

# Understanding the Relationship Between Use of Innovative Technology and Employee Performance: A Case of the Bank of Jordan

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## Abstract

Technological implementation and innovation are considered highly critical in today's competitive and dynamic business environment. This study aimed at analysing the role of innovative technology and work practices on employee performance within the Bank of Jordan. Quantitative methods aligned with survey technique were used to gather data from managerial and non-managerial staffs of the bank. A close ended questionnaire was used for data collection. Further, statistical analysis using correlation and regression was used to explore research objectives comprehensively. This study found positive correlation between technology implementation, innovative work practices, employee attitudes and employee performance. Employee attitudes were least correlated with performance outcomes. Further, results suggest that innovative technology implementation, work practices and employee attitudes have significant impact on employee performance within the Bank of Jordan. The results of study are not generalisable considering the methodological limitations and sample size. Further researchers can expand scope of this study by incorporating large samples by taking into account triangulation approach.

**Keywords:** Innovative technology, Employee performance, Bank of Jordan

## 1. Introduction

Over the recent years, there have been tremendous changes and transformations in organisational processes owing to the implementation of Information and Communication Technologies (ICT) and innovative human resource management practices. When new technologies and practices are implemented, employees do have to go through transformation changes in their behaviour and performance. Several prior studies have noted that innovative work practices and firm performance are positively linked with each other (e.g. Cappelli and Neumark, 2001; and Van Reenen, 2011). Others have analysed that firm's performance has improved through implementation of innovative technologies (Dutse, 2015). Several researchers revealed that implementation of new technologies and innovative work practices enhance employee and organisational performance in the long run (e.g. Bresnahan et al., 2002; Melville et al., 2004; Askenazy and Caroli, 2010; Garicano and Heaton, 2010).

The aim behind introducing innovative technologies and work practices is to enhance employee performance and also to gain positive results such as job satisfaction, employee commitment, and employee involvement in jobs (e.g. Macky and Boxall, 2007; White and Bryson, 2013). Specifically, Macky and Boxall (2007) found a positive association between innovative work practices and positive attitudinal factors such as trust, job satisfaction, and organisational commitment suggesting that innovative work practices are equally important for employers and employees. Although implementation of innovative technologies has been one of the critical areas considered by firms in the past, limited literature is available to explore association between innovative technology, work practices and employee performance. Specifically from Jordanian context, there has been limited evidence about implementation of innovative technology, work practices and employee performance. Hence, the current study is conducted to fill this literature gap and assess impact of innovative technology implementation on employee performance.

This particular paper has aimed at analysing the role of implementation of innovative technology on employee performance within the Bank of Jordan (BOJ). Firstly, this paper evaluates the implementation of innovative practices and technology within the BOJ. Later, the extent to which innovative practices and technology have impacted employee performance in BOJ has been evaluated empirically. The outcomes of this particular study are significant from banking viewpoint to suggest employers about potential benefits of innovative technology and work practices for enhancing employee performance.

## 2. Literature Review

The word innovation finds its origin from the Latin word 'innovare' that means 'to create a new thing' (Tidd et al., 2001). The concept of innovation can be traced in the literature from perspective of multiple researchers such as Damanpour (1991), Dibrell et al (2008) and Ahmad (2009). These researchers agreed on definition of innovation as the process that aims at creation, development, and generation of new ideas to develop new products, services

or any other new activities. Innovation encompasses creation and implementation of novel ideas for bringing new solutions to existing problems in the organisation. Mckeown (2008) defined innovation as the process that creates new and useful things; such as introduction of new techniques, practices and process or producing new products and service. Hence, it is agreed that innovation can take place in any form such as product or service development, structure, administrative system or organisational processes.

World has become a global village which is growing rapidly in the field of high technology trends and concepts. This paves way for innovative technology to accelerate in future organizational policies (Hampel and Martinsons, 2009). Majority of the organizations in the current time face the challenges of competition as well as advancement in technology, growing the ratio of resources and their efficiency to perform, new management skills that delivers excellent leadership (Madsen et al., 2005). Through extensive research it has been found that employee attitude has to be groomed for productive performance (Bernerth, 2004).

