

A Multilevel Social-Organizational Framework for Understanding Employee Agility in New Product Development Projects

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Abstract

Agile methods now dominate information technology (IT) new product development (NPD), yet the human capability that makes agile methods work remains under-theorized. Research on employee agility has grown rapidly but remains fragmented, weakly grounded in theory, and largely disconnected from the project contexts in which agility is most consequential. This conceptual paper integrates the latest employee agility literature with contemporary research on agile project management and digital agility to develop a multilevel framework of employee agility in agile IT NPD projects. Drawing on the micro foundations of dynamic capabilities, social cognitive theory and the job demand resources perspective, we define employee agility as a higher-order individual capability comprising proactivity, adaptability and resilience. In this study authors

have formalized its composition and its individual level and project level relationships in a set of equations. Eight propositions link agile work design and agility oriented human resource management to employee agility through psychological empowerment and learning self-efficacy, and link employee agility to innovative work behavior and NPD project performance, with requirements turbulence and hybrid governance as boundary conditions. The paper contributes a theoretically anchored, testable model that positions employee agility as a micro foundation of organizational and digital agility in IT NPD, offering a structured agenda for empirical research.

Keywords: Employee agility; Workforce agility; Agile project management; New Product Development; IT projects; Dynamic capabilities

Introduction

Few managerial ideas have diffused as widely in the last two decades as agility. In information technology (IT) new product development (NPD) agile methods, iterative delivery, self-organizing teams, continuous customer collaboration and adaptive planning have become the default organizing template for software-intensive product work, to the point that a recent systematic review found that this field is still arguing over as what actually agile project management means (Dong et al., 2024). Empirical comparisons show that agile and hybrid approaches outperform traditional approaches on team-related and future-oriented dimensions of project success (Ćirić Lalić et al., 2022) and agility has become tightly interwoven with digital transformation, in which organizations must combine organizational and information systems development agility into a single capability (Salmela et al., 2022). Agility, in short, has become the dominant answer to environmental turbulence in product innovation and artificial intelligence is only intensifying the demand for it (Rastogi & Pandita, 2025; Tominc et al., 2023).

Yet the diffusion of agile methods has run ahead of our understanding of the human capability on which these methods depend. Agile practices are not self-executing: sprints, retrospectives and backlog reprioritization presuppose employees who can anticipate change, relearn rapidly, absorb setbacks and act without waiting for direction. Recent systematic reviews converge on the individual employee as the elemental unit of enterprise adaptiveness. Employee agility is a multilevel construct with distinct antecedents, mechanisms and outcomes at the individual, team and organizational levels (Alviani et al., 2024), it plays a decisive role in digital transformation (Muduli & Choudhury, 2025). Organizational level evidence now ties agility-

conducive work directly to innovation output (Franco & Landini, 2022). Nevertheless, still three gaps persist.

First, the construct of employee agility is still debatable. Construct clarity, theoretical foundations and rigor in operationalization are still not fully established (Salmen & Festing, 2022) and despite the validation of a multidimensional measure (Petermann & Zacher, 2022), there are many competing conceptualizations (Alviani et al., 2024). Second, research of employees' agility has grown up in isolation from agile IT project research. While the former is rooted in general human resource management (HRM) and organizational behavior (OB) frameworks (Naim et al., 2024; Salmen & Festing, 2022), the latter posits agility as a characteristic of methods, teams, and processes, not individuals (Dong et al., 2024; Lee & Xia, 2010). This creates an incongruity of sorts, as individual agility is most clearly called for in the setting where it has been least explicitly theorized, namely, agile IT NPD projects, which digital agility scholars have started to identify as problematic (Salmela et al., 2022). Third, current models focus mainly on reducing organizational practices to attributes of single employees or single agility to project outcomes, but do not detail how and under which conditions employee agility translates to project performance (Alviani et al., 2024; Muduli & Choudhury, 2025).

This paper seeks to fill these gaps by creating a conceptual multi-level framework of employee agility in agile IT NPD projects. There are three contributions we make. First, we refine the construct, taking the tripartite structure, which begins from Sherehiy and Karwowski (2014) and continues with current reviews and validated measurements (Alviani et al., 2024; Petermann & Zacher, 2022), and we mathematically formalize the composition of the construct of employee agility as a higher-order individual capability that consists of proactivity, adaptability and resilience. Secondly, it is theorized in the context of the agile IT NPD. Eight propositions are presented which link agile work design with agility oriented HRM to employee agility through psychological empowerment and learning self-efficacy; employee agility with innovative work behavior and NPD project performance; and agile work design and agility oriented HRM to employee agility. Each proposition is grounded in the micro foundations of dynamic capabilities (Teece et al., 2016), social cognitive theory (Bandura, 1986), and job demands–resources (JD-R) perspective (Bakker & Demerouti, 2017). Third, we go from the framework to a specific research program and identify the measurement, design and analytic strategies for testing the propositions.

The rest of the paper is organized as follows. In Section 2, the conceptual field and theoretical supports are examined. The focal construct is defined and dimensionalized in Section 3. The framework and propositions are developed in section 4, accompanied by supporting equations and figures. The contributions, managerial implications, limitations and research agenda are discussed in section 5 and section 6 is the conclusion.

Conceptual and Theoretical Background

From Enterprise Agility to Employee Agility

Agility has been a school of thought at the enterprise level, but the last five years have firmly brought the construct back to the individual levels. Indeed, bibliometric and systematic evidence reveals a distinctively growing yet scattered research stream where individual, group, and organizational-level antecedents, mechanisms, and outcomes of agility were synthesized (Alviani et al., 2024; Salmen & Festing, 2022). Basing on review of shortlisted 61 articles work-stressor-based framework has been proposed in which flexibility-enabling HR practices and dynamic job demands influence employee agility. Muduli and Choudhury (2025) correlated agile attitudes, abilities and behaviors with digital transformation outcomes. Firm-level economics has also moved onto the scene: Franco and Landini (2022) linked organizational level data to the capacity of organizations to create workplaces that are agile, finding that organizational configurations that encourage agile workforces are important contributors to innovation, bringing agility into the scope of innovation policy relevance.

