The Impacts Of Organizational Dynamics On Organizational Change: Does Leadership Behavior Act As An Enhancer Here?

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Abstract

Building on framework of leadership theories and change models, the present study examines change leadership behavior as a moderator in the relationships between key predictors and change management success as an outcome. Author aims to explore the conditional effect of leadership behavior to analyze whether changes in leadership behavior influence the path relationship between the predictors and outcome variables. Moreover, this study examines under what conditions these changes affect strength of path relationships. A mixed sampling approach was applied to meet the objective of our research because single sampling technique is insufficient to meet our research criteria. An empirical Analyses was performed using SPSS AMOS using data from 423 U.S. employees in IT organizations. The study explores how leadership behavior influences the strength of these relationships. Structural equation model (SEM) and confirmatory factor Analyses (CFA) was applied to test and verified proposed model.

To assess the validity and reliability of constructs, we performed a confirmatory factor Analyses in AMOS (29.0) statistical software to get acceptable model fit values. As a rule of thumb, a reasonable fit between model and data is achieved if value is $\chi2/DF < 2$, $CFI > 0.90$, 10 RMSEA < 0.50, and SRMR < 0.08. Confirmatory factor Analyses has shown a good fit for the tested model. Findings revealed significant effects of moderating Analyses, demonstrating the importance of leadership in shaping change outcomes. All moderator effects were positively significant despite weaker (β values for the interaction of CLB with AI- 0.37; OC- 0.35; CP- 0.36; OA- 0.37) moderator effects. The novelty of this paper lies to understand the pattern of interactions patterns among organizational dynamics that determine change success, especially, the moderating and conditional effects of leadership behavior during organizational change.

Keywords:

Introduction

"Change is the law of nature. We can observe change in every walk of our life" ………. *"To survive in this highly dynamic and competitive environment it is of great importance for all to know what is change, how to manage it"*   W. Warner Burke

Leadership has become a complex and specialized profession, much like medicine, finance, teaching, or law. However, unlike these fields, leadership practitioners often lack dedicated education and professional development at comparable levels.

The COVID-19 pandemic has inspired numerous researchers to explore change and leadership. Kempster & Jackson, (2021) state that while the importance of purpose in leadership may seem like a straightforward concept, it remains an exceptionally complex phenomenon to implement in everyday leadership practice within change management. Additionally, the pandemic has emphasized the need for evidence-based leadership in organizational change efforts to drive successful outcomes (Naslund & Norrman, 2022). Despite thousands of studies conducted across multidisciplinary change management fields, there is still room for more empirical research to deepen our understanding of change and leadership in a globalized world.

A recent Harvard survey on leadership has shed light on current leadership development practices, identifying key forces that are reshaping the role of leaders and the skills required to be a successful leader. The survey highlighted that "coping skills" are no longer sufficient, as change is accelerating with no return to previous norms. In many organizations, the work explored in last year's report is still ongoing. However, this does not mean the situation remains unchanged—a failure to recognize evolving leadership demands could be one reason change initiatives fail. The 2024 global leadership development study ("Time to Transform - global leadership development study, 2024") identified a shift in leadership trends and new themes emerging in workplace settings, underscoring the need for transformational leadership approaches.

When Lewin (1947) first introduced the concept of change management, he emphasized the influence of social and group dynamics in achieving desired change performance within social units. Subsequent research (Jones et al., 2018) has highlighted that 60–70% of organizational change initiatives fail, primarily due to a lack of effective leadership (Burnes, 2011, Hughes, 2011). Leadership behavior plays a crucial role in ensuring the success of change initiatives (Kaiser et al., 2008).

Studies by McNulty & Ferlie, (2004) and Van Der Voet et al. (2014) underscore the complexities of implementing organizational change, particularly due to structural and internal environmental challenges. However, organizations must adaptive in to dynamic environments to survive and thrive. Achieving successful change, especially radical transformational change, remains a significant challenge (Kanitz et al., 2023)
While implementing change is inherently difficult, it is essential for organizations to remain competitive and sustainable in today's business (C. S. Burke et al., 2006). A vast body of literature underscores the critical role of leadership in navigating the challenges of organizational change difficulties of organizational change (Hennessey, 1998; Stewart & Kringas, 2003).

Research on Transformational Leadership (TL) (Bass, 1990; Bass & Riggio, 2006) and change management Burnes, 2004; Cummings et al., 2015) highlights the importance of leadership in change implementation (Hater & Bass, 1988). This article examines the essential leadership traits and practices required for success in today's complex business environment (Sternfels *et al.*, 2024).

In an interview, McGregor Burns stated, "We are living in a world of change where a most exciting and potentially fruitful avenue of leadership research today lies in transformational or transforming leadership" (Bailey & Axelrod, 2001).

However, organizational change requires companies to adapt to new working conditions (culture), embrace technological advancements (AI), maintain a fully engaged workforce (change participants), and foster a more agile organizational structure (OA). While change can often be stressful, leading to stress reactions that affect the entire organization (Islam et al., 2021), strong leadership and established theories can help organizations overcome challenges associated with change and drive successful transformation.

Leadership has been a central focus in the study of change management (Islam et al., 2021). More precisely, this study incorporates two influential frameworks—Transformational Leadership Theory (Bass, 1985) and Kurt Lewin's change model (Lewin, 1947) —which are closely related to change management and leadership. These frameworks provide a structured understanding of change practices that have significantly contributed to successful organizational transformations (Herold et al., 2008; Oreg & Berson, 2019).
In this manuscript, we identify key areas where further research can enhance the understanding of change management and leadership (Jango, 2024)

Despite extensive research on organizational change management, existing literature has yet to comprehensively examine how leadership influences organizational dynamics to drive change management success. Although numerous studies highlight key factors in change implementation, there remains a critical gap in understanding how leadership directly interacts with these factors to enhance organizational performance and success.

This study aims to address the existing research gap by examining the causal relationship between organizational predictors and change management outcomes. Mainly, it analyzes how leadership behavior, as a moderator, interacts with organizational dynamics to influence outcomes. Additionally, this research investigates the direct conditional effect of leadership behavior on the path relationships within the framework of TL theory (Bass & Stogdill, 1990)

Research Objectives
This study is divided into three key sections, focusing on the following objectives:
1.   Investigate the direct path relationship between the organizational dynamics and change management success.
2.   Analyze the role of leadership behavior as an enhancer in change implementation.
3.   Explore the conditional effect of leadership behavior on the path relationships between predictors and outcomes.

Research Questions (RQs)
RQ1: Does leadership behavior moderate the relationship between organizational dynamics (AI, OC, CP, OA) and change management success?
RQ2: How does the strength of the relationship change base on the conditional role of leadership behavior?

Research background and hypotheses development
Artificial intelligence
Alan Turing's pioneering works, "Intelligent Machinery" (1948) and "Computing Machinery and Intelligence" (1950), laid the foundation for Artificial Intelligence (AI), shaping its future development (Wijayati et al., 2022). Research suggests that AI can enhance efficiency and

reduce costs in information-intensive domains such as professional services and educational institutions (Davenport et al., 2020)

As an integral part of modern organizations, AI positively influences organizational growth and success by improving performance, reducing expenses, optimizing outcomes, and promoting sustainability, all of which contribute to change management success (Grewal et al., 2020; Nam et al., 2021). Additionally, studies indicate that Human-Machine (AI) collaboration plays a crucial role in ensuring successful change management (Benbya et al., 2020; Carneiro, 2000). So, we presume:

H₁: Artificial intelligence will positively influence organizational change success.

Organizational culture

Several studies on organizational culture highlight that while culture is one of the most critical types of change, modifying an organization's culture or environment can have a direct impact on its success or failure (Smith, 2003; Burnes & Jackson, 2011). However, culture becomes a key factor for success when organizations seek to enhance overall performance by adopting new change practices (Škerlavaj et al., 2007; Shin et al., 2012).

