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Article

Public Sector Transformation in Emerging Economies: Factors Affecting Change Adoption in Pakistan

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Abstract: Organizational change remains a significant challenge in developing countries, often hindered by entrenched bureaucratic cultures and resistance to reform. This study investigates the key determinants of change acceptance among public sector employees in Pakistan, focusing on the Khyber Pakhtunkhwa (KPK) region. Using a survey of 320 public sector workers, this research examines employee attitudes toward organizational change through a multi-conceptual framework that incorporates technical, organizational, and environmental factors. Ten influencing factors were analyzed using Structural Equation Modeling (SEM) in AMOS. The findings reveal a strong positive relationship between nine factors—change management, IT infrastructure, reward systems, technical competency, top management support, legal frameworks, organizational culture, and HRM practices—and employees' willingness to accept change. This study presents a robust explanatory model with high predictive power for change acceptance. It provides valuable insights into reform dynamics in developing nations and offers practical strategies to guide successful public sector change management initiatives.

Keywords: reform; change management; TOE framework; change model; SEM

1. Introduction

The introduction of Information and Communication Technologies (ICTs) in public administration has long been understood in terms of an intention to implement reform with a view towards minimizing inbuilt inefficiencies in bureaucratized forms of governance (Cordella & Tempini, 2015; Cunha et al., 2019). This transition has in fact supported e-government programs, for ICTs can have a significant impact in terms of public administration (Malodia et al., 2021). The concept and effective use of e-government have been recognized as key breakthroughs in public administration (Van der Voet et al., 2013; Kitsios & Kamariotou, 2017) throughout the 20th century.

However, the COVID-19 pandemic accelerated the adoption of ICTs, reducing the reliance on face-to-face contact. This shift occurred rapidly, and governments have since struggled with the challenges of transforming long-standing traditional practices in a short period.

In today's ever-growing, highly interdependent, and constantly changing environment, private and public sector organizations have no alternative but to adapt in order

to survive and remain competitive (Shaar et al., 2015; Hameed et al., 2019). While the pace of organizational change is increasing across sectors (Rowold & Abrell-Vogel, 2014; Al-Ali et al., 2017; Yuksel, 2017), scholarly attention has predominantly focused on the private sector (Van der Voet et al., 2013; Kickert, 2014; Alshahrani et al., 2022). This has led to extensive work on change management in the private sector, while research in public sector change management remains limited (Burnes & By, 2012; Van der Voet et al., 2013). Nonetheless, some researchers have examined the applicability of private sector change management techniques within public sector contexts (Kickert, 2014; Van der Voet, 2016). Public sector reform programmes, however, often face considerable challenges and failures (Burke, 2010; Kotter, 2010; Burnes & Jackson, 2011; Van der Voet, 2016). What is often missing in the discourse is a detailed analysis of effective organizational change strategies specific to public sector organizations (Kickert, 2010; Kitsios & Kamariotou, 2017).

Over the past 25 years, governments worldwide have launched public sector reforms in response to fiscal pressures, democratic movements, and growing citizen demands for improved governance (Brandsen & Kim, 2010; Gelaidan & Ahmad, 2013). Public sector managers are increasingly expected to implement change programmes and apply relevant theoretical frameworks. However, most of these frameworks have originated in the West and are rooted in private sector practices (Piercy et al., 2013; Van der Voet, 2014), raising concerns about their suitability for developing countries, where the reform landscape is significantly different (Gholami et al., 2021).

This paper explores change and reform in the public sector of Pakistan's Khyber Pakhtunkhwa (KPK) province. This study aims to identify key drivers and barriers to e-government initiatives in this context. Based on this understanding, it offers practical recommendations to help leaders reduce reform failures and enhance success rates. A context-specific change model is developed, focusing on the unique environment of the KPK region.

KPK represents a particularly relevant setting due to its exposure to multiple reform initiatives targeting administrative efficiency, digital governance, transparency, and public accountability. However, despite these efforts, outcomes have remained uneven due to persistent bureaucratic resistance, weak technical infrastructure, and complex socio-political dynamics (World Bank, 2022). These challenges make KPK an ideal case for analyzing the interplay between technological, organizational, and environmental factors in change adoption.

Prior research has shown that public sector organizations face unique challenges in implementing change compared to their private counterparts (Angel-Sveda, 2013; Battaglio et al., 2019; Collington, 2022). Yet, such specific contexts remain underrepresented in the literature (Brandsen & Kim, 2010; Liguori, 2012; Brinkerhoff & Brinkerhoff, 2015; Van der Voet et al., 2013; Alas & Elenurm, 2018; Gholami et al., 2021). Moreover, reform efforts are often shaped by local administrative structures and require tailored approaches; a universal one-size-fits-all model may not be effective (Kuipers et al., 2014; Gholami et al., 2021). In Pakistan, reform efforts face unique challenges such as bureaucratic inertia, centralized decision-making, administrative redundancies, coordination gaps, skill shortages, and insufficient infrastructure (Sharif & Mansoor, 2022). These obstacles undermine reform efforts in KPK, highlighting the importance of analyzing such context-specific barriers and enablers.

Understanding the factors influencing public sector change is vital for developing effective reform strategies (Troshani et al., 2011). This study aims to inform policymakers and public sector leaders by identifying strategies that enhance change readiness and support successful implementation.

While prior studies have examined organizational change in public sector settings, much of the research has been based in Western contexts or drawn from private sector models, often ignoring the specific challenges faced by developing countries (Azzaz & Salahddine, 2022; Alshahrani et al., 2022). Moreover, the application of the Technology–Organization–Environment (TOE) framework in public sector research, especially in emerging economies, has been limited. This study addresses this gap by applying the TOE model to examine change adoption in the context of Pakistan's public sector, with a specific focus on KPK. By integrating context-specific variables, this research enhances the theoretical relevance of the TOE model in public sector reform discourse and provides empirical insights into how technological, organizational, and environmental factors shape change readiness.

This study therefore applies the Technology–Organization–Environment (TOE) framework to investigate the determinants of change adoption among public sector employees in Pakistan, with a particular focus on the unique socio-political landscape of the Khyber Pakhtunkhwa (KPK) region. The TOE framework enables the analysis of contextual influences across three major categories: technological factors (IT infrastructure and technical competence), organizational factors (top management support, reward systems, HR capacity, and organizational culture), and environmental factors (political leadership, legal systems, socio-cultural influences, and economic conditions). By developing and testing a set of hypotheses across these categories, this study aims to identify the key enablers and barriers to reform adoption in a developing country context. This integrated approach offers both theoretical insights and practical implications for designing effective public sector change management strategies in Pakistan and similar emerging economies.

This paper is organized into seven sections. Following this introduction, the next section presents the theoretical background, followed by the methodology, key findings, discussion, and conclusions. This paper concludes by discussing its limitations and suggesting directions for future research.

2. Theoretical Background

2.1. Approaches to Change Management

Organizations, whether private or public, have no choice but to adapt to survive in today's ever-changing business environment (Popara, 2012; Jayabalan et al., 2021; Vorwerk Marren et al., 2024). Change adaptation predominantly involves two types: planned and emergent (Burnes & By, 2012; Gelaidan & Ahmad, 2013; Oliveira et al., 2021). Typically, most change management methodologies prefer employing the planned model (Mitchell, 2013), characterized by its orderly progression between two phases through a sequence of planned actions. It is an ideal model for dealing with organizational concerns arising out of unhappiness with the current state (Gelaidan & Ahmad, 2013).

