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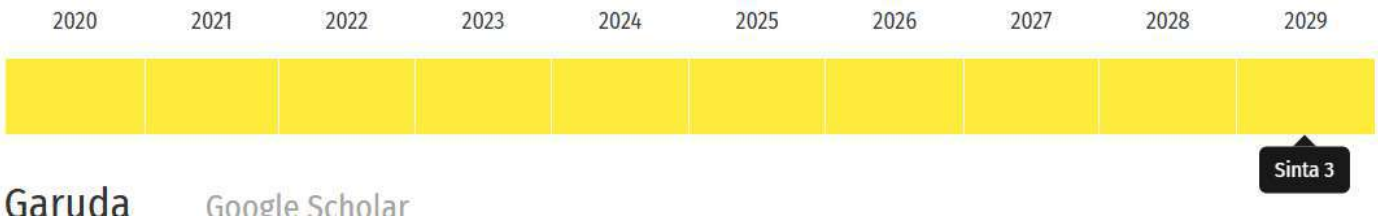

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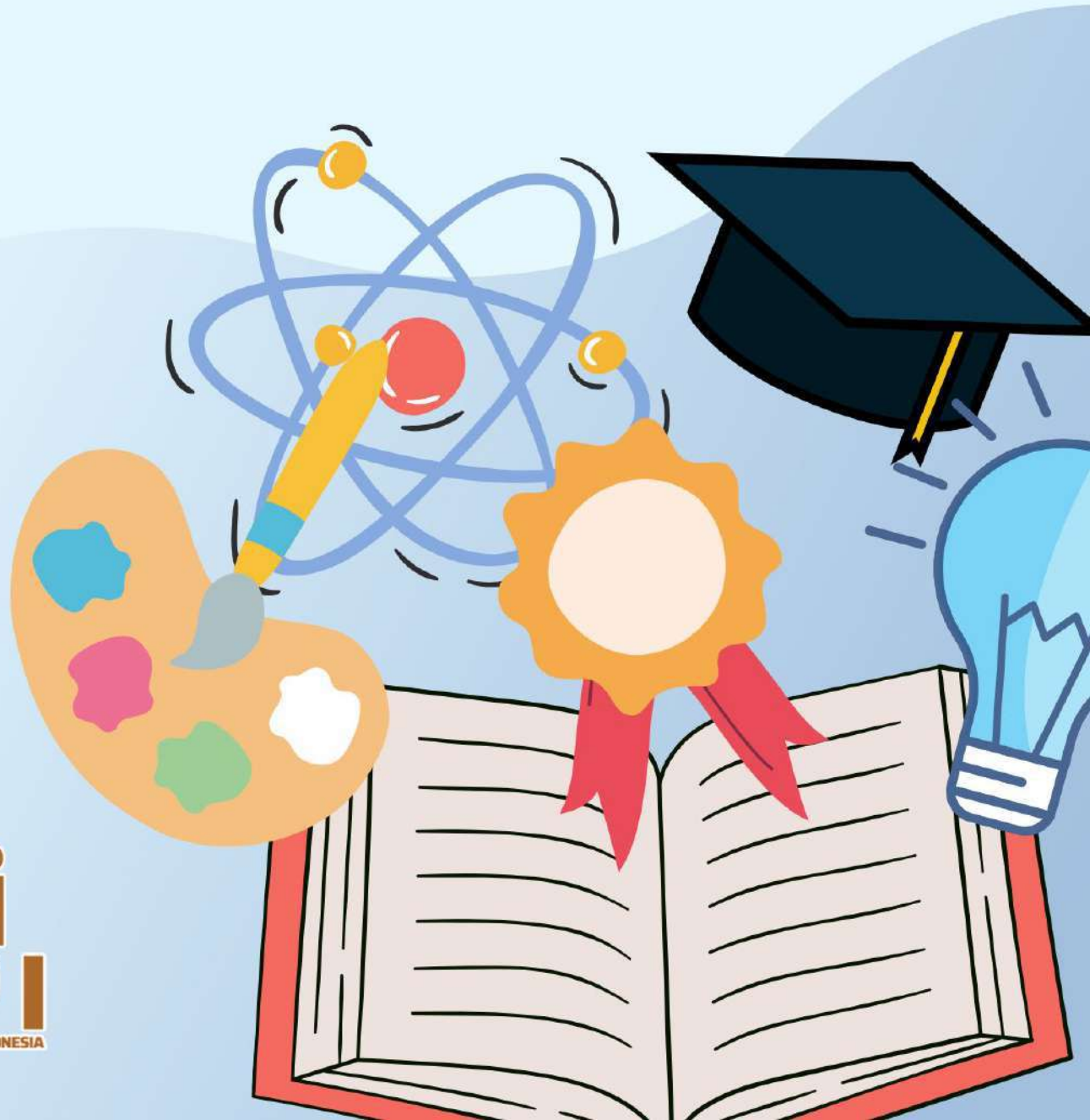

