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Analyzing the determinants influencing technology-driven initiatives in project-based organizations in Pakistan using a hierarchical component modeling approach

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ABSTRACT

The purpose of this paper is to identify and analyze the determinants influencing technology-driven initiatives in project-based organizations in Pakistan. Technology-driven initiatives help organizations to improve the efficiency and effectiveness of business processes, products, and services and are a major source of competitive advantage. These initiatives have become more important for project-based organizations to improve project efficiency, reduce cost, and enhance effectiveness. Many organizations in Pakistan have structured their hierarchy as project-based organizations and strived to implement technology-driven initiatives to enhance innovation and improve project performance. However, for envisaged improvement, the well-recognized determinants influencing technology-driven initiatives have not been previously analyzed in this context. This study has filled this gap and identified and analyzed four determinants influencing technology-driven initiatives in project-based organizations in Pakistan. This has achieved by developing an explanatory model and testing the model using sample data from 98 respondents. The PLS-SEM-based hierarchical component modeling approach has been applied for data analysis. The results indicate that human resource management practices and organizational culture positively influence technology-driven initiatives in this context. Political deadlocks negatively influence technology-driven initiatives. However, leadership inaction shows no significant influence on technology-driven initiatives. The results are useful for theory and practice.

1. Introduction

Modern organizations in today's global economy are required to remain competitive in the marketplace to outshine their competitors (Gholami and Shahroodi, 2016). In order to stay competitive, these organizations need to continuously evolve their business processes through the use of new and emerging technologies (Affeldt and Junior, 2013). Such technologies help organizations to control their strategic objectives, understand their position relative to their competitors, monitor relationships with suppliers, and learn about customers (Samad, 2018). New technology enables organizations to stay more in touch with the market. It helps to identify new opportunities and improves the efficiency and effectiveness of business processes and products/services.

The term "technology-driven" cab be defined as a "management philosophy that pushes for the development of new goods or services based on a firm's technical abilities instead of proven demand: to make keys first and then look for locks to open. Practically every breakthrough innovation is based on a technology-driven orientation" (Businessdictionary.com). These initiatives are paramount to transform organizations into more innovative, effective, and responsive entities. Thus, technology-driven initiatives are vital for the success

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and sustainability of the organizations as these are the major sources of competitive advantages (Pietrewicz, 2019). However, implementation of technology-driven initiatives requires organizational change management at a large scale which is a cumbersome process. Many technical and non-technical factors are involved in this process of change management (Owens and Khazanchi, 2018; Jemala, 2012; Narasimhan et al., 2010). Hence, it is essential for organizations to recognize and develop aligned business processes and competencies to acquire new advantages (Owens and Khazanchi, 2018).

Nevertheless, many businesses divide or organize their work in the form of programs and/or projects to accomplish their goals. Project-based organizational structure is more suitable for such businesses as they need or expect enhanced efficiency, reduced cost, increased responsiveness, and fast innovation. Project-based organizations cover many organizational forms which produce temporary systems to perform their work. Such organizations accomplish most of their work as projects and prefer project hierarchy over the functional arrangement. Technology-driven initiatives have become more important for project-based organizations to improve project efficiency (to complete the project in time), reduce cost (to execute the project within budget) and enhance effectiveness (to deliver the product according to specifications).

In Pakistan, many organizations have structured their hierarchy as project-based organizations. Many technology-driven initiatives have been implemented to enhance innovation and improve project performance. However, for envisaged improvement, the well-recognized determinants influencing the implementation success of technology-driven initiatives have not been fully grasped especially in the project-based organizations in Pakistan. This study has filled this gap and identified and analyzed the determinants influencing the technology-driven initiatives in the project-based organizations in Pakistan.

The rest of the paper proceeds as follows: The next section provides the literature review and theoretical foundation followed by the hypotheses and research model. The fourth section presents the methodology followed by the results and discussion. The conclusion is provided in the last section.

2. Literature review and theoretical background

2.1. Technology-driven initiatives

In today's global business environment, most modern organizations depend on some sort of technology for their operations and collaboration with stakeholders. Specifically, information and communication technologies have changed the business models of many organizations and provided several benefits to organizations including operational efficiency, product differentiation, customer intimacy, and competitiveness. The five most vital technologies which have transferred the dynamics of global businesses are mobile and cloud computing, machine learning, and big data, intelligent manufacturing and censoring, drones and robotics, and clean energy technologies. These technologies have not only changed the employees' ways of work but also changed the fundamental nature of businesses. The latest great wave of technology adoption is social media which enhanced the social interaction among businesses of all types. Due to the increasing dependence of organizations on technology-driven initiatives, there are also many threats associated with the implementation of these technologies. Implementation of technology-driven initiatives is not a straightforward practice. It requires business and social re-engineering at a large scale because organizations are not only business or technical entities but also social entities. Gold et al. (2001) suggested that purposeful technology must be an integral part of organizational structure. It must encompass information, competence, and roles and responsibilities of business departments. To establish an appropriate technology infrastructure, the organizational absorptive capacity is essential as technology has more influence on conditions that stimulate business innovation. Therefore, technology and business should share their common objectives. Kamal (2011) argued that the implementation of technology-driven initiatives in organizations helps in transferring them into innovative, effective, and responsive business entities. Their study asserted that the implementation of technology-driven initiatives requires change management and innovation process based on an appropriate adaptation mechanism that can facilitate tracking technology, development needs, change in organizational culture, and personnel tasks. The purpose of implementing technology-driven initiatives may be different for different organizations. However, all organizations share some common attributes. In terms of innovation adoption, Rogers (1983) identified five general attributes of successful implementation of technology-driven initiatives in organizations. These include relative advantage, compatibility, complexity, observability, and trialability. Relative advantage deals with the extent to which a technology-driven initiative is considered as being better than its predecessor. Compatibility pertains to the extent to which a technology-driven initiative is perceived as being consistent with the existing values, needs and past experiences. Complexity measures the extent to which a technology-driven initiative is considered as being difficult to implement. Observability encompasses the extent to which the results of a technology-driven initiative are observable by others. Trialability involves the extent to which a technology-driven initiative is experimented before adoption.

