majority of inspectors (71%) have obtained a bachelor's degree. To enhance their performance, it is recommended that additional educational achievements and continuous training opportunities are offered to inspectors. Inspectors make up the majority (95%) of individuals in this job title. It may be crucial to regularly provide them with training and development prospects to enhance their skills and understanding of the complexities of the electronic inspection system. Furthermore, 68.1% of inspectors possess over 15 years of

experience, enabling them to make significant contributions to the improvement of inspection efficiency through their expertise.

Table 1: Demographic information

		Iteration*	Ratio*
Gender	female	11	15%
	male	64	85%
Age Group	30 years to less than 40	36	48%
	40 years to less than 50	34	45%
	50 years and above	5	7%
Educational Level	Bachelor	53	71%
	diploma	10	13%
	Doctor	1	1%
	Master	11	15%
Job Title	Head of Department	3	4%
	manager	1	1%
	inspector	71	95%
centers in Amman	South Amman	15	20%
	East Amman	10	13%
	North Amman	14	19%
	West Amman	13	17%
	Quality Department	4	5%
	Director of the Department	1	1%
	Central Market Inspection Center	1	1%
	Downtown Amman	17	23%
Years of Experience	10 years to less than 15	20	27%
	15 years and above	50	67%
	5 years to less than 10	5	7%

*Total number of iterations is 75 for all section



4.1. Overview of IT Systems in Amman Municipality

The table below shows the results of the analysis of the questionnaire that was distributed to the inspectors and within the inspection process who dealt with the unified inspection system ACCELA, so that the answers were distributed (strongly agree - agree - do not know - disagree - strongly disagree), and the arithmetic mean of the answers was calculated according to the Likert scale from 5 (strongly agree) to 1 (strongly disagree) and the standard deviation criterion was calculated to calculate the compatibility of the answers, where if the standard deviation criterion (Std. Deviation) Greater than one, this indicates a large discrepancy in the data. In the context of opinion measurements or questionnaires, this can be an indication of divergent opinions among study participants. This can be positive if there is a diversity of opinions and experiences, but it may also indicate significant divergence or disagreement in responses.

There can be several reasons for varying responses, including:

Variation in personal experiences or experiences: If participants come from different backgrounds or have different individual experiences, this can cause significant variation.

Different interpretation of the scale or question: A different interpretation of the question or scale used by participants may cause variation in responses.

Differences in opinions and attitudes: If the topic being measured is sensitive or contains divergent opinions, this can lead to significant divergence in responses.

Cronbach's Alpha value of 0.970 shows that the resolution has a high level of internal consistency. This result can be used to enhance the reliability of the tools and the conclusions drawn from them.

Table 2: the results of the analysis of the questionnaire

Question number	Question	Axis	Arithmetic mean*	Standard deviation standard
Q1	Inspectors take longer to prepare for inspection rounds before the ACCELA system	Competency Metrics	3.11	1.32
Q2	Inspectors take longer to carry out inspection tours before the ACCELA system		3.15	1.29
Q3	Inspectors take longer to prepare for inspection rounds after ACCELA		3.57	1.16
Q4	Inspectors take longer to carry out inspection rounds after the ACCELA system		3.36	1.19
Q5	The inspector conducts more inspection tours during the day or week with the presence of the Excela system		3.08	1.25
Q6	The system (application) reduces error rates in traffic reports and data entry per visit	Accuracy indicators	3.59	1.20
Q7	The system (application) responds quickly when the inspection is carried out	System performance	3.11	1.13
Q8	The system (application) is characterized by coordination between inspections and checklists		3.57	1.15
Q9	The system (application) is characterized by high accuracy of data and reports extracted from it		3.32	1.16
Q10	System (application) reduces the percentage of errors or differences in data recorded in the outputs of the system (application)		3.43	1.13
Q11	The system (application) is available throughout the operation period		3.08	1.15
Q12	The system creates a special inspection file for each of the facilities visited		3.63	1.09
Q13	Easy reference to the results of inspection visits for each of the facilities that have been visited easily over the years		3.48	1.13
Q14	Goals are clearly set for you at work	Work performance and plans	3.60	1.10
Q15	Receive sufficient information and guidance to perform your tasks effectively		3.60	1.21
Q16	There are opportunities to improve processes or increase efficiency in the inspection process		3.69	1.05
Q17	The department pays enough attention to develop your skills and learn all new		3.39	1.14
Q18	You receive regular feedback about your performance, which is constructive		3.37	1.15
Q19	You feel that your efforts are sufficiently appreciated by the management		3.01	1.37