One emerging trend in AI-enabled change management is the implementation of intelligent automation to optimize workflows and increase efficiency. AI-powered tools can analyze existing work processes, identify bottlenecks, and suggest improvements, which accelerates change implementation and facilitates a smoother transition for employees (Top 5 AI-Enabled Change Management Trends of 2024, 2023). Burnes & Jackson (2011) further explored how misalignment in value systems between the change intervention and organizational members can lead to change failure. Conversely, Jones et al. (2005) found a significant positive relationship between organizational culture and change success. So, we presume:

H₂: Organizational culture will have a significant influence on shaping the organizational change success.

Change participant

Many employees seek active involvement in organizations that recognize and support their growth, especially during change initiatives. Employees exhibit their behavior which is more likely to engage when they feel valued and encouraged to enhance their potential (Time to Transform, 2024). Morgan & Zeffane (2003) argue that employee involvement enhances support for organizational change, particularly when top management or senior leadership actively includes them in decision-making. Employees who experience this involvement are more likely to show positive commitment, increasing the likelihood of successful change implementation.

Recent studies emphasize that change is not easy to adopt, yet to successfully navigate external challenges, organizations must embrace change (Rahi et al., 2022; Saeed et al., 2024). Lines (2004) highlights that individual readiness and involvement are among the most crucial factors for change success, as employees play a central role in determining organizational performance and productivity. Additionally, Armenakis et al. (1993) conclude that individual acceptance of change is a key determinant of successful organizational transformation (Herold et al., 2007). (PAAIS & PATTIRUHU, 2020) emphasize on analyzing the relations between, trust in supervisors and teams, team performance multi-level Analyses, transformational leadership, and job satisfaction. So, we hypothesize:

H₃: Individual involvement in change initiatives will significantly influence change management success.
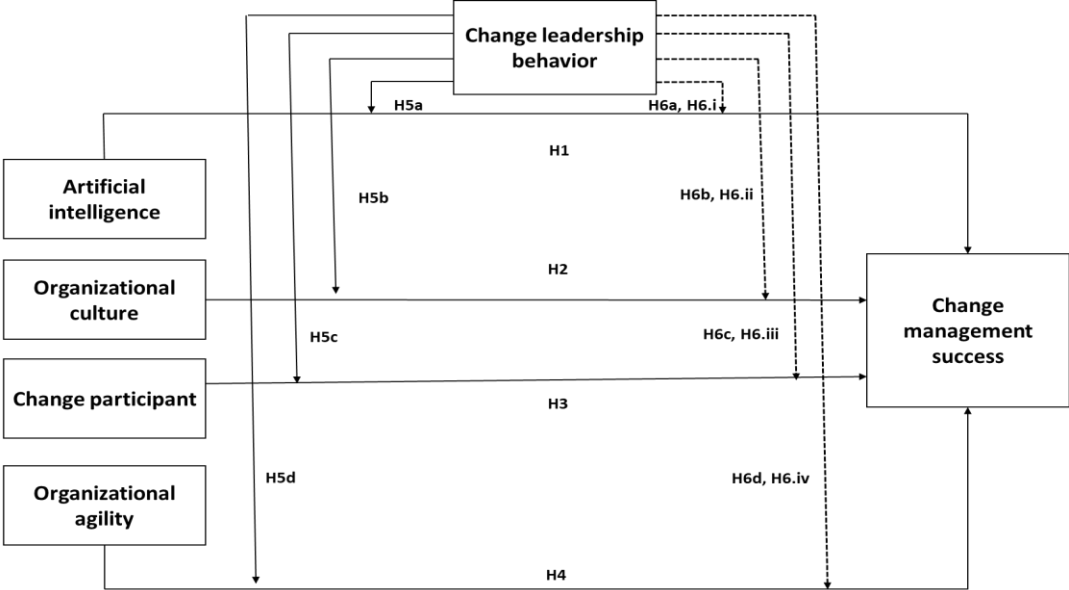

Fig 01: Proposed conceptual model for study variable

Organizational agility

According to an organizational survey, trustworthiness and adaptability are the most critical aspects of the modern workplace (Sternfels *et al.*, 2024). Wageeh (2016) examined the relationship between Organizational Agility (OA) and Change Management Success (CMS) and found a positive correlation.

S. L. Brown & Eisenhardt (1997) argue that the ability to change rapidly and continuously is essential for survival and success in highly competitive environments (Zhou et al., 2006). Similarly, Dess & Beard (1984) highlight environmental dynamism, which consists of change rate and instability in both internal and external environments. These factors have a direct impact on an organization's success or failure (Burnes & Jackson, 2011).

Heckmann et al. (2016) further support previous research, concluding that an organization's change capacity strongly influences its success. So, we hypothesize:

H₄: Organizational agility will have a greater influence on organizational change success.

Variables	Definition	Authors' reference
Artificial intelligence	*"The way in which a system acts or the way in which it thinks"*, *"Theories and techniques used to create machines capable of simulating intelligence, AI is a general term that involves using a computer to model intelligent behavior with minimal human intervention"*	Benko, (2009), Haenlein & Kaplan, (2019)

Organizational culture	*"Shared values, beliefs, norms, and practices that shape the behaviors and interactions of individuals within an organization"*, *"The collective programming of the mind, underscoring its deep influence on individual and group behavior within organizations"*	Murire, (2024), Schein (2010)
Change Participation	*"Involvement of individuals or groups in the processes of organizational change"*	Gouldner, (1960), Neves & Caetano, (2009)
Organizational agility	*"The ability to survive and grow in an unexpected competitive environment of constant change through rapid response to changing"*	Gunasekaran, (1999), Wageeh, (2016)
Change leadership	*"The leadership behaviors are operationalized to foster organizational identification during change, to maximize the success of change initiatives"*	Aitken & Von Treuer, (2021), Graetz, (2008)
Change management success	Defined as *"the process of guiding its people and process through a transition, resulting in desire outcome"*	Errida & Lotfi, (2021), Idogawa et al., (2023), Chrusciel & Field, (2006)

Revealing the relationship between organizational dynamic and change management-moderating role of leadership behavior as an enhancer

Rapid technological advancements introduce increasing complexity to organizations through innovative tools and techniques that transform organizational and economic processes (Martínez-Caro et al., 2020).

Change leadership is defined as "the ability to influence others (employees and followers) by communicating the reasons for change, motivating them, and guiding them toward achieving an organization's desired goal." As a crucial component of the organizational environment, AI contributes to organizational success (Chaganti & Damanpour, 1991; Scott & Bruce, 1994). AI has a vital role in the evolution of business processes and offers greater flexibility in day-to-day operations.

Leadership behavior significantly influences technical innovation and organizational performance, particularly in contexts where firm innovation and change occur (Chaganti & Damanpour, 1991; Scott & Bruce, 1994). Existing studies suggest that the relationship between innovation and organizational success is shaped by Change Leadership Behavior (CLB) (Ruiz-Mercader et al., 2006). So, we hypothesize:

H5a: Leadership behavior will significantly moderate the positive relationship between artificial intelligence and organizational change.

Evidence-based studies highlight the interplay between organizational culture (OC) and change leadership within the organizational boundaries. Statistical analyses have shown a strong

relationship between leadership and OC, with (Tsai, 2011) asserting that creating and managing culture is one of the most critical functions of top-level leaders.

Examining the relationship between OC and leadership behavior provides insights into key factors associated with Change Management Success (CMS) (Peng et al., 2021). Other research further confirms this relationship, showing that leadership and culture are positively correlated, explaining 27% of the variance (Liao et al., 2017). So, we hypothesize:

H5b: The relationship between organizational culture and organizational change will be positively moderated by leadership behavior.

