

## Linking Employee Perceptions and Adaptability to Project Performance: The Chain Mediation of Agile Management Elements in China's Architecture Sector

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**Abstract:** This study investigates the relationship between employee perceptions, adaptability, agile management elements, and project performance in the context of the Chinese architecture industry. Using a quantitative approach and PLS-SEM analysis of survey data from 1,075 professionals, the study finds that perceived ease of use and perceived usefulness have significant direct and indirect effects on project performance, while adaptability indirectly affects performance through agile management elements. The study contributes empirical evidence on the factors influencing project performance in an agile environment and suggests the importance of employee perceptions and adaptability. Implications for theory and practice are discussed.

**Keywords:** Employee perceptions; project performance; chain mediation; agile management; adaptability; PLS-SEM

## 1. Introduction

Atkinson (1999) asserts that the "iron triangle," which evaluates a project's performance in terms of cost, time, and quality, is the most widely used criterion for assessing its success. According to Konchar & Sanvido (1999), measuring project success in terms of unit cost, construction and delivery speed, schedule and cost growth, and other quality indicators is another way to assess its success. There must be a set of rules or principles that act as guidelines or norms for project accomplishment in order to assess a project's success appropriately. According to Unegbu et al. (2022), these benchmarks are known as project success criteria or project performance measures. According to Nwachukwu & Nzotta (2010), the bad performance of construction projects in the majority of developing economies is a result of the underutilization of critical success factors, project performance measures, and best practices for project management—all of which together make up the multi-variables that affect construction projects. Few research has looked at how employee attitudes and performance are impacted by adaptation and change-related uncertainty (Balogun & Johnson, 2004; Elias, 2009; Walker et al., 2007). The capacity of a worker to adjust to changes is known as adaptability. Workers who exhibit adaptive performance are capable of handling uncertain circumstances, coming up with innovative solutions to issues, and handling stress well (Abdul Hamid, 2022). When workers are tech-savvy or prepared to embrace digital technologies, adaptive performance can increase (Abdul Hamid, 2022). professional construct theory places a strong emphasis on professional adaptability, according to Savickas (1997). According to some academics, an in-depth study is required to determine whether performance management systems (PMS) are beneficial in businesses, particularly when considering the viewpoint of the workforce (Dewettinck & van Dijk, 2013; Mishra & Farooqi, 2013; Simmons, 2002). As a result, it is a valuable technique for comprehending and monitoring how organizational projects are performing from the viewpoint of workers' views and flexibility.

However, agile approaches were created to improve flexibility and responsiveness to changing situations because complexity makes projects harder to comprehend and govern ( Nguyen & Mohamed, 2020). The project management methodology known as agile project management (APM) places a strong emphasis on beautiful production (Younus & Younis, 2021). Agile is necessary, according to studies, for significant behavioral changes that affect how team members behave and think in a professional setting ( Sherehiy et al., 2007 ). APM's adaptation to people and processes, together with its quality and dependability, determines how effective it is in any given work context (Highsmith, 2009). The goal of agile methodologies is to increase project performance by increasing flexibility and responsiveness to changing conditions (Fowler & Highsmith, 2001). However, although some scholars try to explore the use of agile management and other methods in projects to improve project performance, they rarely conduct relevant empirical research and mainly discuss based on personal experience and focus on the use of agile management in projects. Exploring the intermediary role of the core elements of agile management and exploring the relationship between employees' psychology and project performance, such as employees' perceptions of project agile management and the process of employees' adaptability to agile projects, is basically a research gap. It still needs to be determined whether this research gap is effective for the future application and promotion of agile management in different fields and whether it has research significance.

Moreover, agile management is a flexible and highly mobile management method. For employees, It is essential to explore the psychology and feelings of the implementers, which can better provide an agile management framework that is more in line with project management for the agility of the project, manage employees better and more rationally, and make better use of the project's resources. Human resources should explore an agile management model that is more in line with project performance development. This article aims to study the relationship between employees ' perception and adaptability and project performance. Based on the chain mediation effect of the core elements of agile management and adaptability, through the perspective of employees, explore the use value of the core

elements of agile management in employee groups, aiming to explore A new management model for improving the performance of a project. From this, relevant research questions are raised.