At the same time, there has been an advancement of the evidences at the individual level. Both Sherehiy and Karwowski (2014) and Petermann and Zacher (2022) measured agility in its three-part form (proactivity, adaptability and resilience) and found that agility has a positive relationship with task performance, organizational citizenship behavior, job satisfaction, well-being and crucially, innovative performance. Recent empirical studies have populated the oncological network: empowering leadership fosters employee agility through psychological safety and knowledge-sharing behavior in the IT industry (Naim et al., 2024). Responsible leadership and psychological empowerment jointly accelerate agility in turbulent sectors (Cyfert et al., 2022), humble leadership promotes agility (Elhadidy & Gao, 2024), workplace spirituality and job involvement predict agility in knowledge institutions (Saeed et al., 2022), and even constructive task conflict raises employee agility while relationship conflict suppresses it (Aghaei

et al., 2022). Interventions are appearing as well, from experiential arts-based training (Vijayalakshmi, 2023) to fuzzy-logic organizational assessment frameworks (Menon & Suresh, 2022). What is still missing is a context-specific theory of how this individual capability forms and pays off inside agile IT NPD projects.

Agile IT NPD Projects as a Work Context

Agile IT NPD is a distinctive work context, not merely a methodological label. Dong et al. (2024) systematic review distills agile project management to iterative, feedback-driven delivery by empowered, collaborative teams continuously responsive to customer value. This features translate directly into work-design characteristics of autonomy, feedback density, skill variety, and task interdependence. Two decades of information systems research add that team-level agility is itself multidimensional, comprising response extensiveness (the range of requirement changes a team accommodates) and response efficiency (the speed and cost of accommodating them), with genuine trade-offs between the two (Lee & Xia, 2010). In digitally converging markets, moreover, organizational agility and IT development agility can no longer be treated as separate constructs; competitive advantage flows to firms able to fuse them into an integrated digital agility (Salmela et al., 2022). These conceptualizations locate agility in methods and team responses; our framework supplies the individual capability that underwrites both.

Two further features of the context matter theoretically. Firstly, agile methods are not just another form of work redesign that has measurable psychological impacts. To demonstrate that agile practice operates on the demand resource architecture of jobs and is not just about delivery cadence, Rietze and Zacher (2022) conducted a two-wave study of 260 agile team members and found that agile work practices were associated with lower job demands and higher job resources, which in turn led to lower emotional fatigue and higher emotional engagement. Second, agile has become a part of hybrid governance. Unlike agile, the hybrid way of working is the norm: organizational design decisions, advantages, and tensions of hybrid project management have been systematically documented, and comparative evidence from 227 projects reveals that the benefits of agile over traditional project management approaches are specific to certain project management success dimensions and are dependent on project characteristics (Reiff & Schlegel, 2022; Ćirić Lalić et al., 2022). Governance form therefore conditions how much individual agility

can express itself in project outcomes, and any adequate framework must treat governance and turbulence as boundary conditions rather than background noise.

Theoretical Anchors

Three theoretical lenses jointly anchor the framework; each covers a distinct explanatory task. The micro foundations of dynamic capabilities explain why employee agility matters strategically. If organizational agility is the firm-level capacity to redeploy and reconfigure under deep uncertainty, a capacity that is valuable precisely because it is costly (Teece et al., 2016). Then individual sensing, seizing, and reconfiguring behaviors are its micro foundations: an organization cannot pivot faster than its members can re-learn. Recent digital transformation research operationalizes exactly this logic, treating agile employee attitudes, abilities, and behaviors as the micro-level carriers of firm-level digital adaptability (Muduli & Choudhury, 2025; Salmela et al., 2022). Employee agility is thus modeled here as an individual-level dynamic capability whose aggregation, through team processes, constitutes project and firm-level agility.

Social cognitive theory explains how employee agility develops. Human functioning is the product of triadic reciprocal determination among personal factors, behavior, and environment, with self-efficacy beliefs governing whether individuals approach or avoid demanding change (Bandura, 1986). Agile work environments supply mastery experiences (successful sprint adaptations), vicarious learning (pair work, retrospectives), and verbal persuasion (continuous feedback), which build the empowerment and efficacy cognitions from which agile behavior flows; recent conceptual work applies precisely this triadic logic to explain how new ways of working generate workforce agility through psychological empowerment (Cornelis & Febriansyah, 2023). Psychological empowerment explained by experienced meaning, competence, self-determination and impact (Spreitzer, 1995) is the proximal motivational state through which context becomes capability, consistent with current empirical evidence that empowerment-centered mechanisms transmit leadership and work-design effects into agility (Cyfert et al., 2022; Naim et al., 2024).

The JD-R perspective explains when agility is sustainable rather than exhausting. Agile IT NPD confronts employees with intense, dynamic demands this require turbulence, time-boxed delivery, constant exposure of work-in-progress. Thus, energize or deplete depending on the resources available (Bakker & Demerouti, 2017). Salmen and Festing (2022) explicitly embed employee agility in this stressor logic: agility flourishes where challenge demands are matched by

autonomy, feedback and supportive HR practices, and degrades into strain where they are not. The two-pathway evidence from agile teams that demand reduction lowering fatigue, resource enrichment raising engagement (Rietze & Zacher, 2022) and conservation-of-resources reasoning in recent agility studies (Naim et al., 2024) converge on the same conclusion: the resilience dimension of employee agility is the individual-level expression of this resource dynamic.

Employee Agility: Definition and Dimensionality

We define employee agility in agile IT NPD as a malleable, higher-order individual capability to anticipate, initiate and respond to project-relevant change quickly and competently while sustaining performance and well-being under uncertainty. Four elements of this definition warrant emphasis. It is individual, distinguishing it from team or method agility (Dong et al., 2024; Lee & Xia, 2010). It is a capability rather than a fixed trait: dispositional and leadership factors predispose it, but it develops through work design, empowerment, and HRM (Cyfert et al., 2022; Naim et al., 2024; Vijayalakshmi, 2023). It is behaviorally anchored, observable in what employees do when requirements shift (Petermann & Zacher, 2022; Sherehiy & Karwowski, 2014). And it includes a sustainability component, because agility that burns out its bearer is not a capability but a liability (Bakker & Demerouti, 2017; Rietze & Zacher, 2022; Salmen & Festing, 2022).