Leadership behavior is one of the most critical factors in driving organizations toward successful change implementation (Villa et al., 2003). Numerous empirical studies highlight the importance of adapting leadership behavior during organizational change (Douglas, 2012; Gilley et al., 2009). Recent experimental research demonstrates that leaders' behavior strengthens the relationship between individual involvement and the change process during implementation (Bayraktar & Jiménez, 2020; Nordin, 2012). Employee motivation plays a pivotal role in mobilizing employees for change initiatives, with effective leadership communication and directive guidance ensuring engagement throughout the change process (Waddell & Sohal,1998).

Quality leadership fosters employee morale, engagement, and a deeper understanding of change dynamics (Groves, 2016). As per the "social learning theory", employees' support for change is shaped by behavioral role models, particularly leaders' responses to organizational change (Bandura & Adams, 1977). Furthermore, Bass & Avolio (1994) provided a framework demonstrating how organizational culture and transformational leadership behavior significantly influence organizational performance. So, we hypothesize:

H5c: Leadership behavior will influence the positive relationship between change participants and organizational change.

In a *dynamic working environment*, an organization's success relies on its strategic and agile decisions, with leadership serving as the cornerstone in managing tensions of strategic agility (Lewis et al., 2014). Organizational Agility (OA) can be sustained globally through adaptations in leadership behavior.

Research on agility and leadership cohesiveness suggests that preparing employees for change is a leader's responsibility, as leaders act as facilitators of change efforts, mitigating resistance and fostering a positive environment for change readiness (Amabile et al., 2004; Wageeh, 2016). OA refers to an organization's ability to adapt, respond to external stimuli, and maintain resilience in uncertain and evolving environments.

Change Leadership Behavior (CLB) can enhance organizational agility by implementing employee development programs, training, management exercises, mentoring, and interpersonal skill-building. These initiatives foster flexibility and adaptability in employees' behaviors and competencies (Doeze Jager et al., 2022; Khairy et al., 2023). This study emphasizes the importance of continuous learning and adaptability among leaders to effectively implement transformational change.

Herold et al. (2008) examined the relationship between transformational leadership and employees' commitment to change, finding a positive correlation. Based on empirical literature, we hypothesize:

H5d: Change leadership behavior will positively moderate the relationship between organizational agility and organizational change.

The conditional effects of change leadership behavior

This section argues that Change Leadership Behavior (CLB) is a critical factor in driving successful organizational change. Leadership behavior, whether at high or low levels, influences the relationship between predictors and outcomes during change implementation. Previous research has highlighted the significant influence of leadership behavior on organizational change success and performance (Van Der Voet, 2016).

Empirical evidence suggests that changes in leadership behavior impact the path relationship between predictors and outcomes during organizational change (Ekvall & Arvonen, 1994; Fernandez, 2008). Meta-Analyses studies indicate that both high and low levels of leadership behavior can either strengthen or weaken this path relationship, affecting the proportion of variance explained by predictors (Bednall et al., 2018; Larsson & Vinberg, 2010).

Previous studies have identified six key dimensions (group goals, individualized support, appropriate role model, intellectual stimulation, high performance expectations, and articulating a vision) of transformational leadership (TL) behavior that influence change processes (Podsakoff et al., 1996; Spreitzer et al., 2005).

These TL behaviors serve to communicate the vision for the future, foster goal alignment, support employees, and model appropriate behavior during change implementation (Conger & Kanungo, 1994). Bryman (2004) and Bass (1985) further supports Bass's perspective, arguing that leadership behavior shapes employees' perceptions of change, directly influencing their commitment to change initiatives.

Additionally, Bendall et al. (2018) and Pandey & Garnett (2006) suggest that change leadership plays a crucial role in determining the extent to which leadership behavior contributes to the positive impact of change initiatives. So, we hypothesize:

H6a. High leadership behavior will strengthen the positive relationship between AI and CMS

H6.i. Low leadership behavior will weaken the positive relationship between AI and CMS

H6b. High level of leadership behavior will strengthen the relationship between OC and CMS

H6.ii. The relationship between OC and CMS will be weaken at low level of the leadership behavior

H6c. Leadership behavior will moderate the positive relationship between CP and CMS such that strength of the relationship will be stronger when moderator is high

H6.iii. Low degree of leadership will weaken the relationship between CP and CMS

H6d. High level of leadership will strengthen the relationship between OA and CMS.

H6.iv. Low level of leadership behavior effect will weaken the relationship between OA and CMS

Methods

Sample

Current study presents a comprehensive investigation into the impacts of organizational dynamics (Artificial Intelligence (AI), Organizational Culture (OC), Change Participation (CP), and Organizational Agility (OA)), focusing on the moderating role of change leadership behavior.

Study was conducted using sample of 500 employees working in various roles within IT service management companies in the U.S. Process of data collection was carried out as follows: first, a purposive and snowball sampling approach was used to select 500 employees in Phoenix City, Arizona, USA. Initial contact was made via telephone to assess their willingness to participate in the study. Second, obtaining verbal and voluntary consent, questionnaires were distributed to the 500 selected employees. Third, total of 423 completed questionnaires were returned, with a response rate of 84.6%, ensuring data reliability and validity. (Table 1)

Table 1. Sample demographic characteristics

Demographic Variables	Categories	n	Percentage (%)
Gender			
	Male	224	47.00%
	Female	199	53.00%
Age			
	18-22	39	9.20%
	23-37	330	78.00%
	38-42	38	9.00%
	43-47	5	1.20%
	Over 48	11	2.60%
Marital Status			
	Married	282	66.70%
	Unmarried	337	33.70%
Education			
	Certified courses	30	7.10%
	Bachelor's	217	51.30%
	Master's	152	35.90%
	Ph. D	24	5.7%
Position			
	Manager	32	7.60%
	Software Developer	175	41.40%
	Cloud Engineer	126	29.80%
	Data Analyst	77	18.20%
	Others	13	3.10%
Work Tenure			
	<1 year	26	6.10%
	1-5 years	209	49.40%
	6-10 years	131	31.00%
	11-15 years	31	7.30%
	>16 years	26	6.10%

Research instrument

All variables were anchored at 1–5 Likert scale, with answering categories ranging from strongly disagree to strongly agree.

"Artificial Intelligence" (AI) was assessed using a seven-item scale adopted from Wijayati et al. (2022) Example items include, "Artificial intelligence can help me find lost data.", "Artificial intelligence provides accurate data and information." The alpha reliability for AI scale was 0.935, exhibiting high consistency and reliability. (See Table 2)

"Organizational Culture" (OC) was assessed using the Organizational Culture Survey (OCS) developed by Glaser et al. (1987). This scale has been widely utilized in prior research to measure organizational culture dimensions. Example items include "People I work with are direct and honest with each other.", "People I work with accept criticism without becoming defensive."

The scale demonstrated good internal consistency, with an alpha reliability (0.916), indicating high reliability (see Table 2).