2.2. Determinants influencing technology-driven initiatives

Previous studies have identified various determinants which influence the implementation success of technology-driven initiatives in organizations. The summary of the literature review on the well-cited determinants influencing technology-driven initiatives in various settings is shown in Table 1. Among these determinants, human resource management (HRM) practices play a crucial role as human resources are considered a big organizational asset for change management (Laursen and Foss, 2003). Moreover, a conducive technology acceptance culture is paramount because culture is central to accelerating technology-driven initiatives (Ziaei Nafchi and Mohelská, 2020). Furthermore, organizational politics plays an important role in the success or failure of technology-driven initiatives (Kacmar and Carlson, 1997). Above all, leadership plays an important role in the whole process of implementing technology-driven initiatives (Cortellazzo et al., 2019; Cho et al., 2011). Conversely, passive leadership (leadership inaction) contributes negatively to technology-driven initiatives (Toor and Ogunlana, 2009).

Table 1: Determinants influencing technology-driven initiatives

Determinant	Definition	Cross reference from the literature
Human Resources Management Practices	Strategies and policies exercised by the organization for assuring efficient working of employees to accomplish organizational objectives and goals.	Easa and Orra (2020); Abdullah et al. (2009); Jiménez-Jiménez and Sanz-Valle (2005); Laursen and Foss (2003)
Organizational Culture	A system of shared values and beliefs that produces norms of behavior and establishes an organizational way of life.	Ziaei Nafchi and Mohelská (2020); Karahanna et al. (2005); Harrington and Guimaraes, (2005); Doherty and Doig (2003); Fedrick (2001); Gold et al. (2001); Dasgupta et al. (1999)
Political Deadlocks	A social influence directed at those who are entrusted to ensure rewards and can help to protect and promote self-interests.	Behrens (2012); Zittel (2009); Kacmar and Carlson (1997); Warne and Hart (1996); Dunford (1992); Hirschheim and Newman (1991); Robey et al. (1989)
Leadership Inaction	A very passive approach to lead through which a leader does not effectively perform his obligations with interest.	Hoving (2010); Toor and Ogunlana (2009); Fullan (2009); Einarsen et al. (2007); Yukl (1999)

The adequate HRM practices enable the organizations to attain their goals and objectives more efficiently and effectively. Aleem and Bowra (2020) identified that majority of HRM practices emphasize employees' satisfaction and retention because human resources is a key dynamic asset to gain competitive advantage. Obviously, positive feelings of employees regarding HRM practices facilitate them to remain in the organizations. HRM practices can be divided into four categories including recruitment and selection, training and development, compensation, and performance evaluation (Huynh et al., 2020). Recruitment and selection practice deals with the notion that the right people should be placed at the right jobs at right time. This contains the identification of job nature and utilizations of recruitment and selection process for assuring exact match in the organization. In other words, the process of recruitment and selection consists of hiring relevant people, selecting suitable applicants from the available pool of applicants, and sometimes firing employees. Training and development practice encompasses all activities related to the training and development of employees in organizations. Compensation practice deals with developing and implementing pay packages and benefit schemes for the employees and the organization. Performance evaluation practice refers to the evaluation of organizational targets and objectives after a regular interval of time. It involves both employees and the organization.

Moreover, employees' behavior and organizational performance are strongly influenced by organizational culture. Organizations with hard-to-imitate cultures often enjoy a competitive advantage over others. Anderson et al. (2010) found that the majority of business leaders perceive that corporate culture is equally important as corporate strategy. Researchers have found that organizational culture positively affects organizational performance in terms of profits, market shares, sales, and revenues (e.g., Kristof-Brown et al. (2005)). Giberson et al. (2005) highlighted that organizational performance can be enhanced through organizational culture if shared values are appropriate for the organization in question. For instance, in a culture of high-tech organizations, organizational performance can be enhanced through innovativeness and adaptability. Kilmann and Saxton (1983) described that organizational culture can be divided into four norms including task support, task innovation, social relationship, and personal freedom. Task support norms pertain to information sharing, efficiency concerns, and helping others. Task innovation norms cover stressed creativity and using different and new approaches. Social relationship norms encompass rules for socializing and friendships with others. Personal freedom norms involve regulating self-expression, exercising discretion, and pleasing oneself.

Furthermore, Ferris and Kacmar (1992) argued that organizational politics is a common way of life in all types of organizations. It is a social influence directed at those who are entrusted to ensure rewards and can help to protect and promote self-interests. Kacmar and Ferris (1993) identified three main causes due to which organizational politics or political deadlocks emerge in organizations including political behavior, going along to get ahead, and pay and promotion policies. Political behavior in organizations is enhanced when there are no formal rules and regulations present in organizations. Due