It has been assumed that employees are indulged in the management activities for implementing innovative technology. Initially the resources are trained about the technology and various development skills which improve their knowledge level. It should be assessed that workers contribute their own approaches towards technology advancement. The staff which worked through old and new organizational systems had less productive and concerned behaviour towards their jobs. The organization had reduced such processes which circulate the attitudes that lack new system. They major firms and companies motivate their resources in order to adopt the latest technology trends and for performing well the employees are given incentives (Dauda and Akingbade, 2011).

To achieve the best of success, organizations invest heavily towards the innovative technology as well as developing their employee's performance up to the mark. They consider facilitating various tasks for job, enhance the communication modes and persuade for high levels of work efficiency. Through these measures the technological enhancement makes great impact on the employee performance and time management.

Various processes are combined and reorganized to generate innovative technology on the basis of new concepts. This innovation has a credible impact on the performance of an organization (Mumford, 2000). The basic criteria of innovative technology require internal advancement through enhancing the capabilities of employees (Pavitt, 1990). This proves a close association of innovation and performance (Huselid, 1995). It has been elaborated through the conceptual framework drawn in Figure 1.

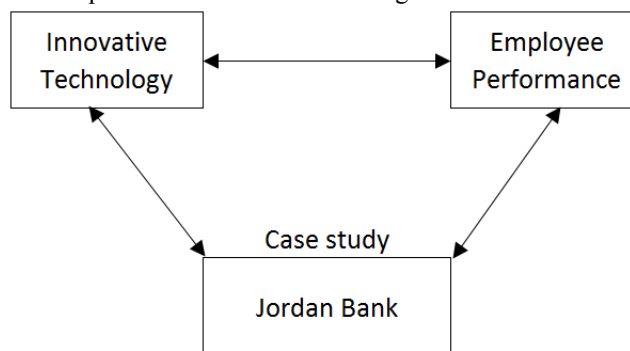


Figure 1: Conceptual framework

The productivity of any organization can be achieved rapidly if the technology applied is combined with various effective resources. This way they use the technology to perform effectively and ethically (Dauda and Akingbade, 2011). Apart from this, the employee performance is also enhanced due to innovation which benefits the firm (Lawless and Anderson, 1996). Thus the overall performance of a firm is enhanced through innovation in technology (Li and Deng, 1999).

The resources acquire knowledge based on advanced training which effects rapidly (Chi et al., 1989). The technological advancement directly influences the employee motivation (Hennessey and Amabile, 1998). A resource based theory proposed that a company's employee is highly important for the core development of human capital of the firm. This has been elaborated more through the dependency of employees, their abilities and eagerness for working. The human resource management play their role well in this regard (Mumford, 2000).

Numerous technological elements affect and influence the performance of employee (Nohria and Gulati, 1996). Majority of researchers conclude that a positive association has been achieved through advancement in technology and performance of the company (Hitt et al., 1997). They consider it credible to cultivate the productive performance overall through technology enhancement and implementation. (Foster, 1986).

Technology is destined to change contiguously and it may also have association with employee outcomes. Dutse (2015) noted that state of technological innovations and employee performance are interconnected as they have to put efforts to operate and perform on new systems. Over the recent past, organisations have developed multiple innovative working practices such as teamwork practices, job rotations, Total Quality Management (TQM), delaying and electronic working practices (Osterman, 2000; Bloom and Van Reenen, 2007). Further,

Askenazy and Caroli (2010) also emphasised that innovative working practice bring multiple changes in organisations such as production processes become leaner and responsive to market needs that ultimately lead to quick response rate, quick service delivery, reduction in production costs and higher customer satisfaction. The implementation of innovative working practices involves changes in traditional working practices such as decentralized decision making, flow of resources and communication between managerial and non-managerial staff (Askenazy and Caroli, 2010).