Consistent with the tripartite structure that dominates the field (Alviani et al., 2024; Sherehiy & Karwowski, 2014) and with validated multidimensional measurement (Petermann & Zacher, 2022), we model employee agility as a second-order construct reflected in three first-order dimensions. Proactivity is anticipatory, self-initiated change behavior: surfacing risks before they materialize, proposing backlog improvements, and initiating process change. Adaptability is the competent adjustment of self, role, and methods to new demands: rapid re-learning of technologies, role fluidity across the development pipeline, and interpersonal adjustment across functions. Resilience is sustained functioning under change: tolerance of ambiguity, constructive response to sprint failures and criticism, and recovery of performance after setbacks. Table 1 traces the definitional landscape with an emphasis on current conceptualizations; Figure 2 depicts the construct structure.

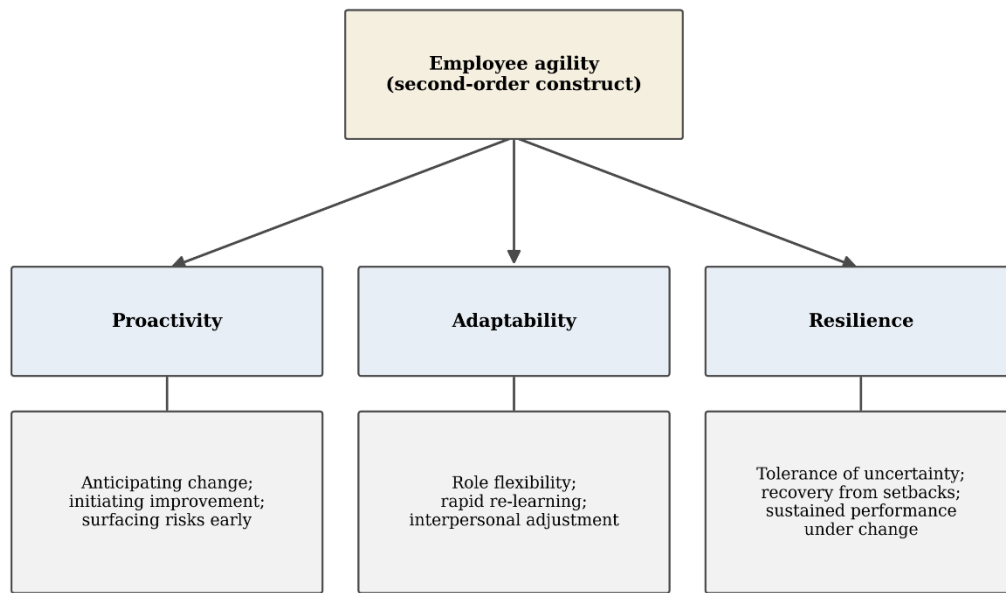
Table 1: *Representative Conceptualizations of Employee/Workforce Agility, 2010–2025*

Source	Conceptualization	Level/context
Lee & Xia (2010)	Software development agility as team response extensiveness and response efficiency, with trade-offs for performance	Team; software projects
Sherehiy & Karwowski (2014)	Employee proactivity, adaptability, resilience as workforce agility dimensions; autonomy as key work-organization antecedent	Individual; manufacturing SMEs
Salmen & Festing (2022)	Employee agility embedded in a work-stressor framework, shaped by dynamic job demands and flexibility-promoting HRM; field diagnosed as lacking construct clarity	Individual; systematic review of 61 articles
Petermann & Zacher (2022)	Ten-dimensional formative measure of workforce agility (e.g., accepting change, iteration, self-organization, learning); validated against task, citizenship, and innovative performance	Individual; two-sample validation (N = 218; 533)
Salmela et al. (2022)	Digital agility as the integration of organizational agility and IS development agility for digitally converging markets	Organization/IS; conceptual, Journal of the AIS
Alviani et al. (2024)	Workforce agility as a multilevel construct with individual, group, and organizational antecedents, mechanisms, and outcomes	Multilevel; systematic review and research agenda
Dong et al. (2024)	Agile project management defined via systematic review as iterative, feedback-driven, customer-value-centered delivery by empowered teams	Project/method; systematic review, PMJ

Source	Conceptualization	Level/context
Muduli & Choudhury (2025)	Agile attitudes, abilities, and behaviors as micro-level enablers of digital transformation (attitude–ability–behavior–outcome framework)	Individual within digital transformation; PRISMA review

Note. SME = small and medium-sized enterprise; HRM = human resource management; IS = information systems; AIS = Association for Information Systems; PMJ = Project Management Journal; NPD = new product development.

Figure 2: *Second-Order Structure of Employee Agility*



Note. Author's own elaboration synthesizing the tripartite structure in Sherehiy and Karwowski (2014), Petermann and Zacher (2022), and Alviani et al. (2024).

Formally, let P , A , and R denote standardized scores on the three dimensions for employee i . Employee agility can be expressed as the weighted composite in Equation 1,

$$EA_i = w_1P_i + w_2A_i + w_3R_i, \quad w_1 + w_2 + w_3 = 1, \quad w_k \geq 0 \quad (1)$$