Planned change frameworks, sometimes simply called stage or step approaches, follow a sequential format. The famous three-step model developed by Lewin's in 1951 involves actions for unfreezing, changing, and re-freezing (Shirey, 2013; Mitchell, 2013). It posits dropping outmoded behavior in favor of effective behavior change. In contrast with its base model, criticism for oversimplism and failure to present useful guidance have prompted refinements and additions via Lippitt et al. (1958), Cummings and Huse (1989), Schein (1996), Rogers (2003), and Capriotti and Donaldson (2022). These adaptations seek to mitigate weaknesses in the model, such as its constant organizational assumption. Kotter (2010) subsequently developed this one stage further with an eight-step model for change for use in most types of organizational change.

Kotter's eight-step model (Table 1) identifies leadership's key role in change management, and that is developing and communicating a vision (Rees & French, 2016). It is a map for change, but success will rely on the timing, availability, and careful performance

of each stage; one wrong move and the whole exercise can go wrong. Empirical studies under picking change models are not many, but most have pre-implement, implement, and post-implement phases. Successful change management approaches must be flexible, with continuous re-evaluation, redesign, and reorientation at each stage in the process.

Table 1. Kotter's (2010) eight-step change model.

Steps	Description
1. Establish a sense of urgency	The need to change.
2. Create a guiding coalition	With authority and credibility.
3. Develop a vision and strategy	A clear aim and way forward.
4. Communicate the change vision	Promote understanding and commitment.
5. Empower broad-based action	Enable people to act and overcome barriers.
6. Generate short-term wins	To motivate and ensure further support.
7. Consolidate gains and produce more change	Maintain change momentum.
8. Anchor new approaches in the culture	New values, attitudes, and behaviors.

2.2. Organizational Change in the Public Sector

The public sector encompasses all state-controlled entities dedicated to serving the public (Wetherly & Otter, 2011; Domínguez et al., 2011; Kelly & Ashwin, 2013). As noted in Angel-Sveda (2013), public organizations have organizational structures specific to them in terms of legal, technological, economic, political, demographic, ecological, and cultural factors. Public organizations, in contrast to private organizations, have a larger group of decision-makers, multi-diverse groups of stakeholders, and hierarchical structures (Angel-Sveda, 2013; Domínguez et al., 2011; Collington, 2022). Theoretical distinctions between change adoption and its realization arise between private and public organizations (Popara, 2012; Sternberg & Karami, 2022) and denote conflicting motives for change initiation in both sectors (Safdar, 2012). Change implementation strategies developed in the private sector can have counterproductive consequences in the public sector (Kitsios & Kamariotou, 2017; Zoukoua, 2024). Neglecting the public sector's specificity can slow down reform processes (Piercy et al., 2013).

In public administration, "reform" and "change" have been utilized interchangeably (Strokosch & Osborne, 2021; Azhar et al., 2022). Public agencies introduce reform (change) in reaction to stimuli in the environment, such as policy reform, new legislation, technological change, and high-level reorganizations (Bryson et al., 2021). To react to such change, public agencies utilize top-down approaches most, with the assumption that top management best understands and can make a change (Angel-Sveda, 2013; Callanan et al., 2024). Others, however, believe a base model of change, with participative workers, is most important to reverse resistance and build a high level of commitment (Abdulraheem et al., 2013; Khaw et al., 2023). Pure top-down with little consultation with workers will not work (Gotsch et al., 2023).

Political and legislative considerations make reform (change) in public organizations even more complex (Angel-Sveda, 2013). Public organizations have long been positioned in organization development and change management theory to have a role of differentiation, in that changing them is even more complex in comparison with private organizations (Neumann et al., 2024). Some key change management fundamentals in public organizations include creating a guiding coalition, with resistance, creating a sense of urgency for

change, defining consequences, creating a plan, creating a commitment plan, and altering structures and HR processes (Kotter, 2010; Popara, 2012).

Organizational change in the public sector has been a source of significant inquiry and discussion, with less regard for the human element (Abdulraheem et al., 2013). Politicians have been seen as drivers of change in public organizations, with a high impact level in administration in the public sector (Alas & Elenurm, 2018). Planning in the public sector can at times be difficult, with politicians having a short-term orientation (Alas & Elenurm, 2018). There is no model in use in the public sector at the current stage, and private sector approaches must be translated for use in public sector needs (Bisogno & Donatella, 2022). Public sector studies on organizational change have several weaknesses, including a lack of empirical studies and a prevalent use of qualitative methodologies (Van der Voet, 2014). Context factors' role in contributing to organizational change has been debated (Busari et al., 2019), but the uniqueness of public organizations' character is not yet understood (Kuipers et al., 2014). Public sector organizations, therefore, must apply approaches to change specific to environments (Van der Voet, 2014; Busari et al., 2019). Organizational change in the public sector is determined by context and culture, and little empirical evidence is present in such cases. Cross-country transference of change theory can prove to be ineffectual, with success resting in cultural variation and contextual factors (Krishna et al., 2023). Contingency theory postulates that organizations must fit in with environments to work, and no single model can work for managing change (Krishna et al., 2023).

While organizational change is increasingly occurring across both public and private sectors, much of the existing research and change management frameworks are derived from private sector contexts. Several studies have questioned the suitability of these approaches for the public sector, highlighting differences in structure, culture, and stakeholder environments (Piercy et al., 2013). Scholars have also noted a lack of empirical evidence specific to public sector change, particularly in developing countries (Van der Voet et al., 2013). This reinforces the need for tailored frameworks that account for the unique contextual characteristics of public organizations.

The push for reform in public sector organizations started in developed nations such as the UK and the US in the 1980s (Gultekin, 2011; Collington, 2022). Various change processes in the public sector have been defined in terms of reengineering processes, total quality management, changing cultures, post-bureaucracy, and New Public Management (NPM) (Butt et al., 2013). NPM, one of the most embraced reforms in the public sector, developed in response to conventional public administration in consideration of its failure (Mongkol, 2011; Vries & Nemec, 2013; Bhul, 2023). NPM involves putting private sector management techniques in the public sector to maximize performance and minimize public spending (Mongkol, 2011; Cordery & Hay, 2024). Despite its widespread use, NPM has been criticized in a variety of writings (Mongkol, 2011; Gultekin, 2011). Other public sector reform frameworks have been mooted, such as the Westminster reform model, in which shrinking government through subcontracting or private sector procurement is prioritized; the American reform model, in which efficiency is prioritized over shrinking; and the Hybrid style model, in which both the Westminster model and holding onto government breadth have been mixed (Campbell, 2021).

Reform approaches such as NPM function best in developed countries and could not possibly tackle such concerns as extremism and conflict in developing countries such as Pakistan. NPM cannot possibly serve as a silver bullet for developing countries' public sectors, but selectively taking its ingredients and inserting them in individual sectors can function in its favor.

2.3. Factors Affecting Change Adoption in the Public Sector

The change management theory identifies useful information regarding factors driving and putting into practice change in public organizations. Ali and Anwar (2021) determined factors such as resources and political will that impact effective implementation, for example, in Canada's medical care system. Basloom et al. (2022) discussed eight reform factors in the public sector, including necessity, planning, inner and outer support, resources, top management support, institution, and overall transformation. Montreuil (2023) stressed eight contextual factors, namely capability, time, scope, preservation, power, diversity, preparedness, and capacity, that drive organizational change. Similarly, Blackburn (2014) identified nine important factors in effective reform in Tasmania's public sector, including vision, urgency, awareness of resistance, communications, realignment of objectives and persons, training, effective leadership, ownership, and integration of cultures.

Barriers to change, in terms of Leigh (1988), consist of cultural, social, organizational, and psychological factors, and fall under two categories: technical and behavioral in general. Technical factors are relatively easy to remedy through training, but changing values, beliefs, and behavior is not (Kim & Lee, 2021). Employee behavior, attitude, and perception, developed through past experiences and future horizons, have been at the nucleus of organizational change management studies (Haque et al., 2016; Zhang et al., 2021). Resistance to change is a proven fact (Burnes & Jackson, 2011; Decker et al., 2012; Jacobs et al., 2013; Canning & Found, 2015) and, in most cases, a principal cause of failure in change (reform) (Fullan, 2015).