to the absence of formal rules and regulations, individuals create their own rules and regulations based on their behavior and clues to serve their own interests. They take the benefits of uncertainty in decision-making and make decisions based on their own interpretations of available data. Multiple interpretations of the same information results in poor decision-making which can affect those who are not directly involved in this process. Going along to get ahead means a lack of action. In this situation, non-political individuals serve their self-interests by not interfering with the motives and agendas of political individuals. Individuals who" don't rock the boat" are often seen as non-threatening by individuals who are acting politically. Therefore, these non-political individuals are usually liked and received valued rewards at the cost of not interfering with politically acting individuals. Going along to get ahead or lack of action is seen as a suitable approach to advance one's own self-interests, especially in a politically obsessed organizational environment. Pay and promotion policies deal with the notion that how organizations can provide incentives and enable political behavior through the implementation of policy. Consciously or unconsciously, the HRM system of any organization may reward those who engage in influence behavior and penalize those who do not engage in influence behavior. This results in a political culture in which all HRM decisions are made. Burke (2006) argued that examining the negative attributes of leadership can help in understanding the holistic view of ineffective leadership. Schaubroeck et al. (2007) emphasized that such types of investigations can help to understand how leadership effectiveness can be increased by reducing negative factors which result in ineffective leadership. Yukl (1999) added that leadership inaction becomes obsessed with personal authority and power and may resort to self-centered behavior, one-way communication, intimidation, manipulation, coercion, and narcissism. It possesses many passive attitudes and behaviors including lack of management skills, lack of strategic thinking, lack of team-building skills, and spending more time on irrelevant matters. According to Lombardo et al. (1988), inability to build a cohesive team, being overly ambitious, over and under-managing, demanding of subordinates, being insensitive, not supportive, cold behavior, arrogant, poor relations with followers, and overriding personality defects are the major traits of leadership inaction. Einarsen et al. (2007) specified supportive-disloyal and tyrannical leadership as leadership inaction and Lombardo et al. (1988) recognized derailed leadership as leadership inaction. However, this study focuses on leadership inaction in terms of laissez-faire leadership and management by exception as proposed by Bass and Avolio (1997).

2.3. Hypotheses and research model

HRM practices are vital for attaining and sustaining competitive advantage which further leads to organizational success. These practices are also crucial for sustained technological innovation in organizations (Easa and Orra, 2020). Abdullah et al. (2009) found that high-quality human resources and related practices result in differentiated products/services and technological innovation. Laursen and Foss (2003) asserted that a set of HRM practices is needed to create an innovative environment in organizations. Jiménez-Jiménez and Sanz-Valle (2005) revealed a positive relationship between internal career opportunities, compensation and incentives, performance evaluation, and technological-driven innovation. Shipton et al. (2006) found that training and development and induction and appraisal influence organizational learning. Similarly, Li et al. (2006) found that HRM practices of process control, employees' training, and immaterial motivation are positively associated with technology innovation, and technology innovation further enhances organizational performance. Thus:

H1: The extent to which HRM practices are implemented in project-based organizations in Pakistan positively influences the success of technology-driven initiatives.

Employees' behavior, innovative capabilities, and performance are strongly affected by cultural norms. Various task behaviors at the workplace are the result of underlying cultures. Karahanna et al. (2005) advocated that the work behavior of employees is strongly affected by the relative influence of professional or organizational culture. They further contended that organizations should evaluate the importance of organizational culture and its influence on technology-driven initiatives. Researchers have investigated the influence of organizational culture on technology infrastructure flexibility (Syler, 2003), technology implementation success (Fedrick, 2001), technology adoption and diffusion (Dasgupta et al., 1999), and technology implementation success and absorptive capacity (Harrington and Guimaraes, 2005). Others have investigated the effect of organizational culture on specific technologies like the implementation of data warehouses (Doherty and Doig, 2003) and the implementation of knowledge management (Gold et al., 2001). Hence:

H2: The extent to which organizational culture is conducive in project-based organizations in Pakistan positively influences the success of technology-driven initiatives.

Dunford (1992) argued that organizations are political units that contain individuals and/or groups of individuals with competing needs. Robey et al. (1989) advocated that technology-driven initiatives especially information systems projects are usually executed in some political environment because such initiatives not only change the methods of working but also put threats to the status quo and

formal power structures in organizations. Dunford (1992) noted that organizational politics comes into existence when organizational-wide technology-driven initiatives are implemented. Hirschheim and Newman (1991) found that the implementation success of information system projects is negatively affected by political deadlocks among stakeholders. They further found that conflicts between stakeholders generate political deadlocks which further negatively influence implementation success. Warne and Hart (1996) described that organizational politics and especially political deadlocks among key stakeholders negatively affect the implementation success of technology-driven initiatives. He states "if developers ignore the politics endemic in large, intra-organizational developments they risk the project becoming embroiled in a number of destructive; time-consuming disputes." The stakeholders must have a clear understanding of organizational political dynamics and how political deadlocks influence the implementation success of technology-driven initiatives. Thus:

H3: The extent to which political deadlocks are presented in project-based organizations in Pakistan negatively influences the success of technology-driven initiatives.

Courville (2011) described that leadership in technology-driven initiatives is responsible for promoting technology for business purposes. He further contended that leadership promotes technology integration to improve employees' learning. He contends that leadership "must be able to understand and adapt to changing technologies and guide an organization towards accepting and implementing that change." Cowie et al. (2011) asserted that leadership must have context which should be communicated among the employees responsible for implementing technology-driven initiatives. They further argued that active leadership is paramount for any technological innovation in organizations that requires funding, infrastructure, and professional development. On the other hand, leadership inaction has a negative influence on the implementation of technology-driven initiatives (Fullan, 2009). If leadership shows no interest in technology-driven initiatives, then organizations often face negative consequences in the form of financial and reputations loss. Yukl (1999) found that leadership inaction becomes obsessed with personal authority and power and consequently is counterproductive for the implementation of technological innovations. Hence:

H4: The extent to which leadership inaction exists in project-based organizations in Pakistan negatively influences the success of technology-driven initiatives.