Ample of literature is available on outcomes of organisational changes with respect to technology implementation and employee performance. For instance, Ichniowski et al. (1997) identified positive association between innovative work practices and firm's performance within small steel firms. While others revealed positive relationship between innovative work practices and performance of large firms in relation to investment in information and communication technologies (e.g. Black and Lynch, 200; Cappelli and Neumark, 2001; Bertschek and Kaiser, 2004; Greenan and Mairesse, 2000; and Arvanitis and Loukis, 2009). Further, research also reveals that performance related with innovative technologies s largely dependent on adoption of innovative work practices within organisations (e.g. Askenazy and Caroli, 2010; and Garicano and Heaton, 2010). In the same line of thought, Guest (2002) suggested that innovative work practices and technologies improve organisational performance by enhancing job satisfaction, employee morale and organisational commitment. Further, Guest (2002) suggested that innovative working practices in firms result in higher employee satisfaction. This can be explained in a way that innovative working practices deliver high authority in hands of employees to embrace higher autonomy and control on their jobs that result in higher satisfaction level. Thomke (2006) suggests widespread applications of information technology in terms of databases and communication that paved a way for innovation. He was of the view that information technology systems facilitate researchers to access and exchange knowledge from research centres across the globe, thus contribute in innovation process. On the other hand, others presented an extended view of information technology by elaborating that IT-based systems and networks allow real time data exchanges and flows that enhance scope of innovation (Sudarsan et al., 2005; and Kleis et al., 2012).

Employees operate and work on new technologies and systems implemented in organisations; hence, their attitudes and behaviours can influence organisation's performance (Janssen & Van Yperen, 2004). The contradiction between employees' individual needs and organisational needs may differ. Organisational needs are affected by productivity growth, technological changes and employee performance behaviours. Van Reenen (2011) suggests critical role of management in aligning organisation's practices with implementation of new technology. Others have confirmed that information and communication technologies are related with innovative work practices that result in improved communication patterns, collaboration and information exchanges in organisations (Crespin and Austin, 2002). On the other hand, Bloom et al. (2010) highlighted different impacts of communication and information technologies on employees. For instance, they suggested that technologies for retrieving information result in higher autonomy while technologies that aim at decreasing cost of internal communication result in lower autonomy. Almost similar results were identified by Askenazy and Caroli (2010) who suggested that network technologies contribute in collection of information regarding organisational procedures and allow employees to accomplish their tasks effectively.

Literature has also established a link between organisational culture and adoption of innovation within organisations (e.g. Martins & Terblanche, 2003). Innovation is a critically complex process that is influenced by multiple internal and external factors within organisations. Zhu (2013) emphasised that innovation process can be initiated by innovation culture at any level of the organisation as it influences employee behaviours and attitudes to adopt innovation. Within innovative and supportive culture, employees are more likely to think openly and embrace innovative ideas, methods and techniques (Drent & Meelissen, 2008). On the contrary, a restricted and unsupportive organisational culture does not allow employees to think openly and adopt new techniques and methods resulting in restricted innovations. In this respect, Drent & Meelissen (2008) regarded innovation as an outcome of supportive organisational culture.

### **3. Methodology**

#### *3.1 Research design*

For this particular paper, case study design was used to analyse the impact of innovative technology and work practices on employee performance within Bank of Jordon. The survey case study allowed researcher to factual quantitative data from employees regarding innovative practices and technology implementation.

The researcher adhered to deductive approach to test the hypothesised association between innovation practices, technology and employee performance. The rationale of choosing this approach is to test prior propositions regarding relationship between use of sustainable and innovative technology and employee performance.

This study involved quantitative methods to get factual evidence of using sustainable and innovative technology and employee performance inn BOJ. With quantitative methods, the researcher gathered data in numerical form from research participants for statistical testing. This study aimed at testing hypothesis within

context of public sector organisations, which provides underlying principle of applying quantitative methods.