Leadership is regarded as making a considerable contribution towards altering implementations (Kuipers et al., 2014; Van der Voet, 2014). In the public sector, political and senior management intervention and political leadership backing have been stressed (Bentzen, 2021). Yates and Hartley (2021) stressed political leadership backing and effective leadership, with its most important dimensions of credibility and competency matter. Raza et al. (2024) stated that morale in workers is increased when seniors attend to junior workers and speak with them in a respectful manner. Participative and supportive leadership is stressed in the literature in relation to maintaining motivation and positivity toward change (Van der Voet, 2014; Burke, 2010). However, Fielder's (1967) model of situational contingency underlines the necessity for leaders to vary according to situational requirements, acknowledging that situational requirements vary and demand a variety of leadership approaches.

In developing countries, and particularly in countries with poor cultures of development and strong bureaucrat cultures, transformation in the public sector has long been an issue (Akeel & Subramaniam, 2013). Failures in reform (change) in developing countries' public sectors have, in most cases, been caused by weaknesses in infrastructure, the unavailability of financial and human resources, corrupt bureaucrat cultures, poor leadership, and political constraints (Mongkol, 2011; Abdallah & Fan, 2012). Numerous studies have identified factors that can act as barriers to, or triggers for, organizational change (Sarja et al., 2021; Prasad Agrawal, 2024). Leaders, in such a case, who desire to implement change in public organizations must pay consideration to such factors to actualize their organization's aims.

2.4. Theoretical Framework

The literature regarding change processes in the public sector identifies contextual factors concerning management, laws, technology, and the environment as critical in contributing to change processes in the public sector. Overlooking these factors can contribute to reform failure, particularly in developing nations, whose concern is with the government's viewpoint and not the citizen's viewpoint. To bridge such a loophole in the literature,

this study seeks to develop a reform adoption model specific to developing countries. One established model for studying change adoption is one in which one identifies factors of contingency that impact organizational decision-making. Tornatzky and Fleischer (1990) proposed a model for studying the technology, organization, and environment (TOE) in terms of three contextual factors: technology, organization, and environment. The technology context deals with technological factors that affect adoption. The organizational context involves such factors as top management, culture, structure, and the availability of resources. The environmental context takes into consideration external factors such as industry, socio-cultural environments, laws, and government relations, analyzed through frameworks such as the PESTL (Kelly & Ashwin, 2013). The TOE model constitutes a sound basis for the analysis of critical factors in public organizations' acceptance of change. It has a readable format, sound theoretical base, and widespread acceptance and application in academic studies (Bernroider & Schmöllerl, 2013). It has been intensively applied in explaining and describing adoption and implementation decisions in many environments (Pudjianto et al., 2011).

Several well-established models have been employed to explain change/innovation adoption in organizational contexts, including the Technology Acceptance Model (TAM) (Davis, 1989), the Diffusion of Innovation (DOI) theory (Rogers, 2003), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). In addition, the Technology–Organization–Environment (TOE) framework proposed by Tornatzky and Fleischer (1990) has been widely supported in empirical research as a comprehensive model for understanding adoption behavior across various types of changes/reforms at the firm level (Nguyen et al., 2022). The TOE framework provides a robust and flexible foundation for analyzing the key factors influencing change adoption in public organizations. Its structured design, strong theoretical basis, and wide application in empirical research make it a suitable model for this study (Bernroider & Schmöllerl, 2013; Ciganek et al., 2014). The TOE framework is particularly appropriate for public sector settings in developing countries, as it captures influences at both the organizational and national levels. Moreover, it allows for the inclusion of context-specific factors—enabling the model to be tailored to the socio-political, legal, and institutional dynamics of the KPK region. This adaptability strengthens its relevance for examining complex change processes in public sector reform. By applying and contextualizing the TOE framework within a developing country's public sector, this study contributes to expanding its theoretical utility and empirical relevance beyond its conventional applications in the private sector and technological adoption research.

Considering previous work on factors driving workers' intention to enact change and an awareness of the KPK's public sector, several hypotheses have been proposed. One of them involves information technology (IT) in a change in an organization. IT is a significant factor in driving change in any sector. IT can drive efficiency and delivery in the public sector, but its installation can encounter barriers in developing countries in terms of poor IT infrastructure (Waller & Genius, 2015; Campbell, 2021; Younus et al., 2023). There must be a proper IT infrastructure and coordination for awareness of public organizations' complications (Vander Elst & De Rynck, 2014). IT possesses an opportunity to make communications, collaboration, and participatory processes easier during times of change (Waller & Genius, 2015). Hence, a developed IT infrastructure is significant for the effective acceptance of change and effective delivery of public service. This leads to the following hypothesis:

H1a: *IT infrastructure influences change (reform) adoption and implementation.*

The use of information technology (IT) infrastructure is becoming ever more important in enabling public sector organizations to effectively implement and manage change. Page

et al. (2015) stressed collaboration in public administration as a mechanism for creating public value through collaboration. Public administration through collaboration generated a new theory, namely, collaborative public management, most often adopted in the public service sphere (Kusumasari et al., 2024). O'Leary and Vij (2012) stressed even further the imperative for collaborative public management, describing it as a multi-organization, multi-sector, and multi-methods problem-solving mechanism for complex, multi-partner, and multi-sectoral problems, not solvable through single organizations alone.

In recent years, various environmental, organizational, and competitive pressures have underscored the need for collaborative public management. These pressures have been complemented by technological advancements and the desire to enhance the effectiveness of publicly funded programs (O'Leary & Vij, 2012). As such, public officials have increasingly recognized the value of collaborative governance as they strive to deliver public value in a more efficient and coordinated manner (Getha-Taylor et al., 2019). Furthermore, academic studies in e-government have emphasized interdepartmental coordination and technological integration in re-engineering public service (Malodia et al., 2021). In developing countries, in fact, and in most cases in particular, terrorism and conflicts tend to discourage ordinary government operations; interdepartmental collaboration and private sector collaboration are a necessity in an attempt to drive change (Weerakkody et al., 2012).

H1b: *Collaboration has a significant effect on change (reform) adoption.*

Building upon collaboration, collaboration techniques have been seen to promote change adoption (Getha-Taylor et al., 2019). Public managers must build collaboration skills in a position to work with other organizations and collaboratively produce public value (Getha-Taylor et al., 2019). As such, collaboration culture in public organizations is significant in creating room for effective initiation of change and effective change program adoption.

H2a: *Top management support has a significant effect on change (reform) adoption.*

The role of senior leaders and top management in shaping processes of change in an organization is well documented in the literature (Khanh, 2014; Bhattacharya & Wamba, 2015). Senior managers' and leaders' encouragement and backing are imperative in instigating change (Mowbray et al., 2022). Decision-making at the top management level bears long-term ramifications, in that it directs an organization's development and growth through its bearing on strategic decisions (Wu & Tham, 2023). Moreover, top executives in management have been seen to have a significant role in shaping output and performance in public sector entities (Ashok et al., 2021). They have a significant role in deciding, in terms of realization and shaping performance (Utouh & Kitole, 2024). In contrast, in a query in a few studies on whether top management can serve as a source of peril for change programs (Giermindl et al., 2022), studies in the public sector have confirmed that its role in shaping change in an entity is significant (Park et al., 2021). In essence, top management support is important in developing effective change, and its absence can make an entity's change a failure (Lutfi, 2022).