Table 2. Construct Validity and Reliability (descriptive statistics)

Items	Mean	SD	Loadings	Cronbach's Alpha	CR	AVE	MSV
Artificial Intelligence				**0.935**	**0.945**	**0.712**	**0.65**
AI 1	3.81	0.828	0.835				
AI 2	3.75	0.855	0.848				
AI 3	3.86	0.830	0.816				
AI 4	3.87	0.869	0.822				
AI 5	3.84	0.916	0.857				
AI 6	3.79	0.890	0.839				
AI 7	3.81	0.877	0.867				
Organizational Culture				**0.916**	**0.93**	**0.689**	**0.65**
OC 1	3.87	0.845	0.828				
OC 2	4.00	0.815	0.781				
OC 3	3.96	0.882	0.836				
OC 4	3.92	0.844	0.825				
OC 5	3.92	0.838	0.845				

OC 6	3.92	0.830	0.837				
Change Participant				**0.876**	**0.892**	**0.673**	**0.604**
CP 1	4.04	0.806	0.813				
CP 2	3.95	0.851	0.825				
CP 3	3.96	0.875	0.825				
CP 4	3.98	0.816	0.819				
Organizational Agility				**0.903**	**0.917**	**0.687**	**0.585**
OA 1	3.85	0.845	0.814				
OA 2	3.85	0.911	0.844				
OA 3	3.98	0.876	0.845				
OA 4	3.87	0.871	0.833				
OA 5	3.95	0.810	0.808				
Change Management Success				**0.933**	**0.945**	**0.710**	**0.629**
CMS 1	3.86	0.830	0.851				
CMS 2	3.88	0.823	0.834				
CMS 3	3.91	0.883	0.828				
CMS 4	3.90	0.833	0.845				
CMS 5	3.92	0.796	0.835				
CMS 6	3.96	0.834	0.853				
CMS 7	3.91	0.833	0.851				
Change Leadership Behavior				**0.935**	**0.960**	**0.775**	**0.469**
CLB 1	2.23	0.762	0.866				
CLB 2	2.22	0.820	0.869				
CLB 3	2.20	0.818	0.866				
CLB 4	2.22	0.817	0.905				
CLB 5	2.20	0.798	0.887				
CLB 6	2.25	0.816	0.886				
CLB 7	2.15	0.827	0.883				

Note: All items are scored on a Likert (1-5) scale, *AVE- Average Variance Extracted, CR-Composite Reliability; Reliability for all constructs= 0.917; N=423.*

Change Participation (CP) was measured using a four-item scale developed by Antoni (2004) and Fuchs & Prouska (2014). Example items include: "I have supported the organizational change goals.", "I communicated problems of the change that I saw arising." All scale shows high level of internal consistency, with an alpha reliability of 0.876, confirming its reliability (see Table 2).

Organizational Agility (OA) was assessed using a five-item scale developed by Jaworski & Kohli (1993). Example items include: "The organization analyzes important events concerning customers, competitors, and technology without any delay.", "The organization detects opportunities and threats related to changes in customers, competitors, and technology in time."

The scale demonstrated high consistency, with an alpha reliability of 0.903, confirming its whole reliability (see Table 2).

Change Leadership Behavior (CLB) was measured using a seven-item scale developed by Herold et al. (2008). Example items include: "What leaders do to implement a given change effectively.", "My leader developed a clear vision for what will be achieved by our department."

The CLB scale also exhibited high internal consistency, with a Cronbach's alpha reliability of 0.935 (Cronbach, 1951). All additional statistical information is presented in Table 2.

Control Variable

Among the 423 participants, 199 (47.0%) were female, and 224 (53.0%) were male. The average age of respondents ranged from 23 to 37 years (Standard Deviation = 0.679). Regarding educational qualifications: 7.1% had completed certified courses, 51.3% held a bachelor's degree, 35.9% had earned a master's degree, 5.7% held a Ph.D., In terms of job roles, participants were distributed as follows: 7.6% were managers, 41.4% were software developers, 29.8% were cloud engineers, 18.2% were data analysts, 3.1% held other roles, including UI/UX designers, business analysts, system engineers, AI interns, and consultants. Additional demographic characteristics are summarized in Table 1.

Data Analyses

The Analyses was completed in three stages: the first stage examined direct relationship between predictors and outcomes. The second stage analyzed Change Leadership Behavior (CLB) as a singular moderator, assessing its role as an enhancing factor in the relationship between predictors and outcomes (Kulkov et al., 2024; Onyeneke & Abe, 2021). Third stage statistically evaluated the conditional effect of CLB on the direct predictor-outcome relationship, determining under what conditions this relationship is strengthened or weakened.

Results

Measurement model testing

All variables present in this study came from the different source, so we confirmed the correlation between the constructs using Fornell & Larcker (1981) threshold-criterion which satisfied the internal consistency coefficient before testing the hypotheses. We ran the confirmatory factor Analyses (CFA) using AMOS 29.0 to find the fit indices within the acceptable range, i.e. $\chi2$ (PCMIN/DF) = 1.144; CFI = 0.993; TLI = 0.922; RMSEA = 0.018; RMR = 0.016; AGFI = 0.910 (Ahmed et al., 2022; Hair et al., 2012).

Table 3. Fornell–Larcker criterion (correlation estimates)

Constructs	M	SD	CMS	AI	OC	CP	OA	CLB
CMS	3.90	0.704	0.842					
AI	3.81	0.734	0.784	**0.844**				
OC	3.93	0.706	0.793	0.806	**0.83**			
CP	3.98	0.713	0.773	0.777	0.761	**0.821**		
OA	3.89	0.704	0.765	0.758	0.728	0.707	**0.829**	
CLB	2.20	0.685	-0.676	-0.663	-0.685	-0.633	-0.631	**0.88**

Note: Boldfaced numbers on the diagonal represent Cronbach's alpha; M = means; SD = standard deviations; CMS = Change Management Success; AI = Artificial Intelligence; OC = Organizational Culture; CP = Change Participant; OA = Organizational Agility; CLB = Change Leadership Behavior; p < .001

The significance level of all items loading was from 0.718 to 0.905 (Kranthi & Ahmed, 2018). Additionally, the average variance extracted (AVE) value is 0.775, which was less than the Composite reliability (CR) of 0.960 (Fornell & Larcker, 1981). According to Hair et al. (2020) criterion, these results verify the research model's reliability and validity (Table 2 and Fig 02).
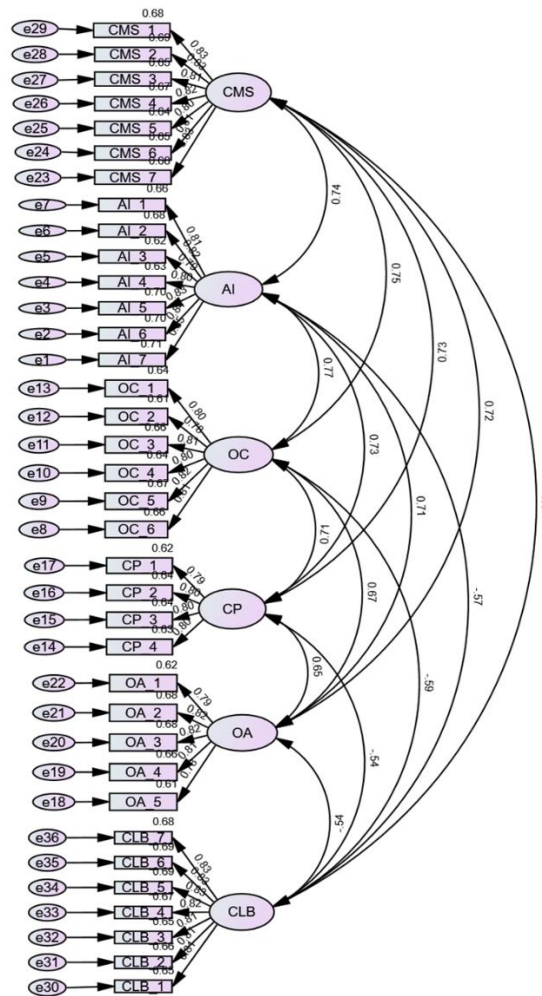

Fig 02: Confirmatory factor Analyses

Results from structural equation model (SEM)
All assumed relationships were tested using (SEM) in SPSS Statistics 27.0 and AMOS 29.0. software. The proposed approach enabled us to analyze the effects of- Predictor variables, Moderator variable, Interaction terms between the predictor and the dependent variable.
This Analyses was conducted after confirming model fit, ensuring the validity and reliability of the results.