According to the hypotheses, technology-driven initiatives are positively influenced by HRM practices and organizational culture whereas negatively influenced by political deadlocks and leadership inaction. Based on these statements, an explanatory research model was formulated to represent the hypotheses pictorially. The research model is shown in Fig. 1. HRM practices (HRMP), organizational culture (OC), political deadlocks (PD), leadership inaction (LI), and technology-driven initiatives (TDI) are complex and generic concepts. Therefore, all these constructs were modeled as second-order latent constructs. Becker et al. (2012) guided that higher-order constructs are represented (reflective) or constituted (formative) from their lower (first) order constructs. Thus, HRMP was constituted from its four underlying first-order constructs i.e. recruitment and selection (RS), training and development (TD), compensation (COMPEN), and performance evaluation (PE). Moreover, organizational culture (OC) was constituted from its four underlying first-order constructs i.e. task support (TS), task innovation (TI), social relationship (SR), and personal freedom (PF). Furthermore, political deadlocks (PD) were constituted from its three underlying first-order constructs i.e. general political behavior (GPB), go along to get ahead (GAGA), and pay and promotion policies (PPP). In a similar way, leadership inaction (LI) was constituted from its two underlying first-order constructs i.e. management-by-exception (MBE) and laissez-faire leadership (LFL). Lastly, technology-driven initiatives were constituted from its five underlying first-order constructs i.e. relative advantage (RA), compatibility (COMPT), complexity (COMLEX), observability (OBS), and trialability (TRIT).

3. Methodology

3.1. Operational measures

Technology-driven initiatives (TDI) were assessed using 20 items of multifaceted technology innovation and diffusion scale designed by Moore and Benbasat (1991). The scale contains five facets i.e. relative advantage (4 items), compatibility (4 items), complexity (4 items), observability (4 items), and trialability (4 items). HRM practices (HRMP) were assessed using 20 items of a multifaceted scale adapted from Tessema and Soeters (2006). The scale contains four facets i.e. recruitment and selection (4 items), training and development (4 items), compensation (4 items), and performance evaluation (4 items). Organizational culture (OC) culture was assessed using 16 items of the multifaceted organizational culture scale designed by Kilmann and Saxton (1983). The scale consists of four facets i.e. task support (4 items), task innovation (4 items), social relationship (4 items), and personal freedom (4 items). Political Deadlocks (PD) were assessed using 12 items of multifaceted perception of organizational politics scale constructed by Kacmar and Carlson (1997). The scale consists of three facets i.e. general political behavior (3 items), go along to get ahead (3 items), and pay and promotion policies

(3 items). Leadership inaction (LI) was assessed using 6 items of a multifaceted MLQ scale constructed by Bass and Avolio (1997). The scale consists of two facets i.e. management-by-exception (3 items) and laissez-faire leadership (3 items). All items were assessed on a "five-point Likert scale ranged from completely disagree=1 to completely agree=5."