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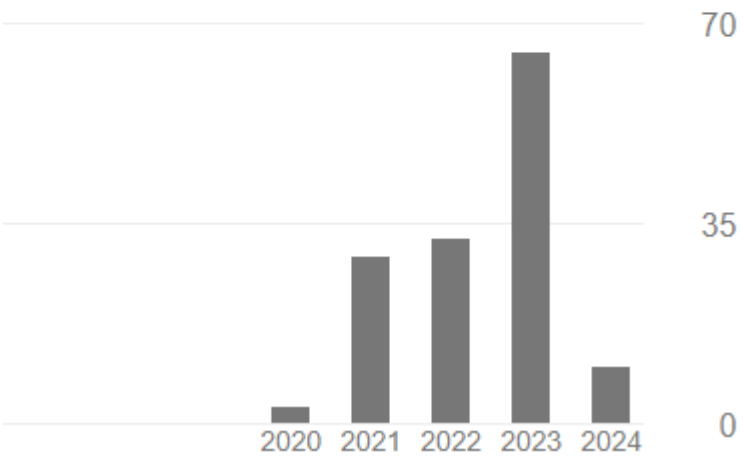

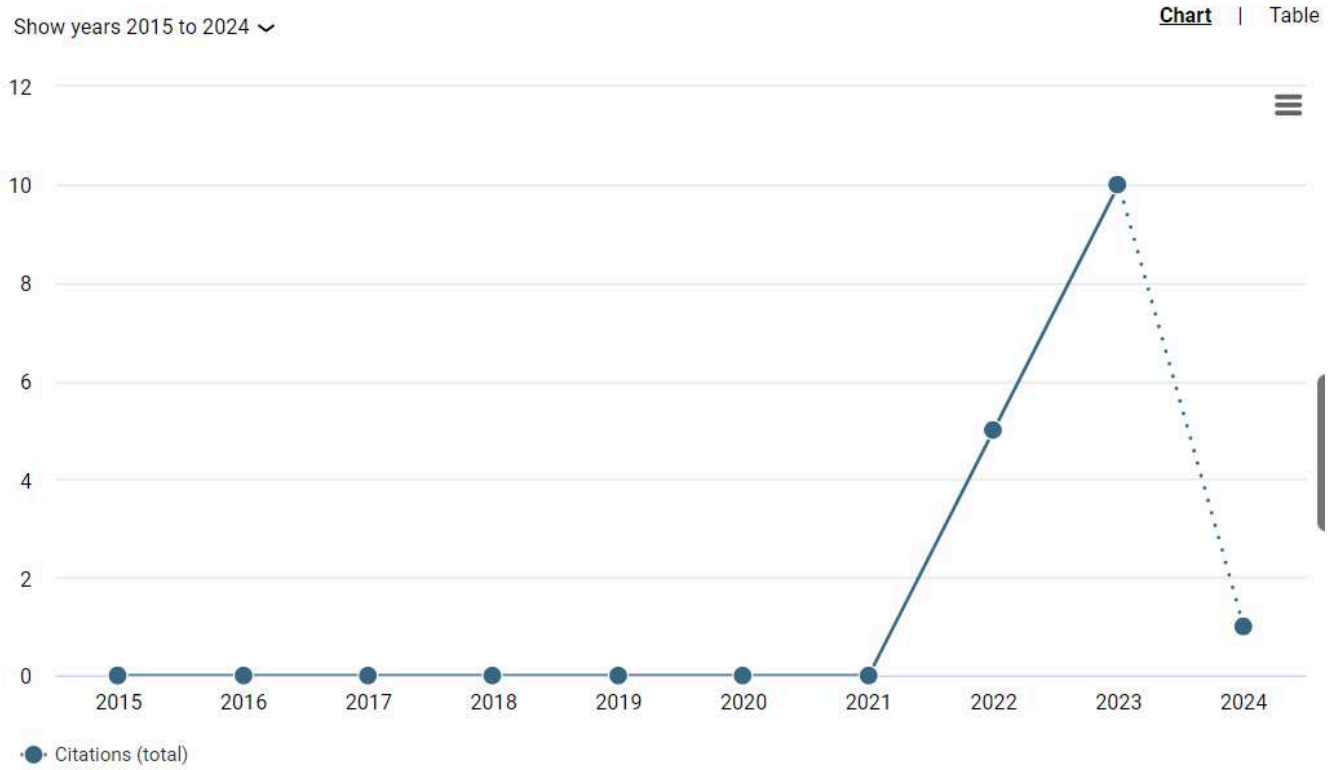

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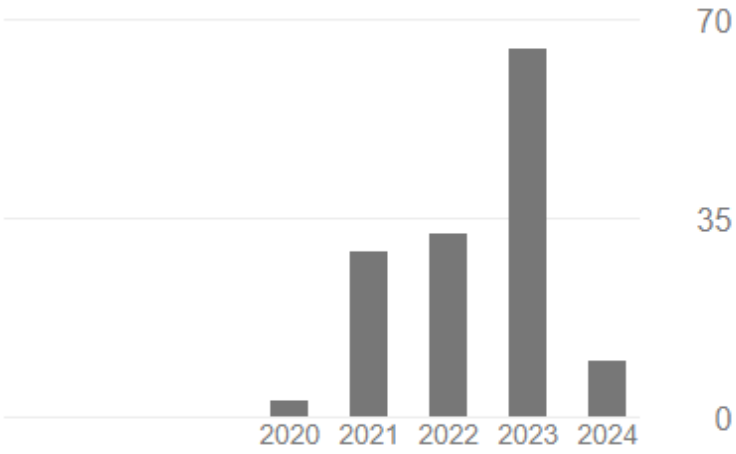