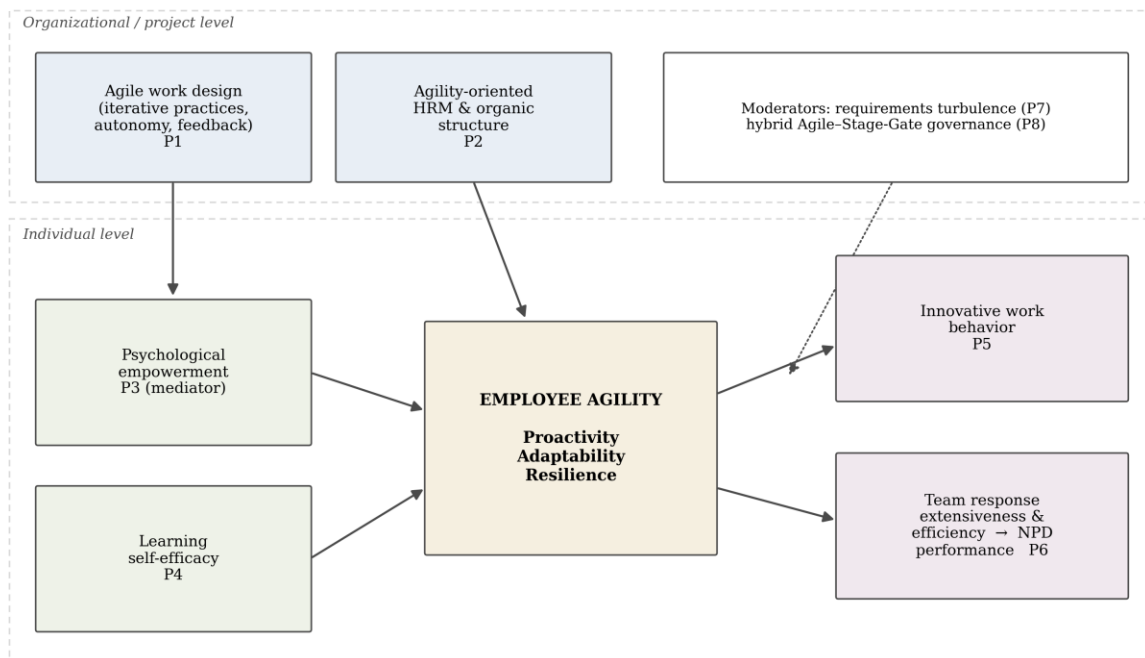
where the weights are estimated empirically (e.g., as standardized loadings of a reflective second-order factor, or as formative weights under a composite specification). Equation 1 is deliberately agnostic between reflective and formative logic; Petermann and Zacher (2022) explicitly specified their measure formatively, while adaptations of the tripartite scale are typically treated reflectively, and construct validation should adjudicate this specification rather than

assume it, given the field's documented operationalization problems (Alviani et al., 2024; Salmen & Festing, 2022). The equation also disciplines a common conceptual error: agility is not reducible to any single dimension. Therefore, a profile that is high on adaptability but depleted on resilience emphasizing on the pattern of the JD-R evidence rendering plausible under sustained turbulence (Bakker & Demerouti, 2017; Rietze & Zacher, 2022) that does not qualify as high agility.

A Multilevel Framework of Employee Agility in Agile IT NPD

Figure 1 presents the framework. Organizational and project-level inputs (agile work design; agility-oriented HRM and empowering structures that shape individual motivational and cognitive states (psychological empowerment; learning self-efficacy), which produce employee agility. Employee agility, in turn, drives innovative work behavior and through team response capabilities, NPD project performance. Requirements turbulence and hybrid governance moderate the capability and outcome linkages. The framework is multilevel by construction (as recent reviews (Alviani et al., 2024) demands) with antecedents residing primarily at the organizational/project level, i.e. the focal construct at the individual level, and outcomes at both.

Figure 3: *Multilevel Conceptual Framework of Employee Agility in Agile IT NPD Projects*



Note. Solid arrows denote proposed positive relationships; the dotted arrow denotes moderation. P1–P8 index the propositions. EA aggregation to the team level is discussed in the text.

Contextual Antecedents: Agile Work Design and Agility-Oriented HRM

The Agile practices redefine jobs. Iterative planning distributes the authority of making decisions about the task; daily coordination and retrospectives promote institutionalization of feedback; the cross-functional teams account for variety of skills, and visible increments build task identity and task significance (Dong et al., 2024). The psychological implications, which can now be measured, show that an agile working practice leads to reduced perceived job demands and increased job resources, which then has a downstream effect on fatigue and engagement (Rietze & Zacher, 2022). These same features produce mastery experiences and vicarious learning from which agile behavior is acquired (Bandura, 1986), and are job resources that transform demands into challenges instead of threats (Bakker & Demerouti, 2017). Thus, agile practice use is expected and not just the adoption of the term agile, to develop employee agility, through depth and fidelity.

***Proposition 1.** The extent and fidelity of agile work-design practices (iterative delivery, self-organization, continuous feedback, cross-functional teaming) in an IT NPD project is positively related to team members' employee agility.*

Beyond the method itself, the surrounding organization matters. Leadership and HRM systems are the best-evidenced organizational antecedents in the current literature: empowering leadership builds employee agility through psychological safety and knowledge-sharing behavior in IT firms (Naim et al., 2024), responsible leadership and psychological empowerment jointly predict workforce agility (Cyfert et al., 2022), humble leadership fosters it (Elhadidy & Gao, 2024), and agility-supportive climates rooted in involvement and meaning. This includes workplace spirituality to show consistent positive associations (Saeed et al., 2022). Deliberate capability-building also works: experiential interventions can raise agile capacities (Vijayalakshmi, 2023), and organizations can audit their agility-enabling practices systematically (Menon & Suresh, 2022). In agile IT NPD, such systems signal that adaptive behavior is valued and safe, addressing the resource side of the JD-R ledger (Salmen & Festing, 2022).

***Proposition 2.** Agility-oriented HRM practices and empowering leadership are positively related to employee agility in agile IT NPD projects, over and above agile method use.*

Individual Mechanisms: Psychological Empowerment and Learning Self-Efficacy

Context does not become capability automatically; it is transmitted through motivational and cognitive states. Psychological empowerment (experienced meaning, competence, self-determination, and impact) is the best-evidenced mechanism in the current agility literature (Spreitzer, 1995). Empowerment carries the effect of responsible leadership on workforce agility (Cyfert et al., 2022), serial mediation through psychological safety and knowledge sharing explains how empowering leadership produces agility (Naim et al., 2024), and conceptual work grounded in social cognitive theory positions empowerment as the pivot between new ways of working and agile behavior (Cornelis & Febriansyah, 2023). Agile work design is practically an empowerment machine: self-organization confers self-determination, working software confers impact, and customer collaboration confers meaning. We therefore model empowerment as the pivotal mediating state.