**Q1:** What is the correlation between employee perception and adaptability and the five core elements of agile management and project performance?

**Q2:** How do the core elements of agile management and employee adaptability chain-mediate the relationship between employee perception and project performance?

**Q3:** what is the correlation model between employee perception and project performance under the chain mediating role of agile management and adaptability?

## 2. Literature Review and Establishing Hypotheses

### Five core elements of agile management

**Iterative Incremental Development:** Coined by Moran (2015), "iterative development" is a method of iteratively moving through multiple phases of a solution development life cycle in order to produce a tested, working prototype rapidly. Small iterative cycles of development and implementation enable rapid experimentation and feedback, as well as real-time strategy adjustments based on experimental results (Beerbaum, 2023). Moran (2015) first used the term "incremental delivery" to describe a supplier's willingness, rather than the right, to provide consumers with previously developed product artifacts. Often, multiple adjustments are made between the initial delivery and the final version of a product (Moran, 2015). Understanding grows at each level, and demonstrations and detailed information can be provided to clients (Moran, 2015). Every step after that, we were able to show our customers and provide them with more details. These two ideas are combined in some approaches into an "iterative and incremental" development process (Moran, 2015).

**Visualization and information flow:** Requires honest, open communication within the company. This makes it easier to ensure everyone is pursuing the same goals and understands strategy and status updates related to those goals (Beerbaum, 2023). Thanks to visualization, Kanban boards are always visible (Ellis, 2016). Once the limit is reached, the team cannot advance the task on the Kanban board, but they do indicate the work in progress and provide a direct way to limit it (Ellis, 2016). Again, this process can be managed using Kanban project management; identifying when a task is stalled is simple and intuitive (Ellis, 2016). Since the fundamental purpose of Kanban is to allow you to observe how you operate, even flimsy attempts can be beneficial (Ellis, 2016).

**Continuous improvement:** This is a process of constant development and learning. This means that the program is never "finished" but is continually improved and modified based on input and results (Beerbaum, 2023). Ellis (2016) After the concept of agile, continuous improvement was first proposed in the software industry, it quickly became popular. It expanded to other sectors, and the acceptance of Scrum was revolutionary. Scrum is a great starting point, but it is not the end. Once Scrum is embraced and established, teams need to look for incremental improvements over time. To meet the need for improvement, some of these procedures may be implemented at a time (Ellis, 2016). Agile Project Management (APM) is a team effort that relies on everyone on the team working together to deliver results, get direct feedback, and facilitate learning for the next iteration of the solution. Continuous feedback and development are some of APM's strengths (Ellis, 2016).

**Customer Orientation:** Creating value for consumers is the primary goal of agile strategy. This requires a thorough understanding of the client's requirements and preferences and being prepared to modify the approach if necessary (Beerbaum, 2023). Denning (2016) Agile thinking is characterized by a primary focus on delivering ever-increasing value to consumers. "The most important thing is to please the customer," reads the first principle of the Agile Manifesto. When agile teams prioritize customer satisfaction, it shows that they have a strong mindset, a strong belief in the talent and ability of the work, and the understanding that, given the right environment, values, and goals, the people who work there will generally continue to Innovate and add value to customers and end-users while

delivering benefits to the business (Denning, 2016). Denning (2016) believes that the goal of agile management is to enable all members of the organization to create value for customers.

**Teamwork:** Agile techniques require collaboration among multiple organizational roles. This requires gathering people with different specialties and abilities to collaborate on a project to achieve a common goal (Beerbaum, 2023). Instead, an agile attitude encourages communication and collaboration among managers, employees, and customers (Denning, 2016). Team members who are ready to answer inquiries about how to use the application are live customers on-site (Ellis, 2016). Agile methods are instrumental in unclear and rapidly changing situations, as these situations may make traditional long-term planning less successful. Organizations can better manage change and create value for consumers by leveraging flexibility, experimentation, and iterative adaptation (Beerbaum, 2023).