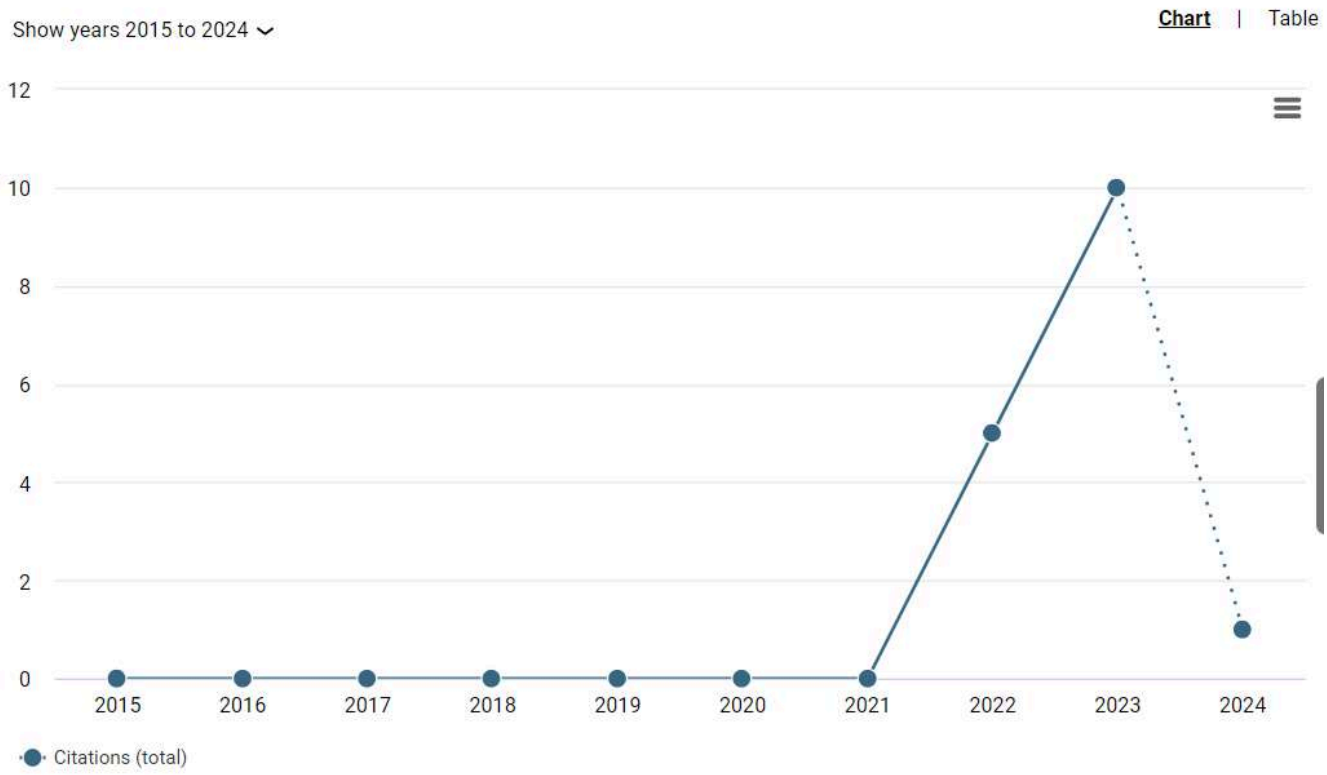

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Perceived Usefulness Influence on Digital Technology Use Intention: The Moderating Role of Resistance to Change