### 3.2 Data collection and analysis

Primary data was collected from managerial staff of the BOJ regarding use of sustainable and innovative technology and employee performance. Survey strategy was applied to reach target population for collecting data. The survey is suitable strategy to reach a huge population with a single questionnaire. Close ended questionnaire using Likert scale was used for conducting survey. Basically, questionnaire was adapted from prior studies on innovation technology and employee performance. The questionnaire included two main parts where the first part was aimed at getting personal information of participants whereas the second part focused on getting information regarding research variables. These variables included technology implementation, innovative work practices, employee attitudes, and employee performance. The technology implementation variable is measured in terms of implementation of electronic tools, information system and videoconferencing. The innovative work practices are measured with questions regarding innovation risks, acceptance of new ideas, encouragement of employees to set forth new ideas and management support behind new ideas. Employee attitudes were measured with questions like whether employees consider technology critical for their jobs, intent to use and adopt technology, and perception towards ease or difficulty in using technology. Lastly, employee performance was measured in terms of generating new ideas, improvement in performance, timely accomplishment of tasks, reduction in absenteeism, communication with peers, and problem resolution.

Karl Pearson's correlation coefficient formula was applied to calculate correlation between the variables of sustainable and innovative technology and employee performance. Also, to linear regression was used to check the dependency level of employee performance on sustainable and innovative technology. These two tests are appropriate to check the level of association between technology implementation and employee performance and also to see the impact of technology implementation on the dependent variable i.e. employee performance. The Statistical Package for the Social Sciences (SPSS) was used to conduct correlation and regression analysis.

### 3.3 Sample and population

The target population of this study was composed of workforce of BOJ. From this population, managerial and non-managerial staff was targeted for data collection. Managerial employees have better understanding of organisation's technology base, innovation practices and employee performance; hence, they are suitable for collecting data. For selecting the right sample size, the researcher used LeBlanc's (2004) formula:

$$SS = \frac{Z^2 * P*(1 - P)}{C^2}$$

Where,

SS = required sample size

Z = Z value (e.g. 1.96 for 95% confidence level)

C = confidence interval, expressed as decimal (e.g., .04 = ±4)

P = percentage picking a choice, expressed as decimal (.5 used for sample size needed)

The sample of 80 employees was calculated that focuses on targeting only those research subjects who are easily accessible.

## 4. Results and Discussion

Data was collected through close ended questionnaire from employees of the Bank of Jordan. From the chosen sample, 55 respondents returned completely filled questionnaires and results were analysed statistically by using SPSS software. The following table summarises the demographical data of respondents about their gender, age and employment duration in the bank:

Table 1: Descriptive Statistics

		Gender	Age	Employment duration
N	Valid	55	55	55
	Missing	0	0	0
Mean		.5333	2.0667	2.5667
Median		1.0000	2.0000	3.0000
Mode		1.00	1.00	1.00
	Sum	16.00	62.00	77.00

Table 2: Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Female	26	47.3	47.3	47.3
Male	29	52.7	52.7	100.0
Total	55	100.0	100.0	

The descriptive statistics of gender revealed that a composite sample of males and females was chosen. Almost 47.3% respondents were females while 52.7% were male respondents.

Table 3: Age

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 21-30	20	36.4	36.4	36.4
31-40	19	34.6	34.6	70.9
41-50	9	16.4	16.4	87.3
above 50	7	12.7	12.7	100.0
Total	55	100.0	100.0	

The descriptive results respondents' age state that 36.4% respondents were in the age bracket of 21-30 years. 34.6% respondents were in the age bracket of 31-40 years and 16.4% were between 41 to 50 years. 12.7% respondents were above 50 years of age.

Table 4: Employment duration

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1-4 years	18	32.7	32.7	32.7
5-8 years	4	7.3	7.3	40.0
9-12 years	16	29.1	29.1	69.1
above 12 years	17	30.9	30.9	100.0
Total	55	100.0	100.0	

The descriptive statistics regarding employment duration suggested that most of respondents were working in the BOJ for more than 9 years (60%). 7.3% respondents were serving the bank for 5-8 years while the rest of respondents were working for the bank for 1-4 years.

Correlation analysis was conducted to evaluate association between employee performance, technology implementation, employee attitudes and innovative work practices within BOJ.