#### Elements of perception, adaptability, and agile management

According to Savickas (2007), adaptability is "the quality of being able to change effortlessly to adapt to new or changing circumstances." The career adaptability model (Savickas & Porfeli, 2012; Tolentino et al., 2014) includes simultaneous adaptability as a feature that characterizes a flexible or changing personality. It is believed that the ability to adapt is a fundamental propensity that lies at the core of an individual or a characteristic that is becoming more and more stable with time (Savickas, 2007; Savickas & Porfeli, 2012). Adaptive behavior is the readiness to react appropriately to changes in one's profession or imbalances in it (Handoyo & Sulistiani, 2018). At that moment, the person must adjust to the imbalance by modifying the environment, themselves, or both (Handoyo & Sulistiani, 2018). According to Tolentino et al. (2014), adaptability is defined as self-regulatory tendencies that show up as proactive personality traits, goal-directed learning, and career optimism. Higher adaptation makes a person more flexible and capable of handling shifting circumstances (Handoyo & Sulistiani, 2018).

The degree to which an individual thinks using technology will improve their performance is known as perceived usefulness. The degree to which a person thinks using a technology will be simple is known as perceived ease of use (Davis, 1989). Perceived simplicity of use has the potential to improve perceived usefulness and raise awareness of technology adoption, according to Barhoumi (2016). The goal of adaptation is to facilitate the onboarding of new workers so they can quickly increase their productivity. An employee's stress level and likelihood of quitting can both be decreased with appropriate adaptation (Zaleśna, 2015). From a professional standpoint, the process of adaptation entails acclimating new hires to the duties and circumstances of their assigned positions as well as familiarizing staff members with their roles within the organization's hierarchy and work environment (Zaleśna, 2015). As a result, the company and the project benefit when staff members adjust to new technologies or management styles. It can improve team value and financial benefits for the business while also helping people adjust more smoothly to their new work environment.

Additionally, agile management possesses the qualities of flexibility and new model. Employees actively learning, comprehending, and increasing their awareness of and adaptation to agile management is meaningful for the project. Consequently, I put up the following hypothesis:

H1: Perceptual ease of use is positively correlated to the core elements of agile management.

H2: Perceptual usefulness is positively correlated to the core elements of agile management.

H3: Employee adaptability is positively related to the core elements of agile management.

#### Agile management and project performance

The accomplishment of project goals within the limitations of schedule, budget, quality, and other project achievement requirements is the basis for evaluating project performance (Ika, 2009). Project scope, time, and money are examples of efficiency factor indicators. Project team happiness, end-user satisfaction, customer satisfaction, and stakeholder-assessed project success are examples of indicators of stakeholder success (Nguyen & Mohamed, 2020). Metrics for stakeholder satisfaction are evidently distinct from project duration, cost, and scope (Nguyen & Mohamed, 2020). However, according to Nguyen & Mohamed (2020), efficiency measurement indicators contain both qualitative project

measurement items like project scope and quantitative measurement elements like time and cost. Because time and money are more specific criteria than project scope criteria, using quantitative and qualitative project performance metrics as components might lead to issues ( Nguyen & Mohamed, 2020). As a result, there are various components to project performance indicators, including qualitative and quantitative project performance (Nguyen & Mohamed, 2018a).

In light of this, studies by Uludag et al. (2018) and Hobbs & Petit (2017) demonstrated in their respective fields that agile management techniques enable reachable stakeholder contact within the firm and sustain a steady stream of feedback from external stakeholders. As a result, it guarantees that the pertinent organizations function at their best while accomplishing objectives, reducing project complexity, and raising organizational performance efficiency ( Levy et al., 2015; Maylor & Turner, 2017). Agile management techniques advise dividing up difficult situations into manageable tasks in order to simplify them. This results in the targeted and practical implementation of management techniques, which will enhance project performance and reduce project-related complexity even further ( Abrahamsson et al., 2017; Maylor & Turner, 2017). Agile management techniques are more successful and efficient at managing complex situations, as demonstrated by Zhu & Mostafavi's (2017) research. As a result, steering projects in the direction of improved performance is advised. As a result, I put forth one leading theory along with five supporting hypothesis:

H4: The core elements of agile management are positively correlated to project performance

H4a: Iterative, incremental development and project performance are positively correlated.

H4b: Visualization and information flow are positively correlated to project performance.

H4c: Continuous improvement is a positive correlation with project performance.