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Abstract. This study examines how Perceived Usefulness (PU) influences Intention to Use (IU) digital technology, with Resistance to Change (RC) as a moderating variable, among employees of ABC Project. Grounded in the Technology Acceptance Model (TAM) and organizational change theory, the study tests whether dispositional resistance weakens the cognitive pathway from perceived usefulness to adoption intention. A cross-sectional survey was administered to 120 employees involved in the organization's digital transformation initiative. Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The results indicate that PU has a strong positive effect on IU ($\beta = 0.634$, $p < 0.001$), while RC exerts a significant negative effect ($\beta = -0.182$, $p = 0.009$). The moderating effect of RC on the PU–IU relationship was not statistically significant ($\beta = -0.006$, $p = 0.812$), suggesting that cognitive value assessment and resistance operate through independent psychological mechanisms. The study contributes to TAM literature by empirically testing resistance as a boundary condition in a project-based organizational context and offers practical implications for change management in digital transformation initiatives.

Keywords: Perceived usefulness, resistance to change, intention to use, digital technology, technology acceptance model.

1 Introduction

Digital transformation has become a strategic imperative for organizations seeking to maintain competitiveness in an increasingly technology-driven business environment. The proliferation of cloud computing, artificial intelligence, and enterprise systems has fundamentally reshaped organizational operations, decision-making processes, and value delivery mechanisms [1]. Yet despite substantial investments in digital infrastructure, many organizations continue to struggle with achieving optimal technology adoption rates among their workforce. Research consistently demonstrates that implementation failures more frequently stem from human and organizational factors than from technical shortcomings [2], [3].

At ABC Project, the integration of digital technology solutions has revealed considerable variation in employee acceptance. While some employees readily embrace

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new digital tools to improve productivity, others exhibit reluctance or active resistance toward these technological changes. Such disparities underscore the need to identify the psychological and cognitive factors that drive or inhibit technology adoption within the organization. This challenge is particularly salient in project-based environments characterized by temporary teams, time pressure, and high performance visibility, where technology performance directly affects deliverable quality, timelines, and client satisfaction [4].

The Technology Acceptance Model (TAM), originally proposed by Davis et al. [2] and subsequently extended by Venkatesh and Davis [5], posits that Perceived Usefulness (PU) is the primary determinant of individuals' behavioral intention to use technology. When employees believe that a system will enhance their job performance, they develop stronger intentions to adopt it. TAM has been extensively validated across diverse organizational contexts and remains among the most influential theoretical frameworks in information systems research [6], [7]. However, in organizations undergoing transformation, resistance to change often emerges as a critical factor that may disrupt the relationship between perceived benefits and actual adoption behavior [8], [9].

Resistance to change is a well-documented psychological tendency in which individuals oppose or avoid alterations to established routines and systems [10]. In digital transformation contexts, this resistance may manifest as reluctance to participate in training, minimal system usage, or outright skepticism toward new technologies [11]. While prior research has established that resistance negatively affects adoption, its potential moderating role specifically, whether it weakens the influence of perceived usefulness on intention to use remains insufficiently explored. Most studies have treated resistance as a direct inhibitor rather than as a boundary condition that alters the strength of the PU–IU relationship [12]. Theoretically, resistance to change is positioned as a moderator because it represents a dispositional characteristic that is conceptually distinct from usefulness perceptions yet theoretically capable of attenuating their motivational force. Unlike a mediator which would explain the mechanism through which PU affects IU, resistance operates as a contingency factor that can suppress or amplify existing cognitive pathways [12].

This study addresses this gap by examining three interrelated questions: (1) To what extent does perceived usefulness influence intention to use digital technology at ABC Project? (2) How does resistance to change affect intention to use? (3) Does resistance to change moderate the relationship between perceived usefulness and intention to use? By integrating resistance to change as a moderating variable within the TAM framework, this research aims to provide a more nuanced understanding of technology acceptance in organizational change environments. The findings are expected to offer both theoretical contributions to the TAM literature and practical insights for designing effective change management strategies at ABC Project.