H2b: *Human resource capacity has a significant effect on change (reform) adoption.*

Human resource capacity is a key part of an organization's effectiveness in achieving its aims (Mensah, 2020). It entails having a trained and qualified workforce, and such a workforce constitutes a driving force for an organization in driving change (Câmpeanu-Sonea & Sonea, 2010). Ineffective capacity will have a direct consequence on an organization's

program delivery, work accomplishment, and responsiveness toward change (Mensah, 2020). As important as the human factor occupies a central position in any organization (Tien et al., 2021), a lack of proper technical competency and training among workers has been seen to act as a barrier to change (Obeidat & Abu-Shanab, 2010). Therefore, it is critical for organizations to invest in developing their human resource capability and capacity in anticipation of change programs (Mishra & Sharma, 2013). Successful change management in organizations is a matter of securing workers' cooperation and acceptance through training and development interventions (Gelaidan & Ahmad, 2013). That demand for a qualified workforce is even more critical in the public sector, with changing social, financial, and political environments escalating qualifications for public workers in managing change (Al Jawali et al., 2022).

H2c: *Technical competence has a significant effect on change (reform) adoption.*

Technical competence is a key success criterion in change adoption, and in many cases, even in the public sector, compatibility between a proposed change and an organization's existing technological infrastructure is a key success criterion for successful adoption (Lin & Ho, 2011). In most cases, organizations must assess their technical capabilities first before attempting change. On a case-by-case basis, organizations have a variable level of difficulty in changing, with a lot of work involved in changing some and less in changing others (Lin & Ho, 2011). To what extent a change's characteristics and an organization's existing technological configuration align with one another is a key success criterion (Lin & Ho, 2011). In developing countries, outdated and inefficient technical infrastructure-related issues form strong barriers to change realization (Costan et al., 2021; Aiyetan & Das, 2021). Not only is technical competency a function of having relevant hardware and communications tools, but it is also a function of having such tools in a working and updated state (Waller & Genius, 2015; Jayousi et al., 2024). Technical competency, therefore, forms a critical consideration in an organization's intention to implement and realize value through change programs (Wang et al., 2010; Troshani et al., 2011; Nawafleh et al., 2012; Thi et al., 2014; Gangwar et al., 2015).

H2d: *A rReward system has a significant effect on change (reform) adoption.*

Performance appraisal and reward programs are key tools for the motivation and performance improvement of workers (Azzone & Palermo, 2011). Workers will become more inclined towards changing when workers perceive a direct relation between them and tangible incentives (Aljumah, 2023). Tangible incentives have a significant role in supporting and motivating workers towards change and contributing to effectiveness in an organization (Burke, 2010; Ali & Anwar, 2021). Thus, organizations with well-established reward systems for acknowledging and valuing workers' work during transformation times have a high probability of having a motivated and committed workforce (Azzone & Palermo, 2011). That motivation and commitment, in its turn, aids in successful change objectives' acceptance and realization.

H3a: *Political leadership has a significant effect on change (reform) adoption.*

Political leadership in the public sector is defined in a certain way in contrast with private sector leadership (Kuipers et al., 2014). In the public sector, political leaders make a big contribution in terms of programs for change, for politics is a practice of values and objectives' authoritative distribution for society (Samier & Tok, 2021; Virtanen et al., 2022). Political controllers can make a big contribution in terms of success in new

policies (Dafe et al., 2022). Hence, political leaders' political support and political will are important factors in successful public sector organizational change. Political leaders can influence change outcomes by articulating the need for change, selecting appointees who are committed to change, and possessing the necessary knowledge and skills to manage the transformation (Fernandez et al., 2022). Their role in legitimizing and supporting change initiatives cannot be overstated, and their vision and commitment are instrumental in driving change adoption.

H3b: *Economic factors have a significant effect on change (reform) adoption.*

Political leaders can implement change consequences by declaring a need for change, selecting appointees with a commitment to change, and possessing information and expertise in guiding the transformation (Fernandez et al., 2022; Marquardt et al., 2022). There can be no exaggeration regarding political leaders' role in sanctioning and backing change programs, and political leaders' vision and commitment have a significant role in driving the acceptance of change. Successful change, in most instances, will require significant resources to finance the change process (Chen et al., 2021). Shortfalls in offering sufficient resources can result in poor efforts in implementation, heightened interpersonal tension, and bypassing important organizational processes (Marquardt et al., 2022). Long-term public reform programs demand long-term financial support from governments and, in such a case, create a challenge when financial resources become thin or face political uncertainty (Khanh, 2014; Raavi et al., 2025). In such a case, financial factors exercise a significant impact in terms of feasibility and success in terms of change acceptance.

H3c: *Socio-cultural factors have a significant effect on change (reform) adoption.*

Socio-cultural factors involve customs, values, and living habits that characterize a society (Hofstede, 2005; Halimah et al., 2023). Culture is a critical consideration in cases of organizational transformation, particularly when deep transformation, deep-rooted reform, involves value and cultural transformation (Goniewicz et al., 2024). Organizational culture occupies a critical role in shaping workers' reactions to change and acceptance of new programs (Schein, 1996; Kotter, 2010; Abdulraheem et al., 2013). Therefore, public organizations must cultivate a change and innovation-promoting culture (Dzimińska, 2024). Participative and decentralized cultures have a high chance of change acceptance in contrast with hierarchical and centralized cultures (Lau et al., 2024). Cultures in an organization that enable change and adaptability are significant in enhancing effective reform program acceptance.

H3d: *The legal system has a significant effect on change (reform) adoption.*

It is important to acknowledge the legislative frameworks that shape the scope of managerial authority, particularly in public administration. Legal provisions often define the rights, responsibilities, and limitations of managers, thereby influencing how reforms and innovations are adopted and implemented. As Peráček and Kaššaj (2023) argue, managerial actions are deeply embedded within legislative structures that determine accountability, decision-making autonomy, and executive obligations. Similarly, Ștefan (2024) highlights the importance of legal transparency and integrity in guiding the conduct of public authorities, which has direct implications for reform effectiveness and public trust. Recognizing these legislative dimensions adds further depth to the analysis of change adoption in public sector contexts.

Based on a review of pertinent literature, such as Burke (2010), Kotter (2010), Mongkol (2011), Otusanya (2011), Abdallah and Fan (2012), Burnes and By (2012), Guerrero and Kim (2013), Akeel and Subramaniam (2013), Jones (2013), Van der Voet (2014), and Thi et al. (2014), in this work, the following research model is proposed to be examined. The studies and interpretations of Wang et al. (2010), Troshani et al. (2011), Pudjianto et al. (2011), T. Yoon and George (2013), Bernroider and Schmöllerl (2013), Thi et al. (2014) and Gangwar et al. (2015) have shaped the proposed model and hypothesis.