As illustrated in Table 4, path coefficient, p-value, and R-square was tested (Dash & Paul, 2021). The fit statistics for the SEM model (i.e. χ^2 (PCMIN/DF) = 3.420; CFI = .902; GFI = .812; RMSEA = .076) indicates acceptable model fit (Burke et al., 2002; Kumaraperumal et al., 2022). The findings from results reveal significant and positive relationship between

Table 4. Results for path Analyses

Hypotheses	Path Relationship	Path Coefficient	p-value	Result	R^2
H_1	AI → CMS	0.29	0.000***	Supported	
H_2	OC → CMS	0.377	0.000***	Supported	0.451
H_3	CP → CMS	0.32	0.000***	Supported	
H_4	OA → CMS	0.35	0.000***	Supported	

*** P<0.001
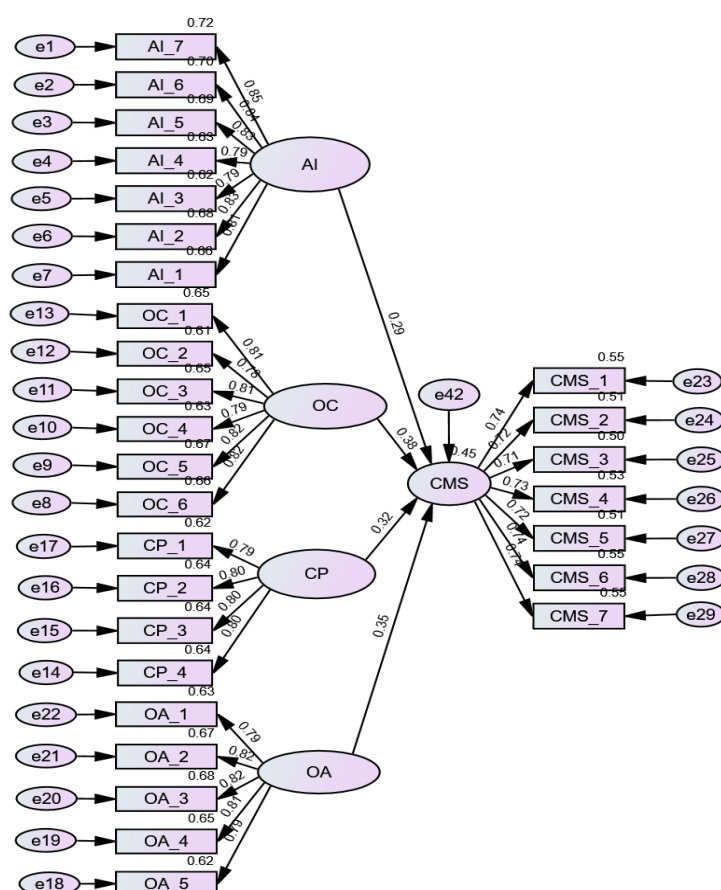
Fig 03: Results of Structural Equation Model

organizational dynamics and CMS: [AI (β = 0.29, *p<0.001*), OC (β = 0.37, *p<0.001*), CP (β = 0.32, *p<0.001*), and OA (β = 0.35, *p<0.001*)]. Predictor explains 45% of the variance in CMS (R-squared = 0.45) (Gao, 2024). Therefore, H_1, H_2, H_3 and H_4 are significantly supported. (Table 4 and Fig 03).

Results from moderator analyses
Second, we tested H5a, H5b, H5c, and H5d, hypothesizing that leadership behavior (CLB) moderates the relationship between organizational dynamics and CMS. Without the moderating effect, the overall R^2 value for CMS was 0.451, indicating 45% of the variance in CMS was

Table 5. Moderator interaction effect

Hypotheses	Interaction	Estimate	S. E	CR	P	Results	R^2

H5a	Interaction_AIxCLB→CMS	0.242	0.030	7.978	0.000***	Supported	0.584
H5b	Interaction_OCxCLB→CMS	0.246	0.033	7.495	0.000***	Supported	0.575
H5c	Interaction_CPxCLB→CMS	0.246	0.033	7.375	0.000***	Supported	0.557
H5d	Interaction_OAxCLB→CMS	0.262	0.033	7.914	0.000***	Supported	0.565

Note: *Unstandardized beta coefficients are reported (±1). SE, ***p-value<0.001*
exhibited by AI, OC, CP, and OA. With the inclusion of interaction terms (AI*CLB, OC*CLB, CP*CLB, and OA*CLB), the overall R² increased to 0.570, demonstrating that 57% of the variance in CMS was explained.
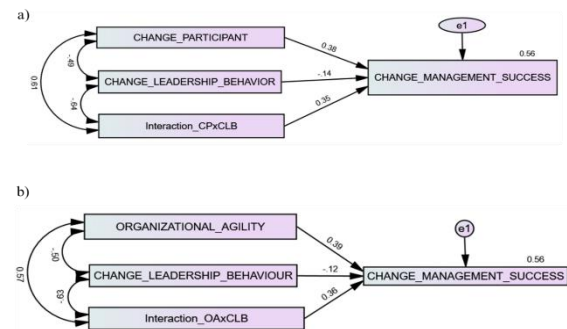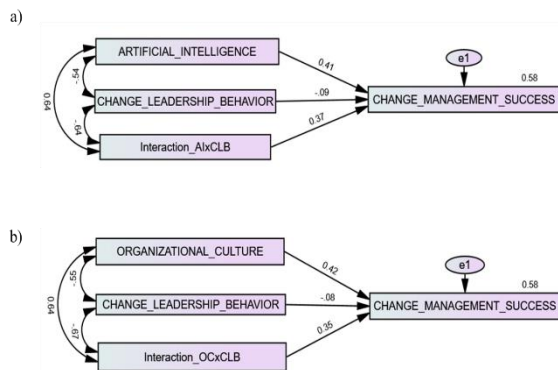
Fig 04: The moderating effect of change leadership
Fig 05: The moderating effect of change leadership
behavior on the relationship between a) Artificial intelligence behavior on the relationship between a) Change participant and change management success b) Organizational and change management success b) Organizational culture and change management success agility and change management success

Fig 06: Interactive effect of change leadership behavior   Fig 07: Interactive effect of
change leadership behavior
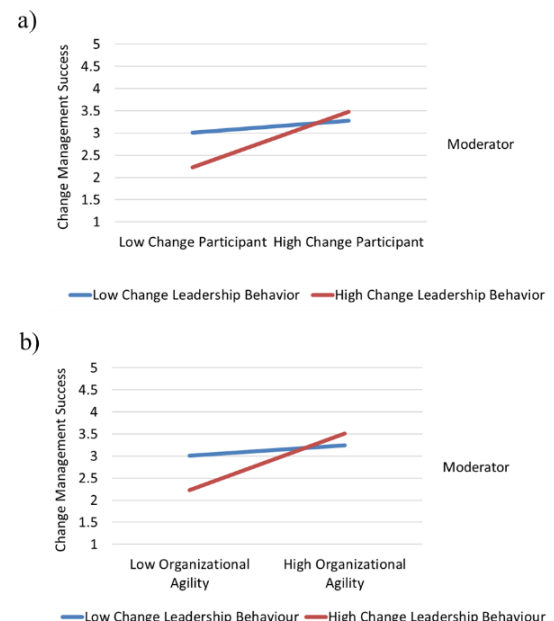
a) artificial intelligence on change management success   a) change participant on change management success

b) Organizational culture on change management success   b) Organizational agility on change management success

This increase provides empirical additional interesting result for the moderating effect of CLB, confirming that CLB significantly influences the relationship between organizational dynamics and CMS (see Table 5).

Additionally, simple slope analyses were conducted to assess the interaction effects of CLB on CMS [Fig 06(a), 06(b), 07(a), and 07(b)]. The results show that while the moderating effect of CLB is relatively weak, it remains positive, as evidenced by the slightly steeper slope in the CMS prediction models.