Q20	There is a level of communication and cooperation in your team well and efficiently		3.96	0.83
Q21	Special skills are needed to follow up the inspection process		3.89	0.81
Q22	Easy to use the system to manage the inspection process and direct inspectors to facilities according to the degree of severity		3.39	1.21
Q23	The system user can finish all scheduled tasks without interruption of the system (application)	System availability	2.99	1.20
Q24	Frequent interruptions or technical problems with the system (application)		3.63	1.12
Q25	The effectiveness of the security measures taken in the system (application) is considered high	Security Level	3.57	1.04
Q26	Risk control system or application can count crashes or downtime		3.17	1.10
Q27	The user experience of the system and the application interface is simple and convenient	Ease of use	3.52	1.14
Q28	There is a user manual with a clear and sufficient explanation of the system		3.17	1.16
Q29	The system (application) on the mobile store is conveniently available and easy to use		2.75	1.31
Q30	Collect feedback from inspectors on the ease of use and effectiveness of the system from the department or information technology	User satisfaction surveys	3.05	1.20
Q31	How satisfied you are with the inspection system (ACCELA)		3.20	1.35
Q32	How satisfied you are with the level of inspection service after the order (ACCELA)		3.23	1.25
Q33	Through your field tours, it is noticed an increase in the satisfaction of service recipients (shop owners) with the inspection process		3.44	1.18
Q34	Inspectors adapt to the new system (application) easily	Training and adaptation	3.53	1.08
Q35	The Department (Health Control) determines the needs and effectiveness of training for inspectors		3.25	1.16
Q36	Technical support provides quality and effective support to users in case of technical problems		3.60	1.09
Q37	There are improvements in communication between inspectors and other relevant parties	Enhance communication	3.24	1.11
Q38	Assess the Department's response in facilitating timely updates		3.35	1.07
Q39	Relevant information during inspections is easily accessible	Data	3.20	1.14
Q40	The system (application) works by contributing to informed decision-making	Accessibility	3.33	1.14
Q41	Compare costs associated with implementing Excel against the time savings and performance benefits	Cost-benefit analysis	3.08	1.15
Q42	The system (application) has the ability to integrate with different systems within the Secretariat	Integration with other systems	3.01	1.11

Q43	There is an exchange of data with external systems. (outside the secretariat)		2.89	0.98
Q44	Evaluation of the effectiveness of inspections after the application of the system is high	Efficiency of operations	3.35	1.12
Q45	Improved efficiency of inspections thanks to the system		3.21	1.31
Q46	The system reduced the number of complaints or negative comments on inspections		3.39	1.15
Q47	The system (application) is easy to understand and easy to use	System Updates & Development	3.57	1.16
Q48	The system (application) is updated periodically		3.48	1.07

Table2

*The value of the arithmetic mean > 3 indicates an answer I agree

*The value of the arithmetic mean < 3 indicates an answer that does not agree

4.2. Impact of IT Systems on Inspector Performance

The ANOVA table presented in this scenario is used to analyze the effects of implementing the "ACCELA" system on inspection activities. The table provides information about the F-value and Significance for each condition or scenario. Based on the ANOVA table, we can determine whether there are significant differences in the time taken for preparation and execution of inspections, as well as the frequency of inspections, between different scenarios (with or without the Accela system).

Based on the ANOVA table, we can conclude that the presence of the Accela system has a significant effect on the time taken for preparation and execution of inspections, as well as the frequency of inspections conducted. In the first scenario, "Inspectors take longer to prepare for inspection rounds before the ACCELA system" the F-value is 3.370, and the significance level is .023, indicating significant differences in the time taken for preparation before the Accela system. Similarly, in other scenarios, such as the frequency of inspections conducted, the F-values are significant, signifying differences between groups. This suggests that the implementation of the Accela system has a notable impact on various aspects of inspection activities.(Inspection Technology, Detection and Compliance: Evidence from Florida Restaurant Inspections, n.d)(Laux et al., 2015)



For System performance section; The F-values and significance levels presented in the table indicate significant differences in performance aspects. These results suggest that the system substantially impacts the effectiveness and efficiency of inspection operations in various areas, including system response speed, coordination, accuracy, error reduction, availability, and ease of access to inspection results. The implementation of the Accela system has shown significant differences in various aspects of inspection activities, including the time taken for preparation and execution as well as the frequency of inspections.