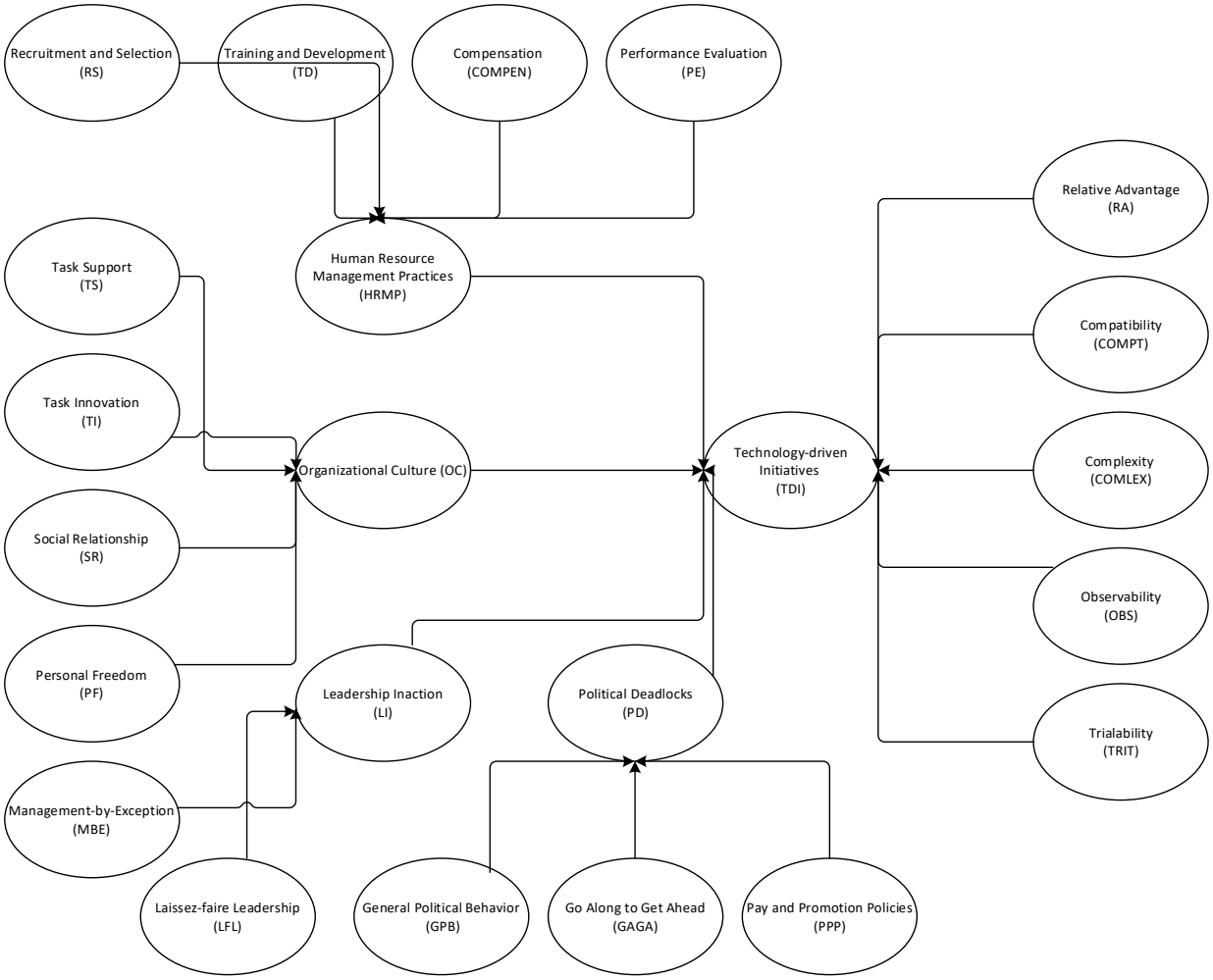

Fig. 1: Research model

3.2. Sampling technique and sample

The purposive sampling technique was applied to pick the right respondents from project-based organizations in twin cities i.e. Islamabad and Rawalpindi, as this technique is considered much simple and well recognized. This technique is more effective in situations when respondents are difficult to access or unwilling to provide data. The unit of analysis was individuals who were mainly Director Generals (Projects), Project Directors, Project Managers, and Project Officers/Coordinators. In order to estimate the minimum sample size, the researchers used Marcoulides and Saunders (2006) guidelines for minimum sample size calculation. The calculated minimum sample size was 80. We distributed 160 questionnaires through email and by hand expecting a response rate of 50%.

3.3. Data collection technique

Survey questionnaires are considered an effective data collection technique to reach a large number of respondents in an economic and efficient way, this study used survey questionnaires to collect relevant data due to the nature of its research questions.

3.4. Data analysis approach

For the analysis of the collected data, we applied the "PLS-based structural equation modelling" technique. According to Fornell and Larcker (1981), PLS is a "variance-based structural equation modelling" technique for testing hypothesized relationships. PLS is applicable for small samples which are non-normally distributed (Peng and Lai, 2012). Particularly, we used Smart PLS version 3.2.7 in order to analyze the collected data.

4. Results and discussion

4.1. Sample characteristics

Within the due time of two weeks, 55 respondents returned the completely filled questionnaires. Subsequently, a reminder was sent

to the remaining respondents. As a result, 43 more respondents returned the completely filled questionnaires. In this way, 98 valid questionnaires were returned. This constituted a response rate of 61.25%. Table 2 provides the sample characteristics of the respondents which show that majority of the respondents were Project Directors (32.66%) followed by Project Managers (30.61%) and Director Generals (Projects) (26.53%). However, less number of respondents (10.20%) were Project Officers/Coordinators. Moreover, the average experience of the respondents was 6 years and the majority of the respondents held a master's degree (62 out of 98) followed by a bachelor's (24 out of 98) and below bachelor's (12 out of 98). Furthermore, the majority of the respondents were males (72 out of 98) and a fairly less number of females (26 out of 98) participated in this study than males.

Table 2: Sample characteristics

	Frequency	Percentage
Role in organization		
Director General (Projects)	26	26.53
Project Director	32	32.66
Project Manager	30	30.61
Project Officer/Coordinator	10	10.20
Experience		
Experience in Years (Median)	6	
Qualification		
Master Degree	62	63.27
Bachelor Degree	24	24.49
Others	12	12.24
Gender		
Male	72	73.47
Female	26	26.53

4.2. Test of non-response and common method bias

Peytchev (2013) argued that non-response bias (NRB) occurs in survey research when the respondents and non-respondents vary in a meaningful way. He further added that the credibility of the results may be compromised if NRB exists in the data. We applied "Levene's Test for Equality of Variances" to test the variance between early and late responses. The results showed that all the principle latent constructs had a p-value greater than 0.05 at a 95% confidence level. This indicated that there was no significant difference in the early and late responses. It means both types of respondents belong to the same population. Hence, there was no issue with NRB in the data.

Podsakoff et al. (2003) argued that common method bias (CMB) occurs in survey research when data for independent and dependent constructs are received from the same respondents. Tehseen et al. (2017) mentioned that the quality of the results is significantly compromised if CMB exists in the data. Various researchers have suggested various techniques to control CMB. However, we applied two techniques. First, "Harman's single factor test," proposed by Podsakoff et al. (2003) was applied. In this test, principal component analysis of all the indicators is conducted with an un-rotated factor solution to test two things 1) a single factor has emerged, or 2) the total variance of one common factor is greater than 50%. Podsakoff et al. (2003) suggested that the CMB exists when a single factor emerges or the total variance of one common factor is greater than 50%. The results showed that the total variance explained by a single factor was 44.430% which was less than 50%. Hence, CMB was not an issue in the data. Second, the correlation matrix procedure proposed by Bagozzi et al. (1991) was applied. In this test, the correlation among the principle constructs is tested. Bagozzi et al. (1991) argued that the CMB exists when this correlation is largely high i.e. $r>0.9$. The results showed that the correlation among the principle constructs was not largely high i.e. $r<0.9$. Hence, CMB was not an issue in the data. It means, our data was safe for further analysis.