Thus, hypotheses H5a, H5b, H5c, and H5d are supported, confirming that CLB serves as a moderator in relationship between organizational dynamics and CMS [Fig 04(a), 04(b), 05(a), and 05(b) illustrate this effect].

Results from conditional effects of moderator

In our final analyses, we examined the conditional effect of the moderator (CLB) and its impact on the hypothesized relationships [H6a, H6(i); H6b, H6(ii); H6c, H6(iii); H6d, H6(iv)]. The Analyses tested whether a high level of moderation strengthens the relationship between organizational dynamics and CMS, while a low level of moderation weakens this relationship. Key findings from Tables 6 and 7 reveal that when the level of moderator is high the strength of the path relationships is significantly stronger- [AI → CMS (β = 0.558, p < 0.001), OC → CMS (β = 0.591, p < 0.001), CP → CMS (β = 0.545, p < 0.001), OA → CMS (β = 0.559, p < 0.001)].

Table 6. Conditional effect of the moderator at high level

Hypotheses	Interaction	Estimate	S. E	CR	P
H6a	AI_HighCLB→CMS	0.558	0.036	15.591	0.000***
H6b	OC_HighCLB→CMS	0.591	0.038	15.514	0.000***
H6c	CP_HighCLB→CMS	0.545	0.037	14.712	0.000***
H6d	OA_HighCLB→CMS	0.559	0.036	15.341	0.000***

Note: *Unstandardized beta coefficients are reported (±1), *** P<0.001*

Whereas, at a low level of moderation, the relationships weaken- [AI → CMS (β = 0.226, p < 0.001), OC → CMS (β = 0.254, p < 0.001), CP → CMS (β = 0.207, p < 0.001), OA → CMS (β = 0.200, p < 0.001)].

Table 7. Conditional effect of the moderator at low level

Hypotheses	Interaction	Estimate	S. E	CR	P
H6.i	AI_LowCLB→CMS	0.226	0.053	4.301	0.000***
H6.ii	OC_LowCLB→CMS	0.254	0.056	4.566	0.000***
H6.iii	CP_LowCLB→CMS	0.207	0.055	3.781	0.000***
H6.iv	OA_LowCLB→CMS	0.200	0.052	3.869	0.000***

Note: *Unstandardized beta coefficients are reported (±1), *** P<0.001*

These statistical findings confirm our hypotheses that leadership behavior (CLB) strengthens the relationship between organizational dynamics and CMS at high levels, while lower levels of CLB weaken this relationship. Thus, our presumptions are supported [see Fig 08(a), 08(b), 09(a), and 09(b)].

We conducted a graphical representation using simple slope analyses to gain deeper insights into the nature of the moderator. These visualizations help illustrate the moderating effect of Change Leadership Behavior (CLB) at high and low levels.

As shown in Fig 10(a) & 10(b), and Fig 11(a) & 11(b), the moderator line is steeper when CLB is high, indicating that increases in the level of moderator strength of the relationship between organizational dynamics and CMS which exhibits more stronger relationship.
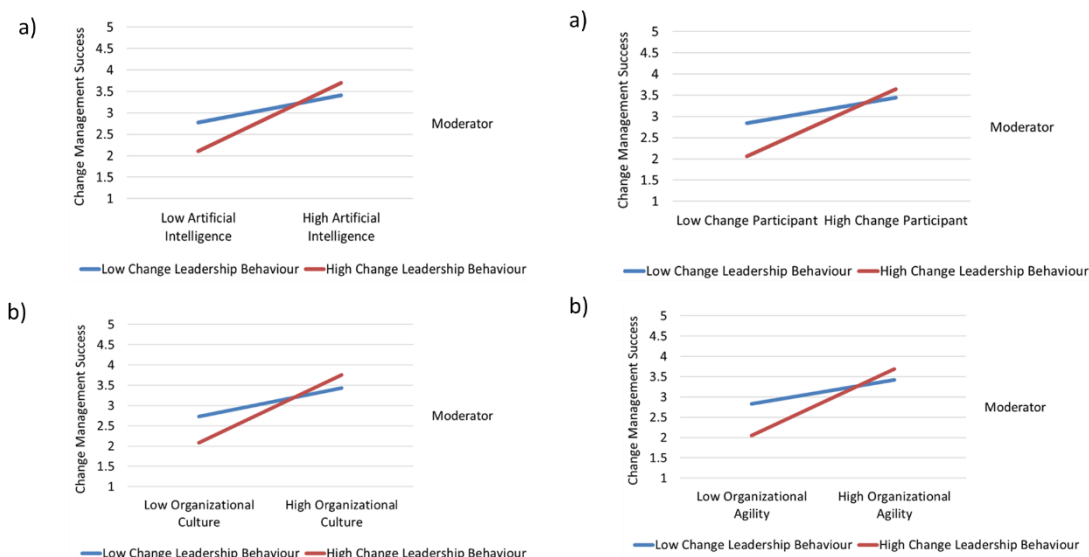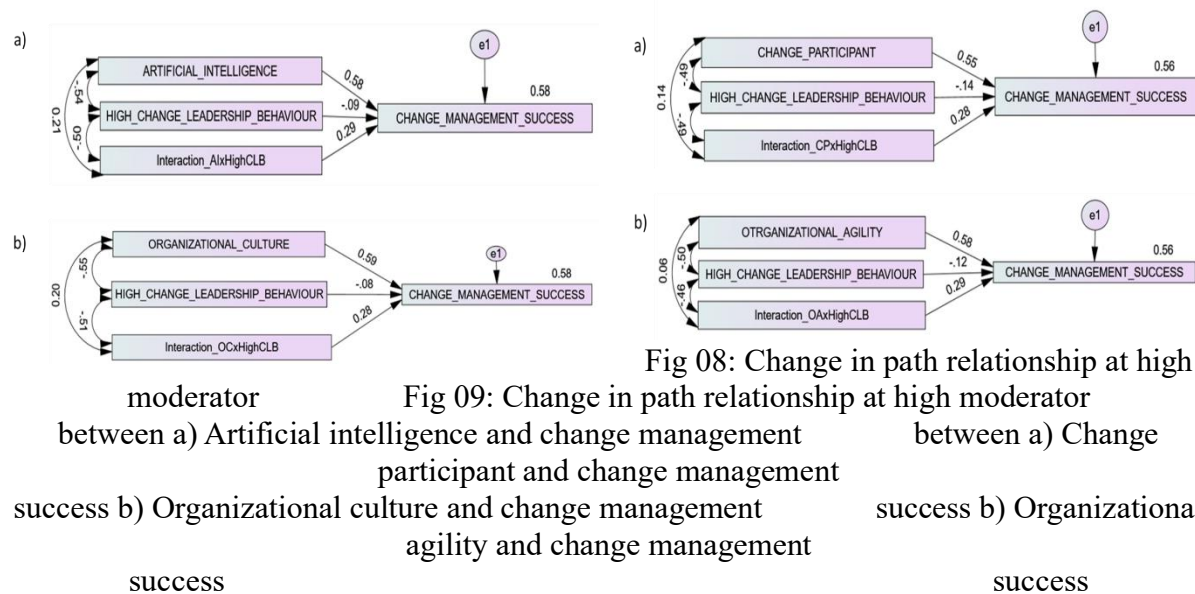