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2 Theoretical Review

2.1 Technology Acceptance Model and Theoretical Integration

The Technology Acceptance Model was developed by Davis et al. [2] as a parsimonious framework for predicting user acceptance of information technology. TAM proposes that two beliefs—Perceived Usefulness and Perceived Ease of Use—are the primary determinants of behavioral intention to use a system. Among these, perceived usefulness has consistently emerged as the stronger predictor across diverse contexts and populations [5], [6]. The model was later extended through TAM2, which incorporated social influence and cognitive instrumental processes [5], and the Unified Theory of Acceptance and Use of Technology (UTAUT), which synthesized constructs from multiple acceptance theories [13]. A comprehensive meta-analysis by Marikyan et al. [6], drawing on 693 empirical studies, confirmed that despite the emergence of newer models, TAM's core constructs—particularly perceived usefulness—remain the most robust predictors of technology adoption across organizational settings.

This study integrates TAM with organizational change theory to address a recognized gap in the literature. While TAM effectively models cognitive evaluations of technology, it does not account for the affective and dispositional factors that characterize individuals' reactions to organizational change [8], [10]. Organizational change theory particularly the dispositional resistance framework of Oreg [10] provides a complementary lens by explaining how cognitive rigidity, emotional reactions, and routine-seeking behaviors shape individuals' responses to change initiatives. The integration of these two theoretical traditions enables a more complete model of technology acceptance in transformation contexts: TAM explains why employees form adoption intentions based on usefulness perceptions, while change theory explains how dispositional resistance may attenuate those intentions. This is not a mere addition of variables; rather, the integration is theoretically grounded in the premise that cognitive acceptance processes and affective resistance processes operate at different levels of the motivational system and may interact when technology adoption is embedded in a context of organizational change.

2.2 Perceived Usefulness

Perceived Usefulness refers to the degree to which an individual believes that using a particular system will enhance job performance [2]. In workplace settings, PU reflects employees' cognitive evaluation of whether a digital tool can simplify tasks, improve accuracy, or create opportunities for professional growth. When the functional benefits of technology are clearly communicated and experienced, employees tend to develop stronger adoption intentions. Organizational factors such as training quality, management support, peer influence, and clarity of communication regarding technological advantages play an important role in shaping PU [14]. In the specific context of ABC Project, enhancing perceived usefulness requires demonstrating how digital transformation tools align with concrete work objectives and reduce operational inef-

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ficiency. Recent empirical evidence from Indonesian organizational settings confirms that PU remains the dominant predictor of digital technology adoption intention in both private and public sectors [15].

2.3 Intention to Use

Intention to Use represents an individual's motivational readiness to engage with a technology and serves as the immediate antecedent of actual usage behavior within the TAM framework [2], [13]. Strong intention indicates that an individual recognizes the system's benefits and is willing to invest effort in using it, whereas low intention typically leads to underutilization even when systems are readily available. Intention is shaped not only by perceived benefits but also by prior experience, attitudes toward change, and the broader organizational culture surrounding technology implementation [6]. In project-based digital transformation initiatives such as ABC Project, monitoring intention levels enables managers to identify adoption barriers early and tailor engagement strategies to address specific employee concerns.

2.4 Resistance to Change

Resistance to change is a multidimensional psychological tendency encompassing cognitive, emotional, and behavioral components [10]. Cognitively, resistance involves rigid thinking patterns and skepticism toward proposed changes. Emotionally, it manifests as anxiety, frustration, or discomfort with unfamiliar situations. Behaviorally, it results in avoidance, minimal compliance, or active opposition. In digital transformation contexts, resistance often arises from fear of incompetence, attachment to established routines, perceived threats to job security, or distrust of management intentions [8], [3]. Oreg [10] developed a validated dispositional scale measuring four facets of resistance: routine seeking, emotional reaction, short-term focus, and cognitive rigidity. Crucially, resistance is conceptualized as a moderator rather than a mediator or independent variable because it represents a stable dispositional characteristic that does not mediate the formation of usefulness beliefs but rather may constrain their motivational effects on behavioral intentions. This positioning is supported by Sverdlik and Oreg [12], whose multilevel research demonstrated that both individual-level and group-level resistance dynamics constrain the translation of cognitive evaluations into behavioral responses to organizational change. Furthermore, a meta-analysis by Gonzalez et al. [11], synthesizing findings from 154 empirical studies, confirmed that dispositional resistance significantly predicts negative reactions to organizational change, including technology adoption resistance.

3 Research Model and Hypotheses

Based on the theoretical framework outlined above, this study proposes the following hypotheses and research model (Fig. 1): The integration of TAM with organizational change theory supports the hypothesized structure, wherein PU directly drives IU

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(H1), RC acts as a direct inhibitor of IU (H2), and RC moderates the PU–IU pathway (H3). The rationale for RC as a moderator rather than a mediator or independent predictor alone rests on its role as a boundary condition: high-resistance individuals may discount usefulness perceptions due to emotional reactance or cognitive rigidity, thereby weakening the cognitive pathway from perceived benefit to behavioral intention.