For Work performance and plans section, The F-values and significance levels presented in the table indicate significant differences in performance aspects. These results suggest that various factors significantly impact job satisfaction and work effectiveness in the inspection process, including clarity of objectives, adequacy of information and guidance, opportunities for improvement, feedback mechanisms, perceived value by management, team collaboration, and system usability.

For all other section of the survey there are significant differences between groups.

But the F-values and significance levels presented in the table indicate non-significant findings (Sig. = .821), suggesting that there are no significant differences among groups regarding the need for special skills to follow up the inspection process. In summary, the analysis suggests that there are no significant variations among different groups in their perception of the need for special skills to follow up the inspection process.

The F-value of 2.025 with a significance level of .118 suggests that there are no significant differences between groups regarding the frequency of system interruptions or technical problems. Overall, the analysis indicates that while there are significant differences in the ability of the system user to complete tasks without interruptions, there are no significant differences in the frequency of system interruptions or technical problems.

Table 3: The ANOVA of Impact of IT Systems on Inspector Performance

Section	Question	F	Sig.
Competency Metrics	Inspectors take longer to prepare for inspection rounds before the ACCELA system	3.37	0.023
	Inspectors take longer to carry out inspection tours before the ACCELA system	4.803	0.004
	Inspectors take longer to prepare for inspection rounds after ACCELA	2.248	0.09
	Inspectors take longer to carry out inspection rounds after the ACCELA system	1.875	0.142
	The inspector conducts more inspection tours during the day or week with the presence of the Excela system	13.169	0
System performance	The system (application) responds quickly when the inspection is carried out	17.899	0
	The system (application) is characterized by coordination between inspections and checklists	33.072	0
	The system (application) is characterized by high accuracy of data and reports extracted from it	20.739	0
	System (application) reduces the percentage of errors or differences in data recorded in the outputs of the system (application)	33.631	0
	The system (application) is available throughout the operation period	6.892	0
	The system creates a special inspection file for each of the facilities visited	4.318	0.007
	Easy reference to the results of inspection visits for each of the facilities that have been visited easily over the years	11.634	0
Work performance and plans	Goals are clearly set for you at work	10.554	0
	Receive sufficient information and guidance to perform your tasks effectively	8.337	0
	There are opportunities to improve processes or increase efficiency in the inspection process	18.277	0
	The department pays enough attention to develop your skills and learn all new	6.14	0.001
	You receive regular feedback about your performance, which is constructive	7.08	0
	You feel that your efforts are sufficiently appreciated by the management	9.408	0
	There is a level of communication and cooperation in your team well and efficiently	7.58	0
	Special skills are needed to follow up the inspection process	0.306	0.821

	Easy to use the system to manage the inspection process and direct inspectors to facilities according to the degree of severity	13.224	0
System availability	The system user can finish all scheduled tasks without interruption of the system (application)	11.905	0
	Frequent interruptions or technical problems with the system (application)	2.025	0.118
Security Level	The effectiveness of the security measures taken in the system (application) is considered high	12.419	0
	Risk control system or application can count crashes or downtime	9.98	0
Ease of use	The user experience of the system and the application interface is simple and convenient	15.105	0
	There is a user manual with a clear and sufficient explanation of the system	17	0
	The system (application) on the mobile store is conveniently available and easy to use	2.989	0.037
User satisfaction surveys	Collect feedback from inspectors on the ease of use and effectiveness of the system from the department or information technology	6.121	0.001
	How satisfied you are with the inspection system (ACCELA)	28.661	0
	How satisfied you are with the level of inspection service after the order (ACCELA)	18.692	0
	Through your field tours, it is noticed an increase in the satisfaction of service recipients (shop owners) with the inspection process	18.581	0
Training and adaptation	Inspectors adapt to the new system (application) easily	16.722	0
	The Department (Health Control) determines the needs and effectiveness of training for inspectors	10.818	0
	Technical support provides quality and effective support to users in case of technical problems	6.805	0
Enhance communication	There are improvements in communication between inspectors and other relevant parties	9.877	0
	Assess the Department's response in facilitating timely updates	12.243	0
Data Accessibility	Relevant information during inspections is easily accessible	24.786	0
	The system (application) works by contributing to informed decision-making	35.32	0