4.3. Estimating hierarchical component model in PLS-SEM

Based on the linkage between first-order and second-order constructs and their indicators, Ringle et al. (2012) proposed four types of hierarchical component models. In the Type I model, also known as the reflective-reflective model, both first-order and second-order constructs are reflective constructs. In this type of model, the correlation between constructs is high enough but the constructs can be separated from each other. In the Type II model, also known as the reflective-formative model, first-order constructs are reflective constructs but second-order constructs are formative constructs. A general concept emerged from first-order constructs which completely mediates the effect on second-order constructs. In the Type III model, also known as the formative-reflective model, first-order constructs are formative constructs and second-order constructs are reflective constructs. First-order constructs form a general concept at second-order constructs. In the Type IV model, also known as the formative-formative model, both first-order and second-order constructs are formative constructs. First-order constructs from a more general and abstract concept at second-order constructs.

In this study, as the first-order constructs of all the second-order constructs represent different concepts and these concepts do not share a common concept, so the overall model was treated as reflective-formative or Type II model.

PLS-based SEM calculates the scores of each construct to estimate the path model. Three approaches are used in second-order models because the indicators of second-order constructs do not exist: 1) repeated indicator approach, 2) two-stage approach, and 3) hybrid approach (Becker et al., 2012). In the first approach, second-order constructs use all the indicators of first-order constructs. It means the indicators of first-order constructs are used twice. In the second approach, the scores of first-order constructs are used as indicators of second-order constructs. In the third

approach, one-half of the indicators of first-order constructs are used by themselves, and the remaining half is used by second-order constructs. There are advantages and disadvantages to each approach (Becker et al., 2012). However, we used a two-stage approach to estimate the model due to its familiarity with academic literature.

4.4. Assessment of the measurement model of first-order reflective constructs

The measurement model is estimated to ensure reliability, internal consistency reliability, convergent validity, and discriminant validity. The measurement model is composed of the first-order constructs and their indicators. These first-order constructs are reflective constructs. Wong (2013) suggested that reflective constructs are tested by the following four criteria: 1) outer loadings, 2) Cronbach's alpha, 3) composite reliability (CR), and 4) average variance extracted (AVE). We applied the PLS algorithm with 5000 maximum iterations. The results are given in Table 3. Hair et al. (2017) recommended that the value of the outer loading of each indicator should be greater than 0.7. The results show that the value of the outer loading of each indicator is greater than 0.7. They also suggested that the value of the Cronbach's alpha of each construct should be larger than 0.7. The results indicate that the value of Cronbach's alpha of each construct is larger than 0.7. Fornell and Larcker (1981) recommended that the value of CR and AVE of each construct should be greater than 0.7 and 0.5 respectively. The results show that the value of CR of each construct is greater than 0.5 and the value of AVE of each construct is greater than 0.5. Therefore, the reliability, internal consistency reliability, and convergent validity are established.

In order to test discriminant validity, we applied the HTMT criterion. In HTMT criteria, if all HTMT values are less than 0.85 in the case of the HTMT0.85 rule and the confidence interval (CI) does not involve the value of 1 in the case of the HTMT inference rule, then there is no issue of discriminant validity (Henseler et al., 2015). The results in Table 4 show that all HTMT values are less than 0.85 and CI does not involve a value of 1. Hence, discriminant validity is established.

Table 3: Construct validity of first order reflective constructs

Latent Construct	Indicators	Outer loading	Cronbach's Alpha	CR	AVE	Latent Construct	Indicators	Outer loading	Cronbach's Alpha	CR	AVE
Recruitment and Selection (RS) (4-items)	RS1	0.907	0.924	0.946	0.815	Go Along To Get Ahead (GAGA) (3 items)	GAGA1	0.784	0.853	0.901	0.694
	RS2	0.902					GAGA2	0.863			
	RS3	0.897					GAGA3	0.855			
	RS4	0.906				Pay and Promotion Policies (PPP) (3 items)	PPP1	0.889	0.913	0.939	0.794
Training and Development (TD) (4-items)	TD1	0.784	0.853	0.901	0.694		PPP2	0.920			
	TD2	0.863					PPP3	0.896			
	TD3	0.855				Management-By-Exception (MBE) (3 items)	MBE1	0.678	0.755	0.845	0.578
	TD4	0.829					MBE2	0.776			
Compensation (COMPEN) (4-items)	COMPEN1	0.889	0.913	0.939	0.794		MBE3	0.763			
	COMPEN2	0.920				Laissez-faire Leadership (LFL) (3 items)	LFL1	0.876	0.824	0.895	0.741
	COMPEN3	0.896					LFL2	0.895			
	COMPEN4	0.858					LFL3	0.810			
Performance Evaluation (PE) (4-items)	PE1	0.778	0.755	0.845	0.578	Relative Advantage (RA) (4-items)	RSI	0.752	0.786	0.874	0.700
	PE2	0.776					RA2	0.881			
	PE3	0.763					RA3	0.871			
	PE4	0.818					RA4	0.899			
Task Support (TS) (4-items)	TS1	0.876	0.824	0.895	0.741	Compatibility (COMPT) (4-items)	COMPT1	0.799	0.770	0.866	0.684
	TS2	0.895					COMPT2	0.892			
	TS3	0.810					COMPT3	0.785			
	TS4	0.878					COMPT4	0.810			
Task Innovation (TI) (4-items)	TI	0.752	0.786	0.874	0.700	Complexity (COMLEX) (4-items)	COMLEX1	0.879	0.836	0.901	0.752
	TI2	0.881					COMLEX2	0.891			
	TI3	0.871					COMLEX3	0.831			
	TI4	0.899					COMLEX4	0.799			
Social Relationship (SR) (4-items)	SR1	0.799	0.770	0.866	0.684	Observability (OBS) (4-items)	OBS1	0.812	0.796	0.778	0.801
	SR2	0.892					OBS2	0.825			
	SR3	0.785					OBS3	0.910			
	SR4	0.810					OBS4	0.789			
Personal Freedom (PF) (4-items)	PF1	0.879	0.836	0.901	0.752	Trialability(TRIT) (4-items)	TRIT1	0.835	0.809	0.802	0.831
	PF2	0.891					TRIT2	0.811			
	PF3	0.831					TRIT3	0.790			
	PF4	0.771					TRIT4	0.897			
General Political Behaviour (GBB) (3 items)	GPB1	0.907	0.924	0.946	0.815						
	GPB2	0.902									
	GPB3	0.897									