H1: Perceived usefulness has a positive effect on intention to use digital technology at ABC Project.

H2: Resistance to change has a negative effect on intention to use digital technology at ABC Project.

H3: Resistance to change negatively moderates the relationship between perceived usefulness and intention to use, such that the positive effect of PU on IU is weaker for individuals with higher resistance to change.

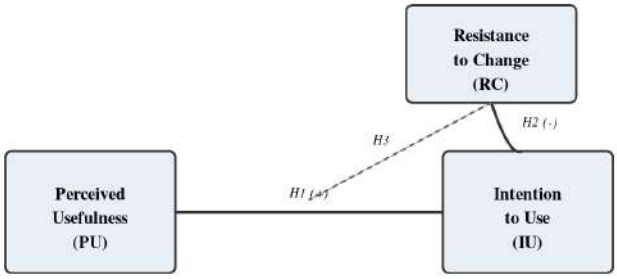

Fig. 1. Research Model

4 Methods

This study employs a quantitative research design with a cross-sectional survey approach. The design is appropriate for examining relationships among measured constructs at a single point in time and aligns with the explanatory nature of the research objectives [16].

4.1 Population and Sample

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4.2 Data Collection

Data were collected via a structured online questionnaire distributed electronically over a four-week period, with follow-up reminders to maximize participation. Responses were anonymous to minimize social desirability bias. The questionnaire consisted of closed-ended items measuring three constructs: Perceived Usefulness, Re-

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sistance to Change, and Intention to Use. Each item was rated on a seven-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7).

4.3 Measurement Instruments

Perceived Usefulness was measured using four items adapted from Davis et al. [2] and subsequent TAM applications in organizational settings [18]. Intention to Use was assessed with three items derived from established TAM scales [15]. Resistance to Change was measured using four items adapted from Oreg's [10] dispositional resistance scale, capturing emotional, cognitive, and behavioral dimensions of resistance relevant to digital transformation contexts. All measurement items were validated in pilot testing to ensure face validity and contextual relevance.

4.4 Data Analysis

Data analysis followed a two-stage PLS-SEM procedure using SmartPLS 4.0 [19]. In the first stage, the measurement (outer) model was evaluated for convergent validity (outer loadings ≥ 0.700; AVE ≥ 0.500), internal consistency reliability (Cronbach's alpha and composite reliability ≥ 0.700), and discriminant validity using the Fornell–Larcker criterion [20], [14]. In the second stage, the structural (inner) model was assessed through path coefficient estimation, R^2 evaluation, and bootstrapping with 5,000 resamples to determine statistical significance [17]. The moderating effect was tested by generating an interaction term (PU × RC) after standardizing both predictor variables to mitigate multicollinearity [21]. To assess common method bias, Harman's Single Factor Test was conducted. The results indicated that a single factor accounted for 38.2% of the total variance well below the 50% threshold suggesting that common method variance does not pose a serious threat to the validity of the findings [22].

5 Results

5.1 Measurement Model Evaluation

Convergent Validity.
Table 1 presents the outer loadings and Average Variance Extracted (AVE) values for all constructs. All indicators exceeded the 0.700 loading threshold, and all constructs achieved AVE values above 0.500, confirming adequate convergent validity [14], [20].

Table 1. Convergent Validity Results.

Construct	Indicator	Outer Loading	AVE	Status
Perceived Usefulness (PU)	PU1	0.811	0.672	Valid
	PU2	0.832		
	PU3	0.845		
	PU4	0.798		

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Resistance to Change (RC)	RC1	0.764	0.601	Valid
	RC2	0.787		
	RC3	0.801		
	RC4	0.775		
Intention to Use (IU)	IU1	0.855	0.699	Valid
	IU2	0.871		
	IU3	0.822		

The PU construct shows loadings ranging from 0.798 to 0.845 (AVE = 0.672), indicating that respondents consistently associate digital technology with performance benefits. The RC construct exhibits loadings between 0.764 and 0.801 (AVE = 0.601), reflecting stable measurement of resistance dimensions. The IU construct demonstrates the strongest convergent validity, with loadings from 0.822 to 0.871 and an AVE of 0.699.

Construct Reliability.
As shown in Table 2, all Cronbach's alpha and composite reliability values exceed 0.800, surpassing the 0.700 threshold recommended by Hair et al. [14], indicating strong internal consistency.

Table 2. Construct Reliability Results.