Table 5: Correlation

		Technologyimplementation	InnovativeWorkpractices	EmployeeAttitudes	EmployeePerformance
TechnologyImplementation	Pearson Correlation	1	.741**	.532**	.834**
	Sig. (2-tailed)		.000	.001	.000
	N	55	55	55	55
InnovativeWorkpractices	Pearson Correlation	.741**	1	.983**	.678**
	Sig. (2-tailed)	.000		.000	.002
	N	55	55	55	55
EmployeeAttitudes	Pearson Correlation	.532**	.983**	1	.432**
	Sig. (2-tailed)	.001	.000		.124
	N	55	55	55	55
EmployeePerformance	Pearson Correlation	.834**	.678**	.432**	1
	Sig. (2-tailed)	.000	.002	.124	
	N	55	55	55	55

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

This study found that employee performance is highly correlated with technology implementation (0.834) and innovative work practices (0.678). On the other hand, employee attitudes are least correlated (0.432) with employee performance within BOJ suggesting that attitudes of employees regarding adoption of technology and innovative practices are less likely to influence their performance.

Regression analysis was conducted to see the exact impact of innovative work practices, technology implementation and employee attitudes on employee performance.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.874	.889	.872	.716

a. Predictors: (Constant), Recruitment, Appraisal, Compensation, Training

Table 7: Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3443.962	4	860.991	1.817E3	.001
	Residual	38.375	81	.474		
	Total	3482.337	85			

a. Predictors: (Constant), Recruitment, Appraisal, Compensation, Training

b. Dependent Variable: Retention

Table 8: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	14.251	.168		84.82	.000
Technologyimplementation	0.57	.017	.050	3.360	.001
InnovativeWorkpractices	.186	.017	.261	11.195	.000
EmployeeAttitudes	0.492	.022	.702	22.080	.000

a. Dependent Variable: Retention

The regression analysis revealed that overall model is significant. This implies that innovative technology implementation, innovative work practices and employee attitudes have positive impact on employee performance

in BOJ. The P value is less than 0.05 that implies that BOJ can enhance employee performance through positive employee attitudes, implementation of technology and introduction of innovative working practices.

The results indicated that BOJ has implemented innovative technology in the form of electronic communication tools, information system and databases to help employees to have access to information. The technology aided information system has assisted employees to accomplish their tasks timely, communicate with management and peers adequately and also to undertake higher responsibility for accomplishing organisational tasks. This technology implementation has allowed employees to access information and also to respond customer needs timely. However, employee attitudes play a critical role in achieving positive performance outcomes when a new technology is implemented in organisation. The literature has also revealed that employee perception and attitudes are critical in technological change within an organisation (Guest, 2002). If employees perceive new technology as ineffective, inadequate, irrelevant or useless for them, it is more likely that their performance will not get improved. When employees have positive attitudes to accept new technology and working practices, their behaviours align with the organisation and they are more likely to produce positive outcomes (White and Bryson, 2013). New technology and working practices require employees to adapt to new environment and management support is critical to align employee attitudes with new working practices. In this regard, the role of organisational culture is highly critical to support employees to put forth new ideas and proposals. This is only possible when innovation supported culture is cultivated in the organisation along with innovative work practices (Askenazy and Caroli, 2010). The study of Macky and Boxall (2007) has also endorsed this idea that employees need to be trained to work on new technology and must learn new skills to adapt technological innovations. This study found that management of BOJ has supported employees to set forth new ideas rather than discouraging them to think out of the box. As indicated by Martins and Terblanche (2003), when employees are supported by management to adapt technological change, they are more likely to perform better. Moreover, the bank has allowed employees significant autonomy in decision making that creates more opportunities for innovation. In this case, management has positively assisted employees in BOJ to adapt to new technologies and share new ideas resulting in positive performance outcomes. These results are aligned with previous studies that have confirmed positive impact of new technology implementation and innovative work practices on employee performance (Dutse, 2015). Further, results are also supported by previous studies; such as Thomke (2006), that indicated technology implementation is critical for innovation and higher employee performance because information technology facilitates improved knowledge management and access to huge information resources that further help in creating innovations. These results are also endorsed by other scholars who emphasised that information technology facilitates smooth flow of information and resources in real time thus enhance scope of innovations (Sudarsan et al., 2005; and Kleis et al., 2012).