H4d: Customer orientation and project performance are positively correlated.

H4e: Project performance and teamwork are positively correlated.

Perception factors, adaptability, and project performance

The learning agility quadrant is characterized by three factors: emotional intelligence (ability to adapt under pressure or maintain a stable self-concept in new situations), willingness to learn (actively seeking novel experiences to enhance learning), and adaptability (willingness to change when new situations require it) ( Davis, 2020). Task performance-oriented adaptability is considered an essential factor in this quadrant. According to Davis's (2020) research findings, the learning agility quadrant and the adaptability of the overall job task performance orientation are substantially correlated, suggesting that the flexibility of job task performance orientation is a crucial aspect of leadership potential. The topic of this study is the relationship between employee adaptability and job performance (Davis, 2020).

According to research by Kim et al. (2017), adaptability oriented toward job task performance is positively correlated with self-reported job performance; this suggests that more flexible people are more productive at work. According to Davis (2020), job task performance-oriented adaptation is deemed vital for job performance by both managers and employees. Davis (1989) postulated in the paper "The Impact of Perceived Usefulness and Perceived Ease of Use on Intention to Continue Using E-Government" that perceived usefulness is the degree to which an individual believes that utilizing a particular technology will improve their capacities and their In other words, there is a perception that using technology would eventually lead to better job performance. Simultaneously, the paper "Emerging Determinants of Ease of Use and Perceived Usefulness of Mobile Banking Adoption" by Raza et al. (2017) emphasizes how people's opinions about utilizing a specific technology are influenced by perceived ease of use. People will be more willing to learn, adjust, and eventually develop the intention to utilize a system that is easy to use, which will lead to an improvement in job performance through frequent usage of the technology. Thus, the following theory is put forth:

H5: There is a positive relationship between perceived ease of use and project performance

H6: There is a positive relationship between perceived usefulness and project performance.

H7: There is a positive relationship between employee adaptability and project performance

H8: Adaptive strategies mediate the relationship between perceived ease of use and project performance

H9: Adaptive strategies mediate the relationship between perceived usefulness and project performance

Therefore, based on the above direct hypothesis, the author further proposes that agile management elements have a hypothesized relationship that mediates employees' perceived ease of use, perceived usefulness, employee adaptability, and project performance, namely:

H10: Agile management core element strategy mediates the relationship between employee perceived ease of use and project performance

H10a: Iterative incremental development strategy mediates the relationship between employee-perceived ease of use and project performance

H10b: Visualization and information flow strategies mediate the relationship between employee perceived ease of use and project performance

H10c: Continuous improvement strategy mediates the relationship between employee perceived ease of use and project performance

H10d: Customer orientation strategy mediates the relationship between employee perceived ease of use and project performance

H10e: Teamwork strategy mediates the relationship between employee perceived ease of use and project performance

H11: Agile management core element strategy mediates the relationship between employee perceived usefulness and project performance

H11a: Iterative incremental development strategy mediates the relationship between employee perceived usefulness and project performance

H11b: Visualization and information flow strategies mediate the relationship between employee perceived usefulness and project performance

H11c: Continuous improvement strategies mediate the relationship between employee-perceived usefulness and project performance

H11d: Customer orientation strategy mediates the relationship between employee perceived usefulness and project performance

H11e: Teamwork strategy mediates the relationship between employee perceived usefulness and project performance

H12: Agile management core elements strategy mediates the relationship between employee adaptability and project performance

H12a: Iterative incremental development strategy mediates the relationship between employee adaptability and project performance

H12b: Visualization and information flow strategies mediate the relationship between employee adaptability and project performance

H12c: Continuous improvement strategy mediates the relationship between employee adaptability and project performance

H12d: Customer orientation strategy mediates the relationship between employee adaptability and project performance

H12e: Teamwork strategy mediates the relationship between employee adaptability and project performance

Since there is almost no literature review on the relationship between employee perception and adaptability factors in agile management, the author will conduct a series of empirical studies in the future to explore and illustrate the mediating relationship between them and complete the relationship between employee perception and adaptability and project performance research model.