4.5. Assessment of the measurement model of second-order formative constructs

The second-order constructs are formative constructs. Hair et al. (2017) suggested that the criterion to estimate formative constructs is different than that of reflective constructs. They proposed two steps to estimate the measurement model of second-order formative constructs: 1) testing of collinearity among first-order constructs using variance inflation vector (VIF), and 2) testing of outer weights and significance (t-value). We

tested the collinearity between the dimensions of the second-order constructs through VIF. These dimensions are the first-order constructs. Second, we tested the outer weights and t-value. Table 5 shows the results. The results show that VIF values fall between 1.346 and 4.052. Ringle et al. (2012) suggested that VIF values should be between 0.2 and 5.0. This shows that there is no issue of collinearity among the first-order constructs. The results also show that the outer weights of the first-order constructs on the second-order constructs are between 0.215 and 0.392 and the t-value is greater than 1.96 at a 5% significant level. This shows that all the second-order constructs are good formative constructs.

Table 4: HTMT criterion

	RS	TD	COMPEN	PE	TS	TI	SR	PF	GPB	GAGA	PPP	MBE	LFA	RA	COMPT	COMLEX	OBS	TRIT
RS																		
TD	0.359																	
COMPEN	0.449	0.501																
PE	0.666	0.639	0.681															
TS	0.427	0.422	0.371	0.458														
TI	0.588	0.631	0.542	0.623	0.433													
SR	0.510	0.643	0.567	0.621	0.553	0.590												
PF	0.660	0.616	0.666	0.671	0.546	0.656	0.631											
GPB	0.621	0.566	0.641	0.646	0.512	0.638	0.547	0.641										
GAGA	0.554	0.421	0.436	0.525	0.564	0.511	0.536	0.454	0.659									
PPP	0.436	0.572	0.300	0.610	0.536	0.339	0.370	0.446	0.540	0.402								
MBE	0.666	0.432	0.265	0.490	0.667	0.321	0.266	0.667	0.365	0.264	0.464							
LFL	0.653	0.456	0.601	0.489	0.633	0.621	0.502	0.643	0.527	0.671	0.438	0.484						
RA	0.467	0.601	0.627	0.335	0.477	0.543	0.624	0.567	0.558	0.527	0.567	0.477	0.332					
COMPT	0.325	0.311	0.613	0.309	0.424	0.316	0.615	0.624	0.570	0.214	0.534	0.343	0.587	0.400				
COMLEX	0.433	0.654	0.598	0.200	0.532	0.665	0.496	0.437	0.643	0.397	0.476	0.466	0.476	0.541	0.456			
OBS	0.322	0.432	0.467	0.555	0.521	0.421	0.666	0.522	0.522	0.369	0.421	0.367	0.489	0.234	0.333	0.611		
TRIT	0.524	0.561	0.299	0.376	0.434	0.571	0.599	0.624	0.610	0.597	0.632	0.647	0.612	0.335	0.665	0.426	0.533	

Table 5: Measurement model validity of second-order reflective constructs

Second-order Constructs	First-order Constructs	Outer Weights	VIF	t-value	Bias-corrected confidence Interval
HRMP	RS	0.392	1.696	7.091	(0.424, 0.550)
	TD	0.347	1.823	4.072	(0.376, 0.477)
	COMPEN	0.242	2.713	2.484	(0.363, 0.513)
OC	PE	0.215	4.052	2.121	(0.477, 0.515)
	TS	0.276	1.346	4.064	(0.381, 0.542)
	TI	0.279	2.247	2.745	(0.267, 0.485)
	SR	0.308	2.218	3.512	(0.318, 0.352)
	PF	0.343	2.001	4.063	(0.226, 0.388)
PD	GPB	0.310	2.290	6.711	(0.453, 0.513)
	GAGA	0.330	3.721	3.422	(0.277, 0.404)
	PPP	0.240	2.411	3.120	(0.372, 0.542)
LI	MBE	0.245	2.050	2.231	(0.256, 0.415)
	LFL	0.290	3.443	2.541	(0.328, 0.466)
	RA	0.379	2.450	4.331	(0.315, 0.477)
TDI	COMPT	0.209	3.110	2.251	(0.324, 0.513)
	COMLEX	0.313	2.015	2.567	(0.265, 0.515)
	OBS	0.329	3.523	3.118	(0.371, 0.542)
	TRIT	0.314	2.210	3.470	(0.257, 0.494)

Note: *** = p<0.001, Bias-Corrected and Accelerated (BCa) bootstrap based on 5000 sub-samples, two tailed test

4.6. Assessment of the structural model

The structural model is used to test hypotheses. We performed PLS bootstrapping with 5000 subsamples. Table 6 shows the coefficient of determination (R^2) of TDI. This indicates that a 68.4% variance in TDI is explained by HRMP, OC, PD, and LI. Hair et al. (2017) proposed that the value of R^2 should be greater than 0.5. So, the value of R^2 is fairly above this threshold.