Proposition 3. *Psychological empowerment mediates the positive relationships of agile work design (P1) and agility-oriented HRM and leadership (P2) with employee agility.*

Second, because agility in IT NPD is substantially a re-learning problem (new frameworks, architectures, and domains arrive faster than formal training cycles) beliefs about one's capacity to learn are decisive. Social cognitive theory positions self-efficacy as the key self-regulatory belief governing thought, motivation, and action under demanding conditions (Bandura, 1986), and recent empirical work links self-efficacy with employee agility in predicting innovative behavior at work (Dzimidienė & Bagdžiūnienė, 2022). Digital-transformation reviews likewise identify computer self-efficacy and cognitive ability among the agile abilities that drive technology adoption (Muduli & Choudhury, 2025). Individuals confident in their ability to master novel technical material appraise requirement shifts as challenges, initiate exploration earlier (proactivity), adjust faster (adaptability), and persist longer after failure (resilience).

Proposition 4. *Learning self-efficacy is positively related to employee agility and partially channels the effect of agile work design on employee agility.*

The individual-level portion of the framework can be summarized as Equation 2,

$$EA_{it} = \alpha_i + \gamma_1 PE_{it} + \gamma_2 LSE_{it} + \gamma_3 X_i + u_{it} \quad (2)$$

where EA_{it} is employee agility for individual i at time t , PE is psychological empowerment, LSE is learning self-efficacy, X_i collects dispositional controls, α_i is an individual intercept

capturing stable between-person differences, and u_{it} is a disturbance. The within-person subscript t is not decorative: it encodes the theoretical claim that agility is malleable and should be studied with repeated-measures designs rather than the cross-sectional snapshots that dominate the field (Alviani et al., 2024; Salmen & Festing, 2022).

Outcomes: Innovative Work Behavior and NPD Project Performance

Employee agility should manifest first in innovative work behavior is the generation, promotion, and realization of novel, useful ideas in the work role. Proactivity supplies idea generation and championing; adaptability supplies implementation under shifting constraints; resilience supplies persistence through the rejection and rework that innovation entails. The empirical case is now strong: workforce agility predicts innovative performance more strongly than any other outcome in validation research (Petermann & Zacher, 2022), correlates positively with innovative work behavior in field samples (Elsayed et al., 2022), combines with self-efficacy to predict innovative behavior (Dzimidienė & Bagdžiūnienė, 2022), and (at the firm level) workforce-agility-conducive organization drives innovation output (Franco & Landini, 2022).

Proposition 5. *Employee agility is positively related to innovative work behavior in agile IT NPD projects.*

At the project level, employee agility is the human input to the team response capabilities that the information systems literature has shown to matter: response extensiveness and response efficiency (Lee & Xia, 2010). A team's response frontier is bounded by its members' capacity to absorb change; agile employees widen the frontier on both dimensions and ease the trade-off between them, and evidence that workforce agility improves adaptive performance through engagement supports the behavioral link (Saptarini & Mustika, 2023). Through this channel, aggregated employee agility should translate into NPD performance, whereas, the team-related and future-preparation success dimensions on which agile approaches demonstrably outperform traditional ones (Ćirić Lalić et al., 2022) and reinforces where agility combines with intelligent technologies (Tominc et al., 2023).

Proposition 6. *Team-level employee agility (the aggregate of members' agility) is positively related to NPD project performance, mediated by team response extensiveness and response efficiency.*

Boundary Conditions: Turbulence and Governance

The value of agility is contingency-shaped. Under stable, well-specified requirements, disciplined execution suffices and agility earns little premium; under deep uncertainty, agility becomes the binding constraint on performance and the precise condition under which dynamic capabilities justify their cost (Teece et al., 2016). Comparative project evidence points the same way: the advantages of agile approaches over traditional ones are not uniform but conditioned by project characteristics such as novelty, technology, complexity, and pace (Ćirić Lalić et al., 2022). We therefore expect requirements turbulence to amplify the agility–performance relationship.

Proposition 7. *Requirements turbulence positively moderates the relationship between team-level employee agility and NPD project performance, such that the relationship is stronger under high turbulence.*

Governance form is the second boundary condition. Hybrid project management—combinations of agile and plan-driven elements—is now the dominant configuration in practice, and systematic review evidence catalogs the control structures (stage gates, mandated synchronization, upfront planning layers) that hybrids reintroduce (Reiff & Schlegel, 2022). Gates and mandated synchronization narrow the action space within which individual agility can express itself: agile employees in heavily gated projects may sense and propose, but cannot always seize and reconfigure. Because the success advantages of agility concentrate in team- and future-oriented dimensions rather than efficiency dimensions (Ćirić Lalić et al., 2022), heavyweight control should attenuate (though not eliminate) the agility–performance link.

Proposition 8. *The positive relationship between team-level employee agility and NPD project performance is weaker under heavyweight hybrid governance (dense stage-gating and mandated synchronization) than under lightweight agile governance.*

Equations 3 and 4 formalize the project-level logic. Equation 3 specifies the moderated performance model,

$$NPD_j = \beta_0 + \beta_1 \bar{EA}_j + \beta_2 T_j + \beta_3 (\bar{EA}_j \times T_j) + \beta_4 G_j + \beta_5 (\bar{EA}_j \times G_j) + \varepsilon_j \quad (3)$$

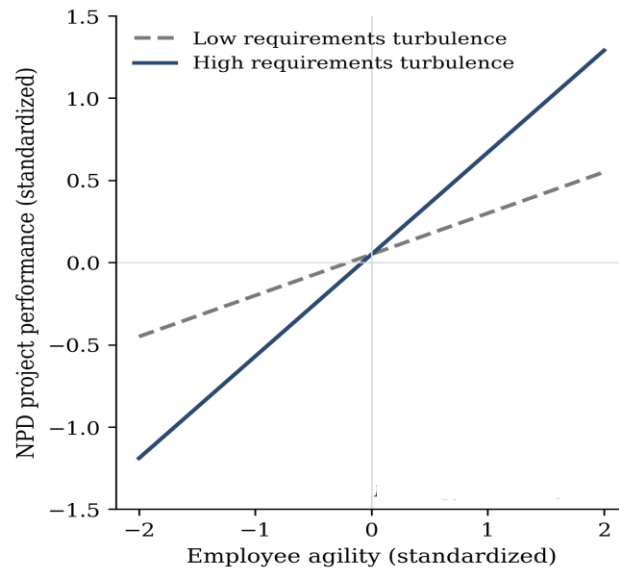
where NPD_j is performance of project j , $\bar{EA}_j$ is mean team member agility, T_j is requirements turbulence, and G_j indexes governance weight; Propositions 7 and 8 correspond to