Fig 08: Change in path relationship at high moderator between a) Artificial intelligence and change management success b) Organizational culture and change management success
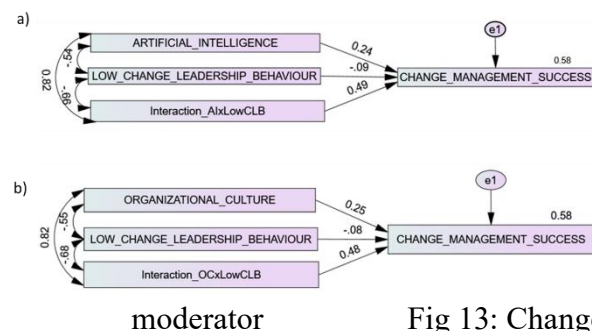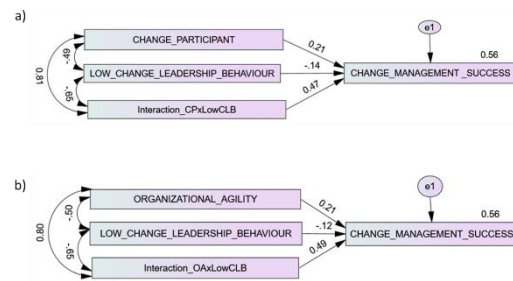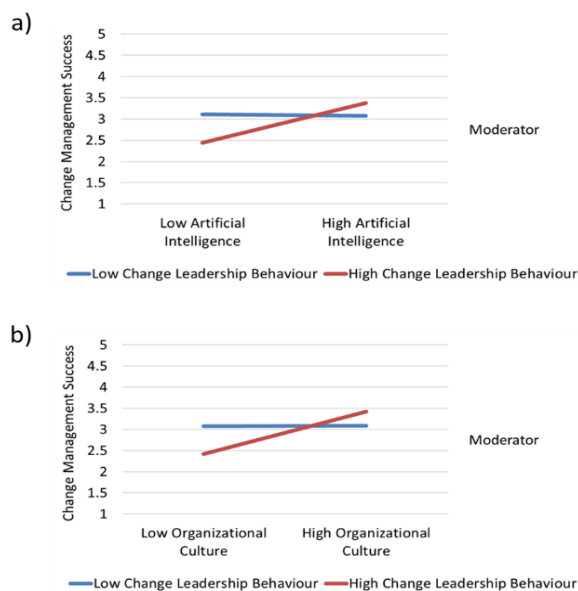
Fig 09: Change in path relationship at high moderator between a) Change participant and change management success b) Organizational agility and change management success
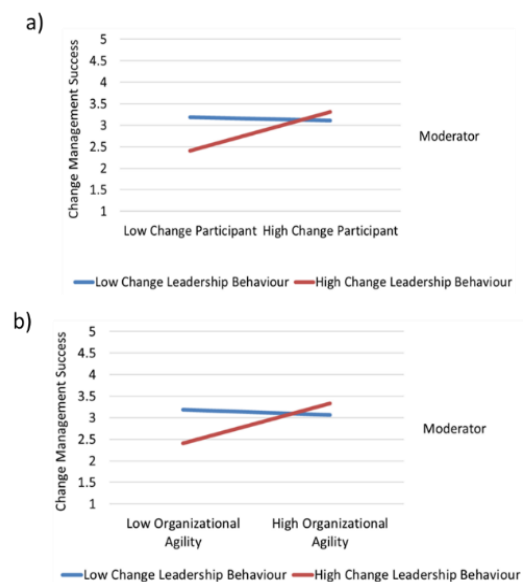
Fig 10: Interactive effect of change leadership behavior at high   Fig 11: Interactive effect of change leadership behavior at high moderator a) artificial intelligence on change management success   moderator a) change participant on change management success b) Organizational culture on change management success   b) Organizational agility on change management success

moderator   Fig 13: Change in path relationship at low moderator between a) Artificial intelligence and change management   between a) Change participant and change management success b) Organizational culture and change management   success b) Organizational agility and change management success   success

Fig 12: Change in path relationship at low

behavior at low   Fig 15: Interactive effect of change leadership behavior at low moderator a) artificial intelligence on change management success   moderator a) change participant on change management success b) Organizational culture on change management success   b) Organizational agility on change management success

Fig 14: Interactive effect of change leadership

These findings further confirm that organizational dynamics have a strong impact on CMS when CLB is high. Conversely, as the level of moderation decreases, the strength of the path relationships also weakens, as depicted in Fig 14(a) & 14(b) and Fig 15(a) & 15(b).

Despite these variations, the relationships remain statistically significant and positive at both high and low levels of moderation. These findings suggest that CLB plays a crucial role in influencing the strength of the relationship between organizational dynamics and CMS.

Discussion

According to a McKinsey report, *since the COVID-19 outbreak and the rise of geopolitical tensions, leadership teams have faced an increasing number of uncertainties and disruptions in the workplace* (Sternfels et al., 2024). These challenges add the sudden emergence of transformative technologies such as generative AI, energy transition, and a global workforce demanding higher autonomy, empowerment, flexibility, and mobility—factors that make leadership more critical than ever. Organizations must now expand skill sets, challenge conventional paradigms, embrace paradoxes, and empower individuals to adopt new technologies and drive innovation and productivity to remain competitive.

The aim of the study was to investigate the moderating role CLB on change success, particularly in interaction with AI, Organizational Culture (OC), Change Participation (CP), and Organizational Agility (OA). Additionally, the study evaluated CLB's conditional effect at high and low levels on path relationships.

The mean score of CLB (2.21 ± 0.80 S.D) suggests that employees perceive moderate leadership presence in their organizations, but with a weaker effect, aligning with previous research (Yukl, 2008). The mean score for AI (3.81 ± 0.86) indicates that employees perceive their organizations as moderately integrating AI, but not to its fullest potential for achieving success (Ruiz-Mercader et al., 2006; Stouten et al., 2018).The mean score for OC (3.93 ± 0.86) suggests a moderate cultural presence, which correlates with organizational success (Ogbonna & Harris, 2000; Sørensen, 2002).

The mean score for CP (3.97 ± 0.83) indicates that change participants are moderately engaged in the organization. A Harvard statistical survey found that 50% of organizations require stronger alignment between employee engagement and leadership capabilities for effective change implementation.

The mean score for OA (3.90 ± 0.86) suggests that organizations exhibit moderate agility but lack strong adaptability to meet customer and market needs (Kumkale, 2022). Greater agility is particularly necessary for IT industries to enhance performance and success (Khairy et al., 2023).

The mean scores across all predictors indicate that organizations possess a reasonable but moderate level of success. Each factor plays a positive and significant role in determining organizational effectiveness. However, low CLB levels, as found in this study, suggest a need for stronger leadership interventions to maximize success (Argenti, 1998).

Thus, the primary aim of this research was to examine CLB's moderating role between predictors and outcome variables, along with its conditional effects, which play a critical role in organizational performance based on statistical outcomes. It is essential to recognize that the effect of interaction is stronger and weaker at high level and low level of CLB. These changes in levels of moderator suggests that as CLB increases, the strength of the relationship between predictors and Change Management Success (CMS) also increases. Conversely, when CLB is low, the strength of this relationship weakens.

These findings demonstrate leadership behavior serves as an enhancer in determining organizational success. A stronger relationship is observed between all predictors and outcome variables when a high conditional effect of CLB is present. Conversely, a weaker or less significant relationship is found when CLB is at a lower level.

A Harvard Review (Time to Transform , 2024) highlights that leadership has evolved into a complex, specialized profession, comparable to fields such as medicine, finance, teaching, or law. However, practitioners often lack dedicated education and professional development at a comparable level, suggesting a gap in leadership training.

The moderate CLB scores in this study indicate that there is space for improvement in leadership practices within organizations. Strengthening leadership development initiatives may help enhance the impact of leadership on change management success.

Theoretical contribution
The findings of this study have several theoretical implications for Lewin's three-step model and Transformational Leadership (TL) theory and. Current study gives evidence-based support for the relationship between predictors (AI, OC, CP, and OA) and their statistical association with organizational change success.