Construct	Cronbach's α	Composite Reliability	Status
Perceived Usefulness (PU)	0.859	0.899	Reliable
Resistance to Change (RC)	0.824	0.878	Reliable
Intention to Use (IU)	0.845	0.905	Reliable

The IU construct recorded the highest composite reliability (0.905), reflecting exceptional measurement stability. The slight gap between Cronbach's alpha (0.824) and composite reliability (0.878) for the RC construct is expected given its multidimensional nature, encompassing affective, cognitive, and behavioral components that produce somewhat unequal indicator contributions [21].

Discriminant Validity.
Table 3 presents the Fornell–Larcker criterion results. All diagonal values (square roots of AVE) exceed the corresponding inter-construct correlations, confirming empirical distinctiveness [20].

Table 3. Fornell–Larcker Criterion.

Construct	PU	RC	IU
PU	**0.820**		
RC	0.463	**0.775**	
IU	0.672	−0.401	**0.836**

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The moderate positive correlation between PU and IU (r = 0.672) is consistent with TAM predictions [2], while the negative correlation between RC and IU (r = −0.401) confirms the inhibiting role of resistance. The positive correlation between PU and RC (r = 0.463) suggests that some employees may recognize technological utility yet still resist change due to emotional or dispositional factors a form of cognitive-affective ambivalence documented in organizational change research [11], [12].

5.2 Structural Model Evaluation

Coefficient of Determination (R^2). The model explains 54.0% of variance in Intention to Use (R^2 = 0.540), which falls within the moderate-to-strong range for PLS-SEM models [14], [17]. The remaining variance is attributable to factors not included in this model, such as perceived ease of use, social influence, facilitating conditions, or organizational support.

Table 4 presents the bootstrapping results (5,000 resamples) for the three hypothesized relationships. Fig. 2 illustrates the structural model with path coefficients.

Table 4. Path Coefficients and Hypothesis Testing Results.

Relationship	β	t-value	p-value	Decision	Remark
PU → IU	0.634	9.247	<0.001	Supported	Sig. (+)
RC → IU	−0.182	2.642	0.009	Supported	Sig. (–)
PU × RC → IU	−0.006	0.238	0.812	Not Supported	Not Sig.

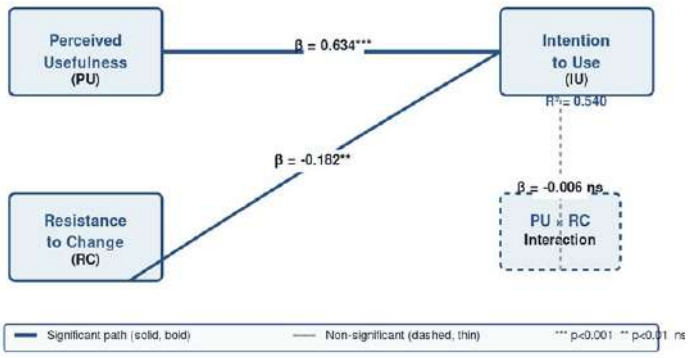

Fig. 2. Structural Model Results.

H1 is supported: Perceived Usefulness exerts a strong, positive, and highly significant effect on Intention to Use (β = 0.634, t = 9.247, p < 0.001). This effect size exceeds the average PU–IU coefficient reported in the meta-analysis by Marikyan et al. [6], which synthesized 693 TAM studies.

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H2 is supported: Resistance to Change has a significant negative effect on Intention to Use ($\beta = -0.182$, $t = 2.642$, $p = 0.009$), confirming that psychological resistance constitutes a meaningful barrier to technology adoption [10], [11], [8].

H3 is not supported: The interaction effect of PU × RC on IU is negligible and statistically non-significant ($\beta = -0.006$, $t = 0.238$, $p = 0.812$). This indicates that the positive influence of perceived usefulness on intention to use remains consistent across varying levels of resistance.

6 Discussion

The dominant role of perceived usefulness as a predictor of intention to use ($\beta = 0.634$) strongly aligns with the foundational premise of TAM [2] and its subsequent extensions [5], [13]. The magnitude of this effect exceeds the average coefficients reported in comprehensive meta-analyses of TAM research. Marikyan et al. [6], in their analysis of 693 empirical studies, found that perceived usefulness consistently demonstrates the strongest effect on behavioral intention across diverse organizational and cultural contexts. This suggests that employees in ABC Project are particularly sensitive to the functional benefits of digital tools, a pattern consistent with project-based environments where technology performance is directly tied to measurable work outcomes such as deliverable quality, timeline adherence, and client satisfaction. The temporary team structure and high performance accountability characteristic of ABC Project may intensify the salience of usefulness perceptions, as employees must quickly evaluate whether new tools justify the cognitive investment required during time-pressured project cycles.