$\beta_3 > 0$ and $\beta_5 < 0$, respectively. Figure 3 illustrates the P7 pattern. Equation 4 expresses the dynamic interpretation of agility as adjustment speed,

$$dK_{it}/dt = \delta \cdot EA_{it} \cdot (K_t^* - K_{it}) \quad (4)$$

where K_{it} is individual i 's current task-relevant knowledge, K_t^* is the (moving) knowledge frontier implied by current requirements, and $\delta > 0$ is a context conversion parameter. Agility, on this reading, is the rate constant of individual adaptation: higher EA closes the gap between what the project now demands and what the employee can now do more quickly. When requirements shift, K_t^* jumps and the gap re-opens; teams of high-EA members re-converge before the next shift, which is precisely the mechanism behind response efficiency (Lee & Xia, 2010) and behind the micro-level carriers of digital transformation identified in recent reviews (Muduli & Choudhury, 2024, 2025).

Figure 4: *Hypothesized Moderation of the Agility–Performance Relationship by Requirements Turbulence (Proposition 7)*



Note. Illustrative rendering of the proposed interaction; slopes are conceptual, not estimated from data.

Table 2: *Mapping Agile IT NPD Practices to Employee Agility Dimensions*

Agile practice cluster	Primary dimension cultivated	Mechanism and current evidence
Iterative delivery and time-boxing	Adaptability	Frequent mastery experiences under bounded risk (Bandura, 1986); iteration as core agile behavior (Petermann & Zacher, 2022)
Retrospectives and continuous feedback	Proactivity	Feedback as job resource raising engagement (Rietze & Zacher, 2022); reflection dimension of agility (Petermann & Zacher, 2022)
Self-organizing, cross-functional teams	Adaptability; Proactivity	Self-determination and impact via psychological empowerment (Cyfert et al., 2022; Spreitzer, 1995)
Empowering, psychologically safe leadership	Proactivity; Resilience	Serial mediation through safety and knowledge sharing (Naim et al., 2024); humble leadership effects (Elhadidy & Gao, 2024)
Customer collaboration and visible increments	Proactivity	User-centricity and value focus in agile project management (Dong et al., 2024); early sensing of change (Teece et al., 2016)
Sustainable pace and team support norms	Resilience	Demand-reduction pathway lowering fatigue (Rietze & Zacher, 2022); stressor-matched resources (Salmen & Festing, 2022)
Backlog reprioritization under turbulence	Resilience; Adaptability	Constructive task conflict raising agility (Aghaei et al., 2022); repeated controlled exposure to change

Note. Practice clusters follow the agile project management synthesis of Dong et al. (2024).

Table 3: *Summary of Propositions*

No.	Proposition (abbreviated)	Level; key supporting sources
P1	Agile work-design practices → employee agility (+)	Cross-level; Rietze & Zacher (2022); Dong et al. (2024)
P2	Agility-oriented HRM and empowering leadership → employee agility (+)	Cross-level; Naim et al. (2024); Cyfert et al. (2022); Elhadidy & Gao (2024)
P3	Psychological empowerment mediates P1 and P2	Individual; Cyfert et al. (2022); Naim et al. (2024); Cornelis & Febriansyah (2023)

No.	Proposition (abbreviated)	Level; key supporting sources
P4	Learning self-efficacy → employee agility (+; partial mediation of P1)	Individual; Dzimidienė & Bagdžiūnienė (2022); Muduli & Choudhury (2025)
P5	Employee agility → innovative work behavior (+)	Individual; Petermann & Zacher (2022); Elsayed et al. (2022); Franco & Landini (2022)
P6	Team employee agility → NPD performance via response extensiveness/efficiency	Team/project; Lee & Xia (2010); Ćirić Lalić et al. (2022); Saptarini & Mustika (2023)
P7	Requirements turbulence strengthens the agility– performance link	Project; Teece et al. (2016); Ćirić Lalić et al. (2022)
P8	Heavyweight hybrid governance weakens the agility– performance link	Project; Reiff & Schlegel (2022); Ćirić Lalić et al. (2022)

Note. Signs in parentheses indicate the proposed direction of association.

Discussion

Theoretical Contributions

The framework contributes to three conversations. To the employee agility literature, it answers the recurring call for construct clarity, theoretical grounding and multilevel specification (Alviani et al., 2024; Salmen & Festing, 2022) by fixing a definition, committing to a dimensional structure, formalizing composition (Equation 1), and crucially situating the construct in a specific, theoretically legible work context instead of the placeless organization of much prior work. The context is not incidental: agile IT NPD is where the construct's demand conditions (turbulence), developmental conditions (agile work design), and performance stakes (NPD outcomes) co-occur most intensely, and it is the setting the digital agility literature identifies as strategically decisive (Salmela et al., 2022).

To the agile project management and information systems literatures, the framework supplies the missing human micro foundation. Current work locates agility in methods (Dong et al., 2024), team responses (Lee & Xia, 2010), and governance configurations (Reiff & Schlegel, 2022), and documents differentiated performance effects at the project level (Ćirić Lalić et al., 2022). Our model explains where those team responses come from and why identical methods yield unequal results across teams: methods cultivate or fail to cultivate, individual agility through

empowerment and efficacy. Also, the governance and turbulence gate how much of that capability reaches performance. Proposition 8 in particular offers a person-centered explanation for the uneven experience of hybrid configurations documented in the systematic literature (Reiff & Schlegel, 2022).

To the dynamic capabilities and digital transformation traditions, the framework operationalizes micro foundations at the level where they are usually invoked but rarely specified (Muduli & Choudhury, 2025; Teece et al., 2016). Equation 4 gives the aggregation logic a precise form: organizational reconfiguration speed is bounded below by the distribution of individual adjustment rates. This converts a metaphor “agile people make agile firms”, into a testable multilevel claim, and it connects directly to firm-level evidence that workforce-agility-conducive organization raises innovation output (Franco & Landini, 2022).