The TOE model-based model with 10 factors for change adoption in public organizations, seen in Figure 1, includes the following factors: political, reward system, IT, top management, human capacity, change strategy, technical infrastructure, legal environment, socio-cultural, and economic. All these factors fall under the technology, organization, and external environment categories, as seen in Figure 1. In the following section, our research approach for studying these factors in Pakistan's public sector is discussed in detail.
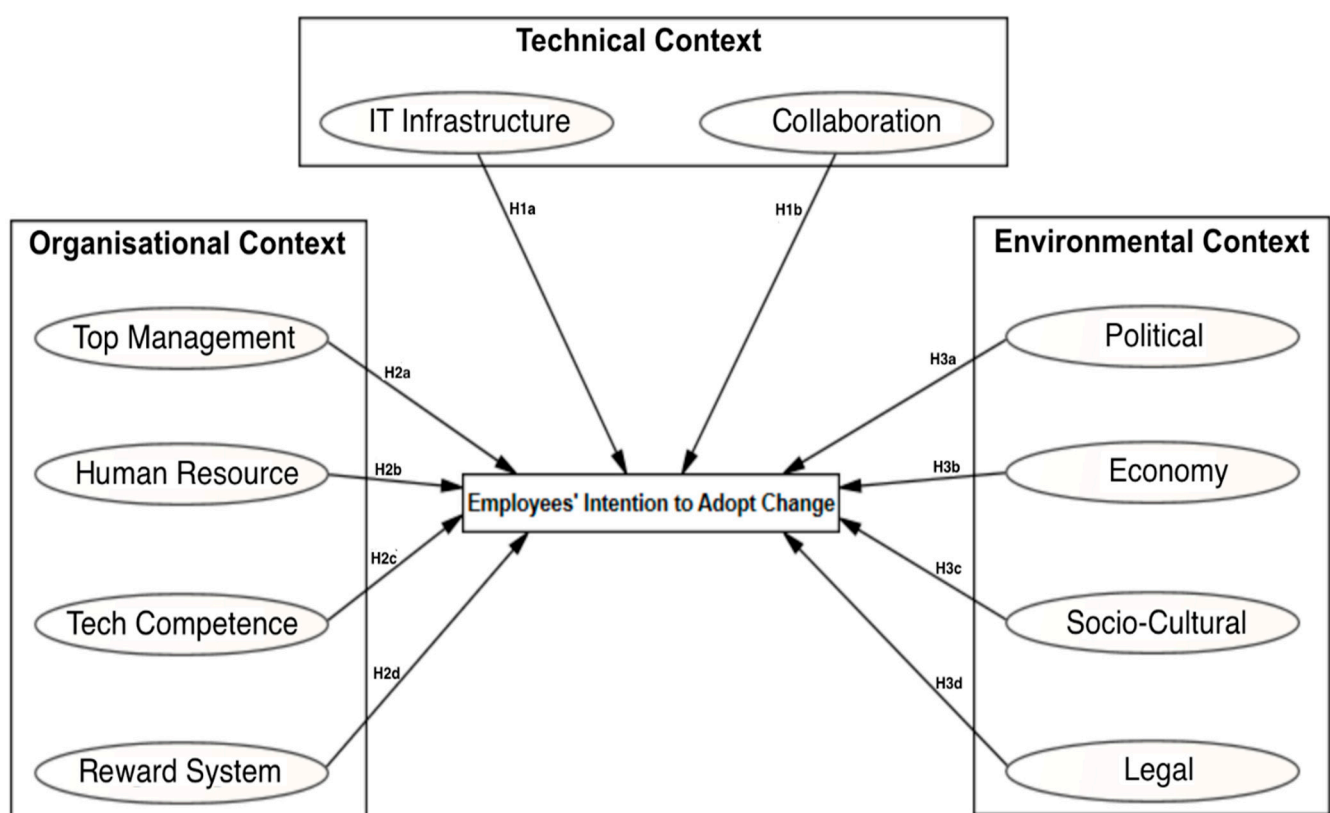
Figure 1. Research framework.

3. Methodology

This article proposes a model explaining critical factors in acceptance of change (reform) in KPK's public organizations through a survey with a public servant questionnaire. With a realization of factors involved in terms of TOE, in this article, a specific consideration will be taken for organization members' reaction in terms of acceptance of a planned organizational change in Pakistan's public sectors.

3.1. Questionnaire Design

Questionnaires were adopted in that they form an efficient tool for data collection when one is aware of information one wants to collect in answer to one's research questions and operationalizing one's research variables (Easterby-Smith et al., 2008). Participants' feelings towards factors' contribution to the role, uncovered in the section preceding, were captured

through 5-point Likert items (1 = "strongly agree" and 5 = "strongly disagree"). In this research, ten constructs, as seen in Figure 1, were measured. All constructs were measured with a range of items. Item statements for these constructs were guided through preceding studies as seen in Table 2. We evaluated the literature in developing the measurement items, and specifically, studies employing the use of TOE were adopted in developing a formative scale. Measurement items were adopted in preceding studies to a significant extent, but individual items and specific items were added and modified following a careful review of the public reform environment.

Table 2. Sources of measurement items.

TOE Factors	Constructs and Abbreviations	No of Items	References
Technical context	IT infrastructure (IT)	4 Items	Teo et al. (2008); J. Yoon and Chae (2009); Pudjianto et al. (2011); Gangwar et al. (2015)
	Collaboration (COL)	3 Items	
Organizational context	Top management (TM)	4 Items	Teo et al. (2008); Wang et al. (2010); Pudjianto et al. (2011); Low et al. (2011); Gangwar et al. (2015); Shaar et al. (2015); Lee et al. (2016)
	Human resources (HR)	3 Items	
	Technical competence (TEC)	4 Items	
	Reward system (RS)	3 Items	
Environmental context	Political (POL)	3 Items	J. Yoon and Chae (2009); Pollard and Cater-Steel (2009); Pudjianto et al. (2011); Gangwar et al. (2015); Lee et al. (2016)
	Economy (ECO)	4 Items	
	Socio-cultural (CUL)	4 Items	
	Legal (LEG)	3 Items	

Categorical questions have been used for demographics such as age, educational level, and work experience. Survey pilot testing was conducted with expert researchers, and then with respondents representing target population, both in Urdu (mother language) and in English language. On taking feedback for pilot testing, wherever feasible, questions have been reworded for ease of understandability. That eliminated any discrepancies and ensured fitness of contents, form, and format of questions and survey.

3.2. Questionnaire Distribution and Respondents

This study employed a non-probability purposive sampling technique, targeting public sector employees in KPK who were likely to have knowledge of ongoing reform initiatives. This approach was deemed appropriate given this study's focus and the need to gather insights from relevant respondents. While purposive sampling was suitable for selecting knowledgeable participants, it may limit the generalizability of the findings. To address this, efforts were made to ensure representation across different departments and roles to enhance the representativeness of the sample. The total workforce in public organizations of KPK is approximately 5000 government employees. A total of 500 questionnaires were distributed across several public sector organizations in the province, and 320 were returned, yielding a response rate of 64%. The relatively high response rate may be attributed to the face-to-face distribution of questionnaires and the use of at least two follow-up reminders. After excluding incomplete responses, 300 fully completed questionnaires were analyzed, with respondents' demographic profiles presented in Table 3. Responses were balanced across departments to further improve representativeness. Written consent was obtained from all respondents prior to data collection. While the findings are primarily contextualized within the KPK province, they offer valuable insights into broader public sector transformation processes in similar developing country settings. However, generalizability to other administrative regions of Pakistan should be approached with caution due to regional variations in institutional capacity and reform maturity.

Table 3. Demographic profile of respondents.

Demographic	Category	Frequencies	Percentage
Gender	Male	225	75
	Female	75	25
Age	20 or Less	18	6
	21–30	71	23.7
	31–40	99	33
	41–50	75	25
	51–60	37	12.3
Education	High School	34	11.3
	Diploma	49	16.3
	Bachelor	78	26
	Masters	119	39.7
	PhD	20	6.7
Pay Grade	1–4	27	9
	5–9	62	20.7
	10–15	57	19
	16–22	152	50.7
	Prefer not to say	2	0.7
Years of Experience	5 or Less	68	22.7
	6–10	76	25.3
	11–15	54	18
	16–22	76	25.3
	Prefer not to say	26	8.7
Department/ Organisation	Excise and Taxation	31	10.3
	Health	56	18.7
	Education	61	20.3
	Planning	11	3.7
	Finance	17	5.7
	Agriculture	5	1.7
	Environment	17	5.7
	Communication	18	6
	Energy and Power	21	7
	Transport	4	1.3
	Law	53	17.7
	Tourism	3	1
	Others	3	1

Table 3 presents the demographic profile of the respondents who participated in the survey. The data reflect a diverse sample in terms of age, gender, education, organizational roles, and years of experience, providing a broad representation of public sector employees in Khyber Pakhtunkhwa. This variation enhances the reliability of the findings and supports the general applicability of the results within the regional public sector context.