The significant negative effect of resistance to change on intention to use ($\beta = -0.182$) is consistent with dispositional models of change resistance [10] and recent empirical evidence. Gonzalez et al. [11], in a meta-analysis synthesizing 154 studies, confirmed that dispositional resistance is a reliable predictor of negative reactions to organizational change across multiple contexts. Sverdlik and Oreg [12] further demonstrated that resistance operates at both individual and group levels, suggesting that the resistance observed at ABC Project may be influenced by team-level dynamics beyond individual dispositions. From an organizational communication perspective, this finding highlights the role of change communication quality in mitigating resistance. Warrick [8] emphasizes that transparent leadership messaging, inclusive participation in change planning, and clear articulation of how new technologies affect job roles are critical components of effective change management. The direct negative effect of RC underscores that communication strategies should not only promote the benefits of technology (targeting PU) but also address the emotional and cognitive sources of resistance through proactive dialogue and psychological safety.

The non-significant moderation effect ($\beta = -0.006$) represents the most theoretically nuanced finding of this study. Rather than weakening the PU–IU relationship as hypothesized, resistance to change operates as a parallel, independent inhibitor of adoption intention. This finding carries an important theoretical implication: within the integrated TAM–change theory framework, cognitive value assessments and af-

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fective resistance operate through separate psychological pathways rather than interacting multiplicatively. This is consistent with dual-process models of cognition that distinguish between deliberative evaluations (captured by PU) and affective-dispositional responses (captured by RC) as largely independent systems in decision-making contexts [9]. In organizational technology adoption contexts, these two systems may activate sequentially rather than concurrently, with cognitive evaluation driving intention while affective resistance shapes actual behavior over time a dynamic that cross-sectional designs may not fully capture.

Alternative methodological explanations are also warranted. Cross-sectional designs capture intention at a single point, and moderation effects may emerge more clearly in longitudinal studies that track how resistance shapes actual adoption behavior over time [17]. Additionally, the professional context of ABC Project characterized by high organizational visibility and performance accountability may create conditions where employees compartmentalize their cognitive evaluations of technology (PU) from their emotional resistance responses (RC), resulting in additive rather than interactive effects on intention.

From a practical standpoint, the findings provide clear guidance for ABC Project management. First, the strongest lever for promoting adoption is ensuring that employees directly experience and can articulate the performance benefits of digital tools in their specific roles. Structured demonstrations, peer learning networks, and use-case mapping exercises that connect technology features to concrete workflow improvements can accelerate the internalization of usefulness perceptions. Second, the direct negative effect of resistance calls for proactive change management infrastructure, including resistance diagnostics, targeted coaching, and transparent communication. Third, the non-significant moderation offers practical optimism: even resistant employees can develop positive adoption intentions when their perception of usefulness is sufficiently elevated.

7 Conclusion

This study demonstrates that perceived usefulness is the dominant predictor of employees' intention to use digital technology at ABC Project, while resistance to change functions as a direct but independent barrier to adoption. The hypothesized moderating role of resistance was not empirically supported, suggesting that the influence of perceived usefulness on intention remains robust regardless of individual resistance levels. Theoretically, the study extends the TAM framework by integrating organizational change theory and empirically testing resistance to change as a boundary condition, contributing evidence that cognitive pathways (usefulness evaluation) and affective pathways (dispositional resistance) operate independently in technology acceptance processes within project-based organizational contexts. The project-based setting of ABC Project constitutes a theoretically meaningful contribution: the unique combination of temporary team structures, time pressure, and high performance accountability provides boundary conditions under which the independence of cognitive and affective pathways may be particularly pronounced.

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Practically, the findings indicate that organizations should prioritize strategies that enhance the perceived functional relevance of new technologies while simultaneously implementing targeted change management interventions for resistant employees. Rather than treating usefulness promotion and resistance management as competing approaches, they should be pursued as complementary components of a comprehensive adoption strategy. In particular, organizational communication plays a critical role: leadership messaging that clearly articulates how digital tools improve work outcomes addresses resistance cognitively, while inclusive communication practices that acknowledge employee concerns and provide psychological safety address the affective dimensions of resistance. These parallel communication strategies are supported by both TAM's emphasis on usefulness communication and organizational change theory's emphasis on participatory change management [8], [1].

Several limitations warrant attention. First, the cross-sectional design precludes causal inference and may not capture moderation effects that emerge over time. Second, the sample is drawn from a single project-based organization, which limits the generalizability of findings to other organizational types and industries. Third, the reliance on self-reported measures of intention may introduce social desirability bias. Future research should employ longitudinal designs, multi-organizational samples, and additional moderators such as organizational culture, leadership style, and digital self-efficacy to develop a more comprehensive understanding of technology acceptance dynamics in organizational change contexts.

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