Managerial Implications

In the eyes of managers of IT NPD, the framework poses a new approach to agility investments. Adopting the methods is not enough, because the propositions state that agile ceremonies develop capability only if they really change both the job demands and the resources (Rietze & Zacher, 2022). If agile is done with the cargo-cult approach, where the ceremonies are performed without decision rights, employee agility and thus the performance should not be affected. Second, leadership and HRM are first order levers, not support staff: empowering, psychologically safe leadership (Naim et al., 2024), responsible leadership combined with empowerment (Cyfert et al., 2022), planned agility training (Vijayalakshmi, 2023), and regular organizational agility audits (Menon & Suresh, 2022) are organizational halves of the capability. Third, resilience needs to be equally valued with speed as agility is a resource-consuming process. Therefore, sustainable pace and support norms are a capability maintenance, not indulgence and the pathway of demand reduction (Bakker & Demerouti, 2017; Rietze & Zacher, 2022). Fourth, govern with turbulence: In a high turbulence context, heavyweight gating taxes the capability the project most needs, which is the idea of governance that should be adapted to turbulence, following the current hybrid project management research trend of tailored hybrid logic (Ćirić Lalić et al., 2022; Reiff & Schlegel, 2022). Last but not least, with learning cycles becoming even shorter in AI-augmented development, the agility of employees becomes the complement, which is the key for project success (Rastogi & Pandita, 2025; Tominc et al., 2023).

Limitations and Future Research

This is a conceptual paper and thus, as such, is limited by its genre: the propositions are not tested for their validity but argued. There were three other restrictions on the contribution. The framework frames the team emergence processes in terms of team composition, team fault lines, team shared mental models, which are likely to impact how individual agilities are aggregated (Proposition 6 assumes additive aggregation as a first approximation). Explicitly, it recognizes turbulence and governance as the two key moderators, and also leaves culture, distributed work, and AI-augmented development for future elaboration, although initial evidence shows that they are relevant. The two key moderators are identified as turbulence and governance; culture, distributed work and AI-augmented development are left for future elaboration, although early evidence indicates the relevance of these three in the project. And although Equation 1 permits either measurement logic, we do not resolve the reflective–formative question here, which remains live in the measurement literature (Petermann & Zacher, 2022). Table 4 converts these limitations into a research agenda with concrete designs.

Table 4: *Research Agenda for Employee Agility in Agile IT NPD*

Research question	Recommended design	Analytic approach
Do agile work-design practices build employee agility over time? (P1, P3, P4)	Longitudinal panel of developers across ≥ 4 sprints; validated multidimensional agility measure (Petermann & Zacher, 2022)	Latent growth / cross-lagged panel models; within-person estimation of Equation 2
Do empowerment and safety mediate leadership–agility links? (P2, P3)	Multi-source survey (employee + Scrum master) with temporal separation, extending Naim et al. (2024) and Cyfert et al. (2022) to NPD teams	Multilevel structural equation modeling with serial mediation tests
Does team agility drive NPD performance via response capabilities? (P6)	Multi-project field study; success measured on the multidimensional criteria of Ćirić Lalić et al. (2022)	2-1-2 multilevel mediation; PLS-SEM or Bayesian MSEM
Do turbulence and governance moderate the agility–performance link? (P7, P8)	Cross-industry sample of agile, hybrid, and gated projects classified per Reiff and Schlegel (2022)	Moderated regression per Equation 3; simple-slope and

Research question	Recommended design	Analytic approach
		regions-of-significance analysis
Is employee agility reflective or formative in composition? (Eq. 1)	Measurement-focused validation study comparing tripartite and ten-dimension specifications (Petermann & Zacher, 2022)	Confirmatory tetrad analysis; nomological comparison of specifications
What is the adjustment-rate distribution in real teams? (Eq. 4)	Digital trace data (commits, review latency) paired with surveys; AI-augmented settings prioritized (Tominc et al., 2023)	State-space / hidden Markov modeling of adaptation episodes
Can agility be trained at scale in IT NPD? (P1–P4)	Field experiments adapting experiential interventions (Vijayalakshmi, 2023) and audit frameworks (Menon & Suresh, 2022)	Randomized or stepped-wedge designs with difference-in-differences estimation

Note. PLS-SEM = partial least squares structural equation modeling; MSEM = multilevel structural equation modeling.

Conclusion

Agile methods had the promise of an organization's ability to change over a plan – that depends on people. This paper has suggested that employee agility (proactivity, adaptability, and resilience) is the micro foundation for agile IT NPD performance, developing in an empowering agile work design and within the limits of employee proactivity, adaptability, and resilience, which are shaped by leadership and expressed within the limits of the turbulence and governance. The framework provides a precise definition of the construct and a formalization of its structure and dynamics, as well as eight propositions to test that are firmly rooted in the latest evidence, and a practical reminder to managers: organizations don't become agile through agile, they become agile through agile people, and then leave them alone.

References

- [1] Agbejule, A., & Lehtineva, L. (2022). The relationship between traditional project management, agile project management and teamwork quality on project success. *International Journal of Organizational Analysis*, 30(7), 124–136. <https://doi.org/10.1108/IJOA-02-2022-3149>
- [2] Aghaei, I., Haghani, M., & Limunga, E. J. (2022). Task and relationship conflicts, employee agility, and perceived job performance. *Journal of Management and Research*, 9(1). <https://doi.org/10.29145/jmr/91/02>
- [3] Alviani, D., Hilmiana, Widiyanto, S., & Muizu, W. O. Z. (2024). Workforce agility: A systematic literature review and research agenda. *Frontiers in Psychology*, 15, Article 1376399. <https://doi.org/10.3389/fpsyg.2024.1376399>
- [4] Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285. <https://doi.org/10.1037/ocp0000056>
- [5] Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- [6] Ćirić Lalić, D., Lalić, B., Delić, M., Gračanin, D., & Stefanović, D. (2022). How project management approach impact project success? From traditional to agile. *International Journal of Managing Projects in Business*, 15(3), 494–521. <https://doi.org/10.1108/IJMPB-04-2021-0108>
- [7] Cornelis, F. C. P. N., & Febriansyah, H. (2023). New ways of working in the manufacturing sector as COVID-19 pandemic learning and its relevance to workforce agility. *International Journal of Management, Entrepreneurship, Social Science and Humanities*, 6(2), 39–55. <https://doi.org/10.31098/ijmesh.v6i2.1195>
- [8] Cyfert, S., Szumowski, W., Dyduch, W., Zastempowski, M., & Chudziński, P. (2022). The power of moving fast: Responsible leadership, psychological empowerment and workforce agility in energy sector firms. *Heliyon*, 8(10), Article e11188. <https://doi.org/10.1016/j.heliyon.2022.e11188>
- [9] Dong, H., Dacre, N., & Baxter, D. (2024). What is agile project management? Developing a new definition following a systematic literature review. *Project Management Journal*, 55(6), 668–688. <https://doi.org/10.1177/87569728241254095>