Given the reliance on self-reported data, steps were taken to mitigate potential common method bias. The questionnaire was designed with varied item formats and reverse-coded items to reduce response patterning. Additionally, anonymity and confidentiality were assured to reduce social desirability bias. Procedural remedies, such as separating independent and dependent variables in the questionnaire layout, were also applied.

3.3. Data Analysis

The research model in Figure 1 was analyzed using a Structural Equation Model (SEM) supported with AMOS. SEM is a multivariate, second-generation, and causal structure testing technique. SEM's value in its application in management studies is its ability to validate a concept and a factor's dimensions and evaluate relations of dominant theory (Widodo, 2015). In following two-step guideline of Hair et al. (2010), AMOS supported both measurement model and structural model development. Initially, confirmatory factor analysis (CFA) was performed through which measurement model was developed in order to confirm whether constructs have sufficient validation and reliability. Thereafter, SEM was utilized in investigating relation direction and intensity between theoretical constructs.

4. Results

The measurement model eliminated three items (IT2, TM4, and TEC4) of different constructs. SEM then validated and confirmed the research model and hypothesis in its confirmatory stage. In its confirmatory stage, it validated that nine out of ten factors have a bearing on the intention of employees toward change in Pakistan's public organizations. These factors in terms of bearing are top management, IT infrastructure, legal, reward system, human capacity, technical competence, political, culture, and collaboration. To everyone's disbelief, the economy did not have a significant bearing. Analysis details follow below.

4.1. The Measurement Model

The measurement model was analyzed via CFA. As postulated by Assaker et al. (2010), first, evaluation and re-specification of the measurement model must occur, when and whenever considered, in a quest for producing a "best fit" model. In its initial run, model evaluation (CFAT first run) revealed three items must be removed in an attempt to have an acceptable model fit, with 32 items remaining, as seen in Table 4. In addition, with guidance from form (Byrne, 2013), several items' covariances of errors via the use of modification indices helped in enhancing model fit (see Table 5).

To evaluate the fitness of the ultimate measurement model, two tests, namely, convergent and discriminant, were conducted. Convergent validity is an expression of the way factors, constructed to evaluate a single variable, agree with each other. Convergent validity was checked through testing for the standardized factor loading, and it should be more than 0.5 for all items (Hair et al., 2010); composite reliability (CR), more than 0.60 (Field, 2013); and average variance extracted (AVE), more than 0.50 for all constructs (Field, 2013). In our model, composite reliabilities and all factors load fall in the range desired and at 0.01 level significant. All composite reliabilities range between 0.863 and 0.992, and factor loads range between 0.77 and 0.93. All of them range between 0.680 and 0.970 for AVE. All these, therefore, validate that our model adheres to the requirements of convergent validity. We further examined the scale's inner reliability with Cronbach's alpha (C-α); its values range between 0.79 and 0.93, all of them over 0.7 (Hair et al., 2010). In Table 4, one can observe, for each construct, its loading in terms of factors, AVE, CR, and C-α.

Table 4. Results of CFA and internal reliability testing.

Constructs	Items	Factor Loadings	C-α	CR	AVE	MSV
Reward system (RS)	RS1: There are clear reward systems in the organisation. RS2: Incentives are in place at all levels to motivate employees. RS3: Employees are aware of the existence of the reward system	0.971 0.983 0.961	0.825	0.931	0.818	0.103
Economy (ECO)	ECO1: There is great donor's support to implement change. ECO2: There are enough funds available to implement change. ECO3: Economic growth in the region is satisfactory	0.963 0.891 0.881	0.894	0.992	0.97	0.123
Socio-cultural (CUL)	Cul1: There is general acceptance for change within our organisation. Cul2: Our organisation has innovative culture. Cul3: Local tradition and beliefs support the change. Cul4: There is readiness for change within the organisation	0.872 0.861 0.852 0.771	0.791	0.914	0.731	0.038
Legal (LEG)	Leg1: Adequate legal/regulatory framework in Place Leg2: Introduction of new legislations supports the change. Leg3: Government has authority to enforce decisions	0.871 0.842 0.781	0.824	0.957	0.881	0.123
Human resources (HR)	HR1: There is enough human resource to implement change. HR2: Our organisation provides regular training programmes for employees to cope with change. HR3: Sufficient skilled workforce available to implement change	0.961 0.879 0.761	0.813	0.864	0.68	0.041
Political (POL)	POL1: There is political stability. POL2: There are consistent government policies. POL3: There is government support for change. POL4: Public reform is a priority for the political leadership	0.861 0.852 0.843 0.731	0.795	0.922	0.798	0.099
Top management (TM)	TM1: Top management is committed to change. TM2: Top management supports the change. TM3: Top management is capable of implementing change	0.789 0.767 0.734	0.874	0.929	0.814	0.264
IT infrastructure (IT)	IT1: IT infrastructure is ready for the change Initiatives. IT2: There is ample availability of internet connection. IT3: There is acceptable reliability of internet connection. IT4: Network is regularly monitored to avoid internet crash	0.91 0.86 0.746 0.741	0.885	0.863	0.686	0.264
Technical competence (TEC)	TEC1: There is an adequate technological infrastructure. TEC2: Government provides adequate technical support. TEC3: Our organisation provides all needed hardware and equipment	0.971 0.874 0.851	0.926	0.911	0.773	0.06
Collaboration (CM)	CM1: Staff members were consulted about the reasons for change. CM2: Front line staff and office workers can raise topics for discussion. CM3: Our department provide sufficient time for consultation.	0.86 0.74 0.71	0.936	0.909	0.769	0.069

Table 5. Discriminant validity analysis.

Construct	RS	ECO	CUL	LEG	HR	POL	TM	IT	TEC	COL
Reward system	0.904									
Economy	−0.011	0.985								
Socio-cultural	0.195	0.013	0.855							
Legal	0.100	0.351	0.148	0.939						
Human resource	0.025	−0.148	0.034	0.153	0.825					
Political	0.188	−0.168	0.036	−0.042	0.202	0.893				
Top management	0.321	0.069	0.088	0.211	0.195	0.314	0.902			
IT infrastructure	0.299	−0.048	0.064	0.090	0.058	0.234	0.514	0.828		
Technical competence	−0.014	0.186	0.085	0.245	−0.105	0.059	0.117	0.099	0.879	
Collaboration	0.026	0.207	0.030	0.262	−0.036	−0.024	0.176	0.078	0.145	0.877

Discriminant validity (also referred to as divergent validity) is the level to which factors intended to measure a specific construct do not forecast conceptually irrelevant criteria (Hair et al., 2010). The construct's discriminant validity was examined by comparing the

square root of AVE of a specific construct with inter-construction correlations for a specific construct. A construct is regarded to have discriminant validity when the square root of the AVE values is larger in value when compared with inter-construction correlations between a specific construct (Hair et al., 2010; Field, 2013). In addition, discriminant validity can be calculated when MSV is less in value when compared with AVE (Hair et al., 2010; Field, 2013). As can be noticed in Table 5, satisfactory discriminant validity is present in the measurement model. In Table 5, off-diagonal values denote "inter-construction correlations", and bolded values in a diagonality denote the "square root value of AVE". As can be noticed, each value in a diagonality is larger in value when compared with respective off-diagonal values. In addition, the MSV for each construction is less in value when compared with the respective values in Table 4. Hence, all constructs in a measurement model were regarded as having satisfactory discriminant validity.