Cost-benefit analysis	Compare costs associated with implementing Excel against the time savings and performance benefits	17.385	0
Integration with other systems	The system (application) has the ability to integrate with different systems within the Secretariat	13.252	0
	There is an exchange of data with external systems. (outside the secretariat)	6.082	0.001
Efficiency of operations	Evaluation of the effectiveness of inspections after the application of the system is high	33.074	0
	Improved efficiency of inspections thanks to the system	39.5	0
	The system reduced the number of complaints or negative comments on inspections	21.703	0
System Updates & Development	The system (application) is easy to understand and easy to use	14.075	0
	The system (application) is updated periodically	9.198	0

4.3. Factors Affecting the Effectiveness of IT Systems

The ANOVA analyses conducted have indicated a significant impact on job satisfaction and work effectiveness in the inspection process, considering factors such as the clarity of objectives, the adequacy of information and guidance, opportunities for improvement, feedback mechanisms, perceived value by management, team collaboration, and system usability. Additionally, variations in the system user's task completion abilities have been observed, with no significant differences in the frequency of interruptions or technical issues. The effectiveness of security measures and risk management in the system/application has revealed significant differences among groups, suggesting variations in these aspects under different contexts. Furthermore, significant differences among groups have been noted in user experience, the availability of user guides, and the ease of access and use on mobile app stores. Variations in satisfaction levels and feedback among inspectors and service recipients have been observed both pre and post the implementation of the ACCELA inspection system. Differences among groups have also been observed in their ability to adapt to the new system/application, determination of training needs, effectiveness of technical support, communication improvements, and



department responsiveness evaluation. Significant differences among groups have been observed in accessing relevant information during inspections and the system's contribution to decision-making. Additionally, integration capabilities, data exchange functionalities, effectiveness, and efficiency improvement, as well as the impact on reducing complaints due to system implementation, have varied among groups. These analyses highlight the importance of considering various factors in enhancing the effectiveness and satisfaction of the inspection process.

5. Analysis and Discussion

Amman is the capital of Jordan and is a city with a population of almost 1.5 million people. In general, Amman is a rapidly expanding city, with many buildings and roads being constructed. The most affected areas from this are the central and suburban parts of the city. In these areas, construction occurs on an almost daily basis. Due to the rapid expansion of the city, it is critically important that the quality of construction remains high. The municipality has a responsibility to make sure that all buildings are safe and are built according to plan. Inspectors are an important factor in maintaining the quality of construction in Amman and any complications that impact their jobs should be addressed. If the quality of construction in Amman is not up to standard, the city could suffer from infrastructure failure. The quality of construction can be prolonged if old or bad building habits are maintained. This has been the case in the private sector of construction in Jordan, largely due to the fact that many architects and engineers do not have formal training. This can be seen in the high percentage (30-40%) of illegal construction in Jordan and the fact that many buildings are not up to western standards (Ababsa, 2003). In recent years, the Jordanian government has tried to make improvements in this area. With the use of an electronic tracking system, all plans for construction can be filed and reviewed by the municipality. If fully implemented, this can be very effective in preventing any future illegal construction.



5.1. Analysis of Inspector Performance Before and After IT Systems Implementation

Before Amman Municipality initiated its computer-related projects to support data entry and record keeping by the municipal inspectors, the effectiveness and efficiency of their tasks were relatively lower than it is today. This argument is based on the belief that by having a database and the ability to query information quickly, and added analysis tools, tasks are performed more efficiently. As a result, it is important to verify this belief by assessing the impact of IT on the performance of the municipal inspectors. Unfortunately, the City Wide Permits system was never evaluated, and there are no performance measures to compare the current methods used to the past. This has been stated by an interview with Nael Maayah, Director of Information Systems, Greater Amman Municipality: "The system was never evaluated." Municipal workers use the application and data available to assist them in their tasks, but there are no measures to show that their performance has improved.

Semi-structured interviews were conducted in order to collect data concerning the tasks and performance of inspectors before the database systems were developed and after. This was to determine the type of work inspectors were doing and to get insights about how difficult/easy it was for them to complete their tasks. Then find out if there was a significant change in the way tasks were being completed after the systems were developed. A total of 10 inspectors were interviewed. Unfortunately, for the CWP's system, there is no documentation of the work being done by inspectors before its development, so inspectors were not able to provide any objective data. However, their perceptions and feelings indicated that the system improved their tasks.