This research demonstrates that TL theory, when combined with Lewin's model, offers a robust framework for understanding leadership's role in managing change. Rather than contradicting or critiquing existing literature, present research supports and reinforces the center role of leadership in change process, introducing new insights into conditional effects.
TL theory is strongly recommended for addressing challenges during the unfreezing, changing, and refreezing stages, as leadership plays a critical role throughout the change process (Cummings et al., 2015). Leadership serves as a supportive pillar during change implementation, ensuring effective communication, motivation, and engagement (Fernandez & Rainey, 2017; Stouten et al., 2018). Empirical findings from (Herold et al., 2008; Kavanagh & Ashkanasy, 2006) reinforce that leadership is the most effective tool for employee encouragement, motivation, and conflict resolution during change. (Tang, 2019) further emphasizes that leadership demonstrate its pivotal role in overcoming obstacles throughout the change process.

By incorporating a direct moderating mechanism, this study provides a comprehensive understanding of how TL theory can be actively applied in major organizational change.
From a practical viewpoint the study recommended, organizations must adopt various change models and theories to remain competitive (Tang, 2019). However, existing research consistently highlights a common factor—leadership is central to an organization's success or failure during change implementation (Bolden, 2011; Rafferty & Griffin, 2004; Reave, 2005). Despite its critical role, past studies indicate that leadership's impact on change outcomes has sometimes been moderate or inconsistent (Bakker et al., 2023). Hughes (2011) reported that mostly *two-thirds of change initiatives not successfully implemented due to a lack of quality leadership* and misalignment between leaders and other organizational factors (predictors) during change implementation.

Key practical implications from this study

Leadership behavior plays a significant role in shaping the organizational change implementation, acting as a moderator even when its direct effect on outcomes appears weaker.

Change Leadership Behavior (CLB) enhances the strength of path relationships, showing a strong positive effect when leadership engagement is high. The most crucial role of CLB during the change process is to: ensure individual involvement in change initiatives, communicate the rationale for change effectively, provide essential support and knowledge to employees, Even when direct leadership support is less required, leaders must remain actively engaged and demonstrate high leadership quality to facilitate successful change.

Recommendations for organizations

To enhance leadership effectiveness, organizations should implement- 360-degree leadership assessments to identify leadership gaps and strengths and tailored leadership training programs to improve change management capabilities (Lowe et al., 1996; Barling et al., 2000; Hannah & Avolio, 2011). By strengthening leadership capacity, organizations can drive successful change implementation and improve overall organizational performance.

Limitations and future research directions

Like other researches, present research also has certain boundaries and these limitations present opportunities for future research:

Theoretical framework limitations

we only study the combination of Kurt Lewin's three-step model and Transformational Leadership (TL) theory to test all hypotheses. Findings revealed a low level of moderation, which might differ if alternative theoretical frameworks were explored. Future research could examine alternative theoretical combinations to assess their impact on leadership's moderating role.

Limited scope of moderation Analyses

This study considered only a singular moderator (CLB) with a conditional effect. Future research could introduce additional moderators, such as organizational size, communication practices, and demographic variables, to gain deeper insights.

Industry-Specific Focus- This research was conducted within IT industries, and findings may not be generalizable across other industries. So, future studies may replicate this research across diverse industries to provide broader insights into leadership's role in change management success.

Future research recommendations

Despite these limitations, this study demonstrates the importance of examining CLB as a moderator in organizational change success within the TL and Lewin's change model framework. Future researchers should explore different combinations of theories and models to assess their impact on leadership's moderating role. Investigate multiple moderators between predictors and outcome variables to determine how and why CLB's indirect and conditional effects influence relationship strength.

Conclusion

This study applied two distinct frameworks—Transformational Leadership (TL) theory (Bass, 1985) and Lewin's change model—to examine the moderating role of leadership in organizational change. Findings indicate that these frameworks are interrelated and positively aligned, reinforcing the idea that continuous change is essential for organizational sustainability (Burnes, 2004).

While change leadership as a moderator may not always be (De Vries et al., 2002a), strong leadership presence is highly recommended to provide guidance, motivation, and support to employees during change initiatives (Bakker et al., 2023).

Key contributions of study highlight the indirect influence of Change Leadership Behavior (CLB) on Change Management Success (CMS). It demonstrates CLB's conditional effect on path relationships, confirming that leadership strengthens the impact of organizational dynamics on CMS. Leadership should continue to play a facilitative role in change initiatives, as successful change requires strong leadership support. This study underscores the importance of leadership at every stage of change implementation. A strong leadership presence ensures that CLB functions as an enhancer, supporting the unfreezing, moving, and refreezing phases of Lewin's model. Thus, CLB serves as a critical pillar in facilitating successful organizational change management.

Conflict of interest
The authors not be involved in any organization or entity discussed in this manuscript and have no financial or non-financial interest discussed in this manuscript.

Data availabilit
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

Authors' contribution
Conceptualization: Dr. Arunkumar Sivakumar; Methodology: Dr. Arunkumar Sivakumar; Formal Analyses and investigation: Sonal Shukla; Writing - original draft preparation: Sonal Shukla; Writing - review and editing: Dr. Arunkumar Sivakumr; Supervision: Dr. Arunkumar Sivakumar

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127. Appendix: A

Construct	Item
Artificial Intelligence (AI)	AI1 Artificial intelligence can help me find lost data
	AI2 Artificial intelligence provides accurate data and information
	AI3 Artificial intelligence can help me in making important decisions in the company
	AI4 Artificial intelligence can help display hard-to-measure data
	AI5 Artificial intelligence can protect the privacy of yourself and others
	AI6 Artificial intelligence can help me in getting the job done
	AI7 The authorities can easily audit artificial intelligence
Organizational Culture (OC)	OC1 People I work with are direct and honest with each other
	OC2 People I work with accept criticism without becoming defensive
	OC3 People I work with function as a team
	OC4 People I work with constructively confront problems
	OC5 People I work with are good listeners
	OC6 Labor and management have a productive working relationship
Change participant (CP)	CP1 I have supported the organizational change goals
	CP2 I communicated problems of the change that I saw arising
	CP3 I contributed with my suggestions and ideas to the change
	CP4 I have been able to participate in the implementation of the change that has been proposed and that is occurring
Organizational Agility (OA)	OA1 The organization analyzes important events concerning customers, competitors, and technology without any delay
	OA2 The organization detects the opportunities and threats to changes in customers, competitors, and technology in time.
	OA3 The organization carries out a specific action plan in order to meet customer needs without any delay.
	OA4 The organization implement a plan of action in order to respond to the strategic movement of competitors without delay.
	OA5 The is implementing an action plan on how to use the new technology without any delay.
Change Management Success (CMS)	CMS1 There was a failure to anticipate organizational resistance to change and plan a response to address it
	CMS2 There was a failure to choose a methodology in process management

	CMS3 The need to manage change has not been recognized
	CMS4 There was a failure to communicate the reasons for the process change to the members of the organization
	CMS5 No necessary changes have been made in human resource policies for the implementation of process management
	CMS6 There was difficulty in achieving cross-functional cooperation
	CMS7 There was a failure of senior management to commit to new values
Change Leadership Behavior (CLB)	CLB1 Change leadership in behavior built a broad coalition up front to support the change
	CLB2 Change leadership behavior developed a clear vision for what was going to be achieved by our work unit
	CLB3 Change leadership in behavior made it clear up front to those in our unit why the change was necessary
	CLB4 Change leadership in behavior made a case for the urgency of this change prior to implementation
	CLB5 Change leadership in behavior empowered people to implement the change
	CLB6 Change leadership in behavior carefully monitored and communicated progress of the change implementation.
	CLB7 Change leadership in behavior gave individual attention to those who had trouble with the change implementation.