The fitness statistics for model testing can be seen in Table 6. There are 25 types of goodness-of-fit statistics in AMOS, and choosing one to report is contentious between methodologies. Hair et al. (2010) advise reporting chi-square x^2 statistics with a complementary absolute such as the RMSEA (root mean square error of approximation) and an incremental such as the CFI. For comparing complex model structures, the NFI (normalized fit index) measure is advised to include between them. Others use the GFI or, in modern times, the SRMR in its stead. This study adopted x^2/df (the ratio between x^2 and level of freedom), the GFI (goodness-of-fit index), the AGFI (adjusted goodness-of-fit index), the NFI (normalized fit index), the CFI (comparative fit index), and the RMSEA (root mean square error of approximation) in testing for the model fitness proposed. All the fitness statistics in the analysis were in satisfactory values, and therefore, the model proposed a correct fit (Refer to Table 6). Thus, it can be concluded that the model is a correct fit for the data and therefore can interpret the hypotheses of this study.

**Table 6.** Overall fit indices of the CFA models.

Fit Index	Recommended Criteria	Results of CFA (First Run)	Results of CFA (Final Model)	References
$x^2/\text{d.f.}$	<3	1.790	1.547	Hair et al. (2010); Field (2013)
CFI	>0.9	0.965	0.978	Field (2013)
GFI	>0.8	0.874	0.901	Field (2013)
AGFI	>0.8	0.841	0.881	Field (2013)
RMSEA	<0.08	0.051	0.043	Hair et al. (2010)
TLI	>0.9	0.959	0.971	Hair et al. (2010)
NFI	>0.9	0.925	0.936	Field (2013)

4.2. Structural Model and Hypothesis Testing

Having successfully validated the measurement model, SEM was then used in testing the hypothesized relations in Figure 1. SEM has been seen to serve as a sound benchmark in comparing the hypothesis developed for a range of variables in terms of causal relations using the data (Lowry & Gaskin, 2014; Matsueda, 2023). SEM (Table 7 and Figure 2) identified that nine out of ten hypotheses and sub-hypotheses were supported.

Table 7. Standardized path coefficients.

Hypothesis	Path	Estimate	*p*	Remarks
H1a	IT -----> Intent to adopt change (reform)	0.363	***	Supported
H1b	COL -----> Intent to adopt change (reform)	0.083	0.016	Supported
H2a	TM -----> Intent to adopt change (reform)	0.432	***	Supported
H2b	HR -----> Intent to adopt change (reform)	0.152	0.002	Supported
H2c	TEC -----> Intent to adopt change (reform)	0.148	***	Supported
H2d	RS -----> Intent to adopt change (reform)	0.177	***	Supported
H3a	POL -----> Intent to adopt change (reform)	0.114	0.003	Supported
H3b	ECO -----> Intent to adopt change (reform)	0.013	0.699	Not Supported
H3c	CUL -----> Intent to adopt change (reform)	0.091	0.001	Supported
H3d	LEG -----> Intent to adopt change (reform)	0.214	***	Supported

*** $p < 0.001$.
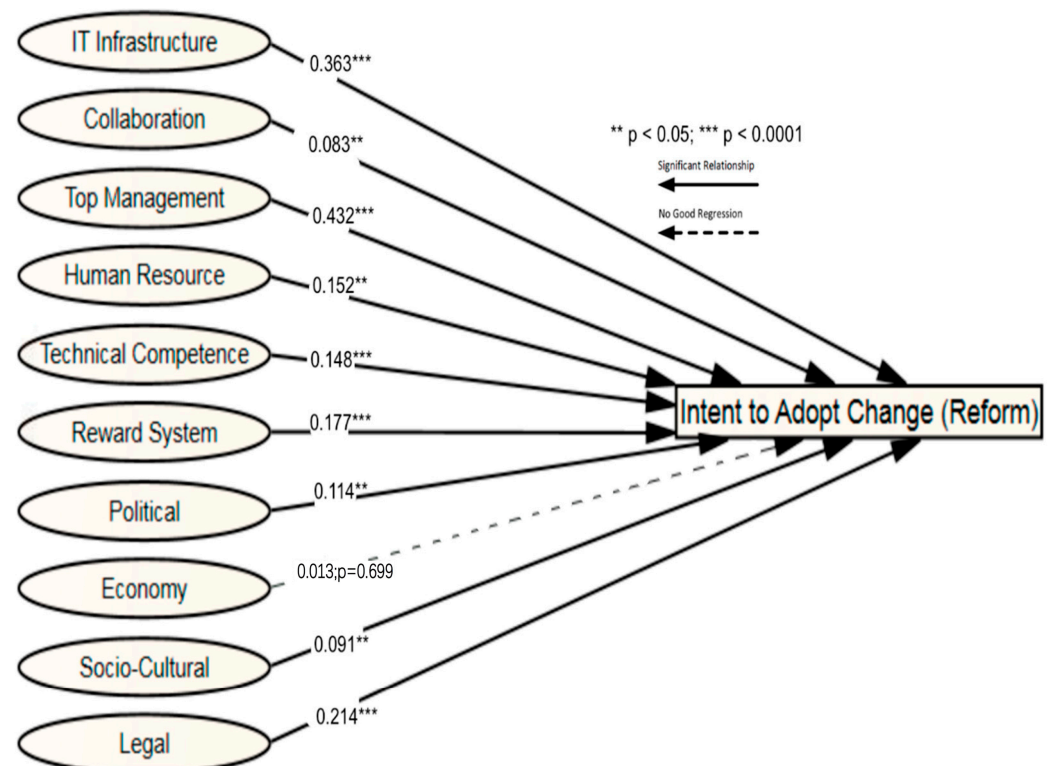
Figure 2. Final research model.

For H1a and H1b, IT infrastructure and collaboration impact and impact on change (reform) acceptance have been examined. As can be seen in Table 7 and Figure 2, IT infrastructure and collaboration impact and impact on intention to implement change (reform) have values (0.363 $p < 0.05$) and (0.083 $p < 0.05$), and hypotheses 1a and 1b have been

confirmed. For H2a, H2b, H2c, and H2d, we analyzed the role of top management, human resources, technical competency, and reward systems toward acceptance of change (reform). As can be noticed in Table 7 and Figure 2, the values for the role of top management, human resource, technical competency, and reward system toward acceptance of change (reform) are 0.432, 0.152, 0.148, and 0.177, respectively, and all path coefficients are significant at $p < 0.05$, supporting H2a, H2b, H2c, and H2d.

In terms of environmental factors and change (reform) adoption, the structural model (Table 7 and Figure 2) reveals that political leadership positively and significantly influences employees' intentions to implement change (reform, H3a, path coefficient of 0.114, $p < 0.05$). In addition, the analysis showed that culture (H3c, path coefficient of 0.091, $p < 0.05$), and legal system (H3d, path coefficient of 0.214, $p < 0.05$) have a positive and significant influence on employees' attitudes toward implementing change (reform). On the other hand, the economy (H3b, path coefficient of 0.013, $p = 0.699$) failed to have a significant influence on attitude toward change (reform) implementation. Thus, Hypothesis 3d is not supported ($p > 0.05$).

5. Discussion and Concluding Remarks

This paper deals with the problem of ICT-facilitated reform in the public sector, with a strong contention that such reform cannot simply be transplanted from private sector practice. Instead of taking cognizance of the idiosyncratic character of the public sector, in many instances, ICT is seen as a tool for imposing planned change with no consideration for the realities in the public sector. There is a supporting view in current overviews of public sector change management (Cordella & Bonina, 2012; Piercy et al., 2013; Van der Voet et al., 2013; Campbell, 2021; Cordella & Tempini, 2015; Kitsios & Kamariotou, 2017).

This study integrates a critical review of public management studies, shedding light on why reform in public sectors through ICT fails when not taking into consideration the public organization's bureaucratized and centralized nature. It addresses the imperative for consideration of macro and micro factors that form an individual's attitudinal orientation towards change and, most notably, in public organizations. As a result, a theoretical model, comprising technical, organizational, and environmental factors impacting workers' receptivity and behaviors toward change, was developed. The model takes into consideration the direct impact of 10 factors regarding TOE on workers' organization change preparedness, basing its consideration on previous studies (Wang et al., 2010; Low et al., 2011; Gangwar et al., 2015).