- [10] Dzimidienė, A., & Bagdžiūnienė, D. (2022). The effect of employee agility and self-efficacy on innovative behavior at work. *Psichologija*, 67, 70–88. <https://doi.org/10.15388/Psichol.2022.60>
- [11] Elhadidy, I. A., & Gao, Y. (2024). The impact of humble leadership on employee agility: Unveiling the mediating role of employees' psychological empowerment. *International Journal of Research in Business and Social Science*, 13(1), 200–209. <https://doi.org/10.20525/ijrbs.v13i1.3145>
- [12] Elsayed, N. M., Abdel-Azeem, A. M., & Abd El-Aziz Zaki, A. K. (2022). The relationship between workforce agility and staff nurses' innovative work behavior at critical care units. *Egyptian Journal of Health Care*, 13(3), 560–573. <https://doi.org/10.21608/ejhc.2022.253723>
- [13] Franco, C., & Landini, F. (2022). Organizational drivers of innovation: The role of workforce agility. *Research Policy*, 51(2), Article 104423. <https://doi.org/10.1016/j.respol.2021.104423>
- [14] Lee, G., & Xia, W. (2010). Toward agile: An integrated analysis of quantitative and qualitative field data on software development agility. *MIS Quarterly*, 34(1), 87–114. <https://doi.org/10.2307/20721416>
- [15] Menon, S., & Suresh, M. (2022). Assessment framework for workforce agility in higher education institutions. *Higher Education, Skills and Work-Based Learning*, 12(6), 1169–1188. <https://doi.org/10.1108/HESWBL-01-2022-0014>
- [16] Muduli, A., & Choudhury, A. (2024). Digital technology adoption, workforce agility and digital technology outcomes in the context of the banking industry of India. *Journal of Science and Technology Policy Management*. Advance online publication. <https://doi.org/10.1108/JSTPM-01-2024-0018>
- [17] Muduli, A., & Choudhury, A. (2025). Exploring the role of workforce agility on digital transformation: A systematic literature review. *Benchmarking: An International Journal*, 32(2), 492–512. <https://doi.org/10.1108/BIJ-02-2023-0108>
- [18] Naim, M. F., Sahai, S., & Elembilassery, V. (2024). Does empowering leadership enhance employee agility? A serial mediation model. *Evidence-based HRM: A Global Forum for Empirical Scholarship*, 12(3), 666–682. <https://doi.org/10.1108/EBHRM-08-2022-0197>

- [19] Petermann, M. K. H., & Zacher, H. (2022). Workforce agility: Development and validation of a multidimensional measure. *Frontiers in Psychology*, 13, Article 841862. <https://doi.org/10.3389/fpsyg.2022.841862>
- [20] Rastogi, S., & Pandita, D. (2025). Driving entrepreneurial success: Navigating AI-driven transformation through workforce agility and sustainability. *Journal of Innovation and Entrepreneurship*, 14(1). <https://doi.org/10.1186/s13731-025-00554-0>
- [21] Reiff, J., & Schlegel, D. (2022). Hybrid project management – A systematic literature review. *International Journal of Information Systems and Project Management*, 10(2), 45–63. <https://doi.org/10.12821/ijispm100203>
- [22] Rietze, S., & Zacher, H. (2022). Relationships between agile work practices and occupational well-being: The role of job demands and resources. *International Journal of Environmental Research and Public Health*, 19(3), Article 1258. <https://doi.org/10.3390/ijerph19031258>
- [23] Saeed, I., Khan, J., Zada, M., Ullah, R., Vega-Muñoz, A., & Contreras-Barraza, N. (2022). Towards examining the link between workplace spirituality and workforce agility: Exploring higher educational institutions. *Psychology Research and Behavior Management*, 15, 31–49. <https://doi.org/10.2147/PRBM.S344651>
- [24] Salmela, H., Baiyere, A., Tapanainen, T., & Galliers, R. D. (2022). Digital agility: Conceptualizing agility for the digital era. *Journal of the Association for Information Systems*, 23(5), 1080–1101. <https://doi.org/10.17705/1jais.00767>
- [25] Salmen, K., & Festing, M. (2022). Paving the way for progress in employee agility research: A systematic literature review and framework. *The International Journal of Human Resource Management*, 33(22), 4386–4439. <https://doi.org/10.1080/09585192.2021.1943491>
- [26] Saptarini, N. I., & Mustika, M. D. (2023). Workforce agility and adaptive performance in government institution: The mediating role of work engagement. *Jurnal Manajemen dan Kewirausahaan*, 25(1), 55–62. <https://doi.org/10.9744/jmk.25.1.55-62>
- [27] Sherehiy, B., & Karwowski, W. (2014). The relationship between work organization and workforce agility in small manufacturing enterprises. *International Journal of Industrial Ergonomics*, 44(3), 466–473. <https://doi.org/10.1016/j.ergon.2014.01.002>

- [28] Spreitzer, G. M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal*, 38(5), 1442–1465. <https://doi.org/10.2307/256865>
- [29] Teece, D. J., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review*, 58(4), 13–35. <https://doi.org/10.1525/cmr.2016.58.4.13>
- [30] Tominc, P., Oreški, D., & Rožman, M. (2023). Artificial intelligence and agility-based model for successful project implementation and company competitiveness. *Information*, 14(6), Article 337. <https://doi.org/10.3390/info14060337>
- [31] Vijayalakshmi, V. (2023). An arts-based process to build workforce agility. *Journal of Organizational Change Management*, 36(6), 917–931. <https://doi.org/10.1108/JOCM-03-2023-0092>