The first objective of this study was to evaluate the ways by which the Bank of Jordon has implemented new technology. It was found that the BOJ has implemented new technology in terms of information systems, electronic tools, and innovative work practices. From results of this study, it can be interpreted that workplace innovations serve as critical condition in order to get successful innovations and higher employee performance (Cappelli and Neumark, 2001). Therefore, the policy makers of the Bank of Jordon must understand that workplace innovations represent organisation's characteristics rather than an individual's characteristics and employee ability to deal with competitive working conditions. Hence, management of the bank needs to grow an innovative culture for reaping best results from employees.

The other aim of the study was to evaluate the extent to which technology implementation influences employee performance within the BOJ. As indicated by results, implementation of new technology in the BOJ has resulted in improvement in employee performance. In relation to innovative workplace, technology implementation can enhance employee performance when it is done appropriately. This is because when employees have access to resources and information adequately, they are more likely to provide new ideas and develop innovations (Guest, 2002). Results of study have also indicated that the Bank of Jordon has shown fine commitment for implementation of new technology with the aim of improving employee and organisational performance. This technology has enabled employees to complete tasks timely and efficiently as well as equipped them with ability to produce innovative solutions of problems (Greenan and Mairesse, 2000). An employee who works on a certain electronic device for transferring funds in the bank can also simultaneously handle other activities such as account opening. Within innovative workplace in a bank, employees are not supposed to wait or stop at moments for working manually. In this way, the built-in technological solutions in the BOJ have aided employees to perform error free efficient tasks. These results are in line with the prior study conducted by Kim and Davidson (2004) that revealed that investment of banks on information technology leads to reduction in payroll, increase in employee productivity and improvement in overall profitability and revenues.

The prior literature has also widely accepted the association between technological implementation and organisational performance in the wider perspective (e.g. Janssen & Van Yperen, 2004). Other than implementation of new technologies in banks, the point of concern for management is to look at employee innovative attitudes and behaviours by which they develop new ideas and work practices (Black and Lynch, 2001).

This study found that employee attitudes towards technology do impact their performance; however, the level of association between employee attitudes and performance was comparatively low (0.432). This emphasises that the management of the BOJ needs to focus on developing innovative behaviours in employees for successful implementation of technology. Mere focus on investment on new technology and ignorance of employee behaviours, attitudes and training will not be effective to develop innovations. These results are in line with the prior literature that implies that successful innovations result from combination of resources, technology, and innovative culture in organisations (Janssen & Van Yperen, 2004).

## 5. Conclusion

This study concludes that innovative working practices and technology are critical in the current competitive and globalised environment. From banking perspective, information system and innovative working practices are highly critical. This study concludes that the Bank of Jordan has implemented sophisticated communication technologies and information systems for managing employees and also to cater business needs in effective manner. With adequate management support and positive employee attitudes, technology implementation and innovative working practices have been successful in the BOJ to derive higher employee performance. However, the association between employee attitudes, technology implementation and employee performance emphasises on management support to persuade employees for adapting new technologies.

This study proposes some important managerial implications for the management of BOJ for improving employee performance through technological changes. First, employees need to be trained frequently for embracing technology and learning how it works. Second, management should support employees by engaging them in technological change process. This would help employees to understand purpose of technological implementation and will also make it easy for employees to adapt technology. One more managerial implication could be the arrangement of innovative work practices in terms of flexible working, management support, and acceptance of new ideas within the organisation.

The results of study are limited to case of the Bank of Jordan and could not be generalised to entire banking sector of Jordan. The future research can be conducted by incorporating more methodological stances for comparing innovative work practices in more than one banks in Jordan in order to determine the potential impact on employee performance.

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