Statistical analysis reveals nine factors (political, reward system, IT infrastructure, technical competency, legal, top management, socio-cultural, and human resources) with a strong impact on workers' positive attitude towards change, but the economy does not have a strong impact on workers' intention to implement change and, therefore, is not included in the model (Figure 2).

Interestingly, economic factors did not show a significant impact on change adoption, which contrasts with previous studies highlighting financial constraints as key barriers to public sector reform (Andrews et al., 2017). A possible explanation is that in the KPK context, external donor support and earmarked reform funding may have reduced the perceived influence of financial constraints. Additionally, respondents may view managerial, technological, and institutional factors as more immediate drivers of change. This finding suggests that while economic limitations exist, they may be perceived as secondary when other contextual factors are more prominent.

Within the technological factors, "Collaboration" and "IT infrastructure" have a direct contribution toward the intention to implement change, with IT infrastructure having a most considerable contribution, in consonance with previous studies (Pudjianto et al., 2011;

Al-Zoubi, 2013). IT infrastructure, when constructed, is perceived to be significant for the acceptance of change and efficient delivery of public service. IT can make a contribution towards enhancing communications and collaboration in an organization, with a heightened participative, involved, and motivated workforce during a period of change.

In the workplace, the "Reward System" and "Top management" have a significant role in Pakistan settings. In agreement with studies, positive top management backing is regarded to make a positive contribution towards successful change in public sectors (Pudjianto et al., 2011; Lee et al., 2016). Effective top management plays a crucial role in shaping the public sector, particularly in planning, implementing, monitoring, and evaluating key public services.

This study identifies senior executives' awareness, competencies, and unequivocal awareness of change's strengths and weaknesses in overcoming the resistance of workers and creating acceptance for change programs as important factors. It brings out the role of greatest manager support and manager capabilities and awareness in supporting the value of change programs.

Among organizational factors, the "Reward System" holds the second-best relation with change adoption. There must be a well-established reward system in order to recruit and maintain talent in times of change and develop a supportive environment. In developing nations, including war-stricken areas such as KPK, fewer resources hinder proper rewards for public servants. As a result, a "brain drain" of talented professionals can occur. In such a scenario, governments have to implement an incentive reward system in order to recruit and maintain talented professionals, contributing towards organizational objectives.

Within the environment, the "Legal Framework" is most significant in the intention toward change, and the "Economy" surprisingly is not significant at all in the intention toward change adoption. Perhaps, in contrast with past studies, such a contradiction can be understood through the specific Pakistan environment. Recent financial development, political will for improvement in the public sector, and national and international donors' backing have eased financial-related impediments towards change. None of the respondents saw excessive expenses in relation to change having an impact on intention toward change adoption. Nevertheless, the findings confirm a positive and significant role played through legislation in backing change ventures. Firm legislation legitimates and empowers change and reform. This study advocates that deeper public management reform involves an equivalent re-furbishing of the legal environment.

The findings align with the TOE-based hypotheses, confirming that technological, organizational, and environmental factors significantly influence change adoption in the public sector. This supports the TOE framework's relevance beyond private sector contexts and highlights its value in understanding reform dynamics in developing countries. This study contributes to the broader discourse by showing that public sector transformation depends not only on technology but also on organizational readiness and external institutional support—offering practical insights for policymakers and reform practitioners.

In summary, the current study generates significant information about the factors influencing workers' intentions for change in Pakistan's KPK, guiding planning and change realization. It formulates a model for studying ICT-facilitated public sector reform and its impediments, contingent on its character. It aids in country reform development, guiding reformers and change leaders in such settings, and formulates a significant role for contextual factors in enhancing successful change acceptance.

6. Theoretical Significance and Practical Implication

6.1. Theoretical Contributions

This research extends the application of the TOE framework beyond its traditional use in private sector technology adoption studies by tailoring it to the context of public sector transformation in a developing country. The integration of context-specific variables enhances the framework's relevance for studying reform readiness in bureaucratic and politically influenced settings, such as those found in Pakistan. This contributes to the broader literature on public sector change management by providing a model that reflects the realities of developing economies.

6.2. Methodological Contributions

This study also offers methodological contributions by applying Structural Equation Modeling (SEM) to examine the interrelationships among multiple change factors. The use of SEM enables a robust, statistically validated approach to model testing in public sector research, which remains relatively underexplored. The findings thus demonstrate how SEM can be used effectively to understand complex dynamics of organizational change in public administration.

6.3. Practical Contributions

From a policy and practice perspective, this study provides actionable insights for public sector leaders, reform practitioners, and decision-makers. The results highlight the importance of investing in IT infrastructure, strengthening leadership support, enhancing human resource practices, and addressing legal and cultural barriers to reform. These insights can inform the design and implementation of more effective change strategies, particularly in public institutions operating within similarly constrained environments.

7. Limitations and Indications for Further Research

While this study provides valuable insights into public sector reform adoption within the KPK province of Pakistan, several limitations must be acknowledged. These limitations also offer opportunities for more targeted and contextually rich future research.

First, the use of purposive sampling may constrain the generalizability of findings to broader public sector contexts across Pakistan. Although care was taken to capture a diverse sample of public servants across departments and roles, future research should consider applying probability sampling techniques to enhance representativeness. In particular, stratified sampling across different departments or pay grades may reveal how hierarchical roles influence perceptions of change readiness.

Second, as this study is based on cross-sectional data, it captures only a snapshot in time. To better understand the evolution of change attitudes and implementation processes, longitudinal research designs are recommended. Such studies could examine shifts in perceptions and the sustainability of reform initiatives at multiple stages (pre-implementation, implementation, and post-implementation). These insights would be particularly useful for evaluating the long-term impact of ICT-driven reform strategies.

Third, the reliance on self-reported data raises the possibility of common method bias. While procedural remedies were employed to mitigate this risk, future studies could incorporate triangulated data sources such as supervisor assessments, performance reports, or case-based documentation of reform outcomes. Mixed-method approaches, combining survey data with in-depth interviews or focus groups, could further enrich understanding of underlying behavioral and institutional dynamics.

Fourth, while the TOE framework served as a valuable analytical tool in this study, future research may benefit from integrating additional theoretical lenses such as the following:

- Institutional Theory to better understand how formal structures and normative pressures influence reform;
- Public Value Theory to assess how reforms contribute to citizen-centered service improvements;
- Change Readiness Models to evaluate emotional and psychological dimensions of reform adoption among employees.

Fifth, to test the generalizability and adaptability of the TOE model in similar socio-political environments, comparative studies are encouraged. Inter-provincial comparisons within Pakistan, such as between Punjab, Sindh, and Balochistan, could reveal whether the same factors hold explanatory power across different regional governance structures. Additionally, cross-country comparisons with other developing nations (e.g., Bangladesh, Nepal, Nigeria, or Kenya) could help assess how different political and cultural contexts influence reform adoption.

Finally, future research may also explore new variables that emerged as influential in this study but require further analysis such as digital literacy, public trust, and inter-agency collaboration, particularly in settings where public services are undergoing digital transformation under challenging socio-economic conditions.

In sum, this study offers a foundation for further exploration into the complexities of public sector transformation. Future research should aim to develop more context-sensitive, dynamic, and comparative models, which will be essential for designing effective, scalable, and sustainable reform strategies across emerging economies.

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Informed Consent Statement: Not applicable.

Data Availability Statement: Data are available upon request from the researchers.

Conflicts of Interest: The authors declare no conflicts of interest.

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