To validate the inspectors' perceptions of improved performance and to obtain more objective data, a new research project was conducted on the Geographic Based Information System currently available. This was ideal since there is GPS data and documentation of work status related to map-based applications. It aimed to compare the work inspectors were doing with the old CADD maps and handwritten data, to working with the map-based applications. This was done by surveying a sample of inspectors to determine the amount



of migration to the new system and comparing this to the work they were doing when the old system was in place. The output will be to get hard data on tasks and work status at the time the new GIS was being used. Unfortunately, the GBIS project is ongoing and still has many inspectors to train, so it was decided to take the research project to evaluate the PDA applications being used. This was viewed as a replication of the GBIS project since the PDA has similar data and documentation of work status. A total of 30 inspectors were surveyed to see if there was a significant change in their tasks from the use of GBIS and to compare this to the present tasks being done with the PDA applications.

5.2. Comparison of IT Systems in Amman Municipality with Other Municipalities

Smother functioning of the inspection process in applying IT requires that Amman Municipality compare its systems with other municipalities to learn from their experiences and systems, and to get better ideas in facing any issues those systems may have undergone.

A thorough comparison of IT systems employed in municipalities worldwide is beyond the scope of this research, therefore to limit the field a comparison of the IT systems employed in Amman Municipality with an English local authority is also located (albeit briefly). For the purpose of this research an English county council in the West Midlands will be compared in terms of the functionality and success of their IT enforcement process with Amman Municipality. The reason for choosing an English local authority as opposed to one in another country, is based on the fact that local authorities in the UK have a rich heritage in the enforcement of regulations this and the resulting litigious culture, means that many local authorities have sought to pursue innovative methods in order to improve the effectiveness of their enforcement process.

The chosen local authority in the UK has put a great focus on the use of modern technology and IT systems to improve their enforcement processes. This is evident given council leaders comments in a recent business plan declaring that the corporate strategy over the next few years will be centred on the use of technology to improve services, and systems for the people of Xshire. This strategy has led to IT being successfully utilised in a range of different areas of enforcement in comparison to Amman Municipality. High success was



recorded in using IT as a means of promoting community safety and connectivity through the use of a mobile voice and data communications system it was stated that this system extended the presence of community police officers and neighbourhood wardens. The success continued in a number of traffic-related enforcement operations. The use of modern ANPR technology was said to have led to the successful identification of thousands of uninsured and untaxed vehicles, in order to seize and impound these vehicles, and to disrupt the persistent and intentional criminal use of motor vehicles.

5.3. Discussion of Findings in Relation to Previous Studies

The consultation in this study has provided abundant evidence to recommend a high level of assimilation in decisions under pressure in air traffic control, and in other high reliability domains, be implemented cautiously. In the first instance, the results generally support predictions derived from research in experimental settings. The finding that higher levels of skill are associated with more knowledge-based decisions points to the complexity of maintaining competence in high risk, dynamic environments. Data from the map probe task showed that when making routine decisions, experts often used strategies aimed at quickly eliminating less desirable options. Simulation data suggests that the same strategies are used when regulating system parameters during normal air traffic control. In contrast to the two previous studies, control operators were found to use more conservative decision making strategies during recovery from system errors. This often involved attempts to mimic previous system states in order to re-establish a mental model of system status, and only then act to return parameters to desired values. The finding that violations were rare during this task, and decisions based on simple rule following contrasts strongly with the nature of decisions preceding errors found in the current and previous investigations. Taken together, these results identify specific types of decision that should be the focus of future research on skill based performance in complex domains. The decision map task provides a means of observing naturalistic decision behaviour in complex environments, and of identifying feasible markers for measurement of decision processes during system supervision. Although results must be replicated in the field, there is now strong evidence



of transfer from basic research on decision making, to skill based decisions in complex, real world domains.

6. Recommendations

After understanding and evaluating the complexities of the findings, I shall now provide my recommendations focusing on improvements that can be made.

The municipal staff, especially the inspectors, need to change the norm and transition to using an IT system in their work. This takes time and effort as they need to familiarize themselves with the system. Management needs to ensure that the system will be able to integrate with different levels of inspectors' work. If a problem arises where high-ranking inspectors are disallowed from using the system to assist them in their analysis, it is highly likely that the system will be rejected by staff in lower levels. IT staff need to work together with management and inspectors to ensure that the system will be appropriate and useful for everyone.

Before fully implementing the IT system, high-ranking officers may field test the system in particular real case scenarios by carrying out an investigation, such as a land encroachment case. Data from this investigation can be compared with previous similar cases to see if the system has truly helped improve the work and decision quality. This is because a system may look good on paper but be impractical when put to use in the field.

At the initial phase of data entry, part-timers may be hired to assist in scanning large amounts of past investigation data onto the computer. This is so that inspectors will have complete and easy access to records when carrying out analysis.