Table 6: Coefficient of determination (R^2)

Endogenous variable	R^2
TDI	0.684

Table 7 shows the β and t-value of the relationships. The results show that HRMP shows a positive significant effect on EC (β=0.462, t=4.423). Therefore, H1 is supported. Moreover, OC indicates a positive significant effect on TDI (β=0.417, t=5.499). Thus, H2 is also supported. Furthermore, PD demonstrates a negative significant effect on TDI (β=-0.336, t=6.979). Hence, H3 is also supported. However, LI does not show a significant effect on TDI (β=0.183, t=1.069). It means hypothesis H4 is not supported.

Table 7: Results of Hypotheses

Path	B	t-value	Hypotheses
HRMP → TDI	0.462	4.423	Supported
OC → TDI	0.417	5.499	Supported
PD → TID	-0.336	6.979	Supported
LI → TDI	0.183	1.069	Not supported

Note: ***=p<0.001, Bias-Corrected and Accelerated (BCa) bootstrap based on 5000 sub-samples, two-tailed test

4.7. Discussion

Due to the importance of technology-driven initiatives in modern organizations, this study identified and analyzed the influence of HRM

practices, organizational culture, political deadlocks, and leadership inaction on technology-driven initiatives in project-based organizations in Pakistan. The study revealed interesting findings. First, HRM practices indicated a positive influence on technology-driven initiatives in this context. This result is in line with the findings of many prior studies (Abdullah et al., 2009; Li et al., 2006; Laursen and Foss, 2003). Second, organizational culture also demonstrated a positive influence on technology-driven initiatives which is also supported by several previous studies (Harrington and Guimaraes, 2005; Fedrick, 2001). Third, organizational politics showed a negative influence on technology-driven initiatives. The result is also similar to prior studies (Warne and Hart, 1996; Hirschheim and Newman, 1991). However, leadership inaction did not show a significant influence on technology-driven initiatives. This is a surprising result of this study. Previous literature mainly suggested that leadership inaction adversely affects technology-driven initiatives (Fullan, 2009; Yukl, 1999). This might be due to the fact that the concept of leadership inaction is not fully comprehended by the project-based organizations in Pakistan. Nevertheless, special attention should be given to those factors which indicated positive and negative influence. Positive factors lead to successful implementation, whereas negative factors lead to implementation failure of technology-driven initiatives. Nevertheless, HRM practices provide huge support for the implementation of technology-driven initiatives followed by organizational culture. HRM practices provide managerial conditions to facilitate technology-driven initiatives. However, these managerial conditions do not contribute without conducive organizational culture. Therefore, organizational culture also plays an important in the implementation success of such initiatives. In organizations with conducive culture, technology-driven initiatives are easy to implement due to less resistance from the management and employees, and other stakeholders. Political deadlocks, on other hand, are counterproductive because when organizations are obsessed with politics then political and personal interests prevail over organizational interests. As leadership inaction indicated no influence on technology-driven initiatives, it does not mean that it should be ignored at all. It may have a negative moderating or mediating influence. Therefore, this factor should be investigated in more detail using data from other sector organizations.

The study contributes to the theories of HRM, organizational culture, organizational politics, and organizational leadership, especially in the context of project-based organizations. The findings of the study provide an understanding of factors that have a positive and negative influence on the implementation success of technology-driven initiatives. The study also enhances the scope of existing practices and provides academic rigor. More specifically, the study strengths the existing frameworks and models designed for this purpose. Moreover, this study provides the opportunity for future researchers to explore the generic concepts of HRM practices, organizational culture, organizational politics, and passive leadership in other contexts. Overall, the study contributes to theory through a new theoretical explanatory model drawing upon the concept of second-order constructs which lacks in previous studies.

The study also has implications for decision-makers and leaders in project-based organizations who seek to successfully implement technology-driven initiatives in their contexts. The findings are vital for practice as they point out the specific HRM practices and organizational culture facets to enhance the implementation success of technology-driven initiatives. At the same time, the study sheds light on factors that can hinder the implementation success of these initiatives. Moreover, leaders, decision-makers, and managers in project-based organizations can prioritize their limited and scarce resources based on the relative importance of these factors. The findings of the study also provide managerial implications for formulating new strategies, policies, and plans and updating existing ones.

5. Conclusion

The study established the importance of HRM practices and organizational culture for the successful implementation of technology-driven initiatives in project-based organizations in Pakistan. It also provides an understanding that how organizational politics is counterproductive for the successful implementation of such initiatives. Therefore, organizations must promote a non-political environment and employees must avoid politics. Organizations must encourage positive factors and discourage negative factors to achieve their organizational objectives and goals. The studied factors are crucial to take into account in this context. Among many other factors (technical and non-technical), the studied factors provide managerial conditions for the successful implementation of these initiatives.

The study was cautiously developed and well-executed, but it possesses some limitations. These limitations must be considered while interpreting the findings of the study. First, the researcher used a non-random sampling technique especially purposive sampling to choose project-based organizations to belong to a single country i.e. Pakistan. Second, the sample size is 98 which is not large enough, but representative. Third, only the quantitative opinion of the respondents was taken through structured questionnaires which restrict the respondents to express their views in more detail. Although these measures put constraints on the generalizability of the results, at the same time, these measures provide an opportunity for future researchers to test and analyze the proposed model with other samples from other countries and

industries. Future research can also obtain a qualitative opinion of the respondents to have an in-depth insight into the broader concepts of HRM practices, organizational culture, political deadlocks and leadership inaction, and their influence on technology-driven initiatives.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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