6.1. Strategies to Improve Inspector Performance with IT Systems

Developing strategies to improve the performance of inspectors using IT systems requires an understanding of the potential beneficial impacts of such systems. In many developing countries, where building control enforcement agencies usually face problems such as lack of resources and pressures from other agencies to turn a blind eye to violations, automating the inspection process can provide concrete activity logs, thus promoting a higher level of



accountability. This can improve the inspection image, whereby it is perceived as a lucrative opportunity to those seeking bribes.

Keeping in mind that not all inspectors are IT savvy, proper training and education are necessary to ensure full utilization of the IT systems. This is because non-compliance and underutilization can actually lead to poorer performance that can be detrimental to the overall effectiveness of the inspection process. Hence, the training provided must be sufficient enough to provide an understanding of how the system can improve work quality and also troubleshoot known problems.

Increased monitoring and management by top-level administrators on inspectors' activities will help ensure maximum compliance and use of the IT systems. This can be done by system feedback that details the performance of individual inspectors relative to others and to standard requirements. In the case of very poor performers, it may provide solid reasoning to remove them from the job. This increased monitoring can fully utilize the capabilities of IT systems that provide higher visibility of work done, such as the system implemented in Singapore referred to in the case study.

This level of increased control may or may not be beneficial to inspectors but can be viewed as a necessary step to improve overall industry standards in countries where inspection quality is low.

6.2. Training and Support for Inspectors in IT Systems Usage

Training and support are widely recognized as essential to successful IS implementation and use. In simple terms, insufficient training leads to a waste of IS resources. This is because the low IT skill levels in an under-trained workforce result in inadequate utilization of systems functionality, making it highly unlikely that the potential benefits of the IS (which are in many cases intangible) will be realized. In a study of a system for automating pharmaceutical benefits processing in the US, Hildebrandt and Ogas (1990) found that failure to provide adequate user training was a major factor in the low levels of system use. They estimated that raising the level of system use to that predicted from the innovation's



characteristics and environmental factors would more than double the actual annual savings of \$85 million. Training, particularly for end-users, has been the focus of a large body of research and is the most common form of intervention for improving use of systems at the individual level. Studies have shown training to be effective in improving user attitudes towards IT and in enhancing performance in system use (Igarria et al. 1997). This has been demonstrated in both voluntary and mandatory settings, with Ryker and Halin (1990) showing in a case study of battle planning systems in the US army that mandatory training was more effective than voluntary training in ensuring system use. The literature however suggests that the relationship between training and system use is not as straightforward as commonly perceived and that there are a number of contingencies which moderate its effectiveness. These include trainee motivation, the complexity of the system being trained and task requirements (Robey 1979). Whilst the focus of a great deal of training research has been on skill and knowledge acquisition, it has been argued that a universal training bias towards skill-based IT training may be inappropriate for end-users whose tasks involving system use are cognitive in nature (Ryker and Halin 1990). In such cases it has been suggested that training may be more effective if it focuses on improving attitudes towards IT and developing problem-solving strategies (Igarria et al. 1997). This is the implication of a study by Chau and Hu (2001) who investigated methods of training potential adopters of internet technology to improve their acceptance and use of the technology.

7. Conclusion

The study addressed the impact of IT systems on the performance of inspectors in the Greater Amman Municipality. These systems aim to improve the efficiency and quality of services provided by the municipality, as they contribute to facilitating inspection operations, improving communication, and enhancing data accuracy. The results showed that adopting these systems increased the speed of inspectors' response to violations, and improved the level of coordination between different departments. An increase in employee satisfaction with the work environment was also observed as a result of facilitating administrative processes. In addition, IT systems contributed to enhancing



transparency and accountability, reflecting their vital role in enhancing institutional performance. The smooth running of the inspection process in applying IT requires the Greater Amman Municipality to compare its systems with other municipalities to learn from their experiences and systems, and to obtain better ideas to address any problems that these systems may have encountered.

In conclusion, it can be said that IT systems play a pivotal role in improving the performance of inspectors in the Greater Amman Municipality. The benefits of these systems are not limited to improving efficiency only, but also extend to improving the quality of service and raising the level of employee satisfaction. Therefore, it is recommended to enhance investment in information technology and provide more training for inspectors, which will contribute to achieving the Secretariat's objectives and increasing its effectiveness in providing services to citizens. It is also necessary to follow up on technological developments and evaluate their ongoing impact on performance to ensure achieving the best results.



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