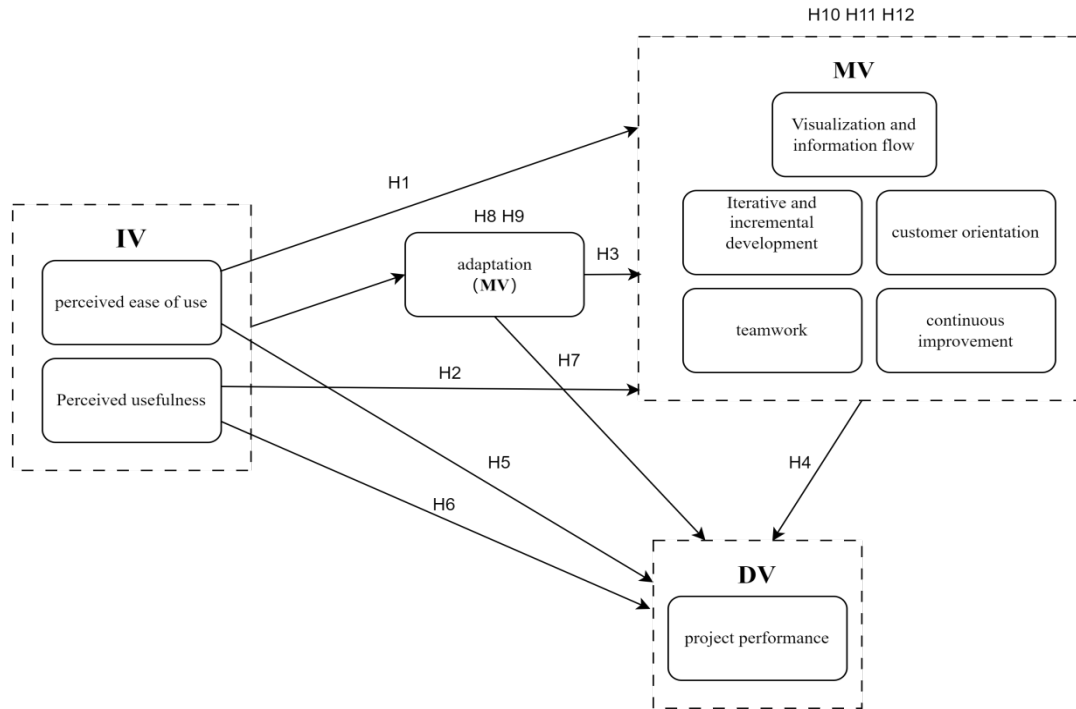


Fig.1: The conceptual framework of variables.

### 3. Research Methodology

#### 3.1.1. Questionnaire design

Literature sources are shown in Table 1. According to the background of this study, based on the design of relevant literature, the author communicated with relevant engineering project managers and relevant experts. We made several adjustments to the questionnaire to make it more targeted. The scale has been discussed and revised several times and has good internal consistency. Therefore, we think it is suitable to conduct research from three aspects: employee perceived ease of use (YY), perceived usefulness (YO), and employee adaptability (SY), as well as agile management elements (MJ) and project performance (JX), and in Reference Relevant questionnaire questions are attached after the literature.

The questionnaire consisted of three essential parts. The first part examines background data on practitioners, including gender, age, highest level of education, position, tenure, and company size. The second part is the agile management intermediary component, which is mainly divided into iterative development, customer-oriented, continuous improvement, team collaboration, and visual information flow, which are the five main components of agile management. The third part mainly investigates employees' adaptability, perceived ease of use, perceived usefulness, and final project performance for the application of new management models and new technologies. The questionnaire explores the applicability and prospects of agile management practices in construction engineering projects through employees' understanding and feelings of new elegant management models and investigates the relationship between employee perceptions, adaptability, and project performance as well as the mediating role of agile management—exploration of elements.

Table 1. Questionnaire design

Variable	Question number	Literature source
Perceived ease	YY1-YY5	Venkatesh&Davis (2000); Venkatesh & Davis (1996);

of use(YY)		Karahanna&Straub(1999)
Perceived usefulness(YO)	YO1-YO6	Davis(1989);Karahanna&Straub(1999)
Adaptation (SY)	SY1-SY6	Sibunruang et al. (2015)
Agile Management (MJ)	DD1-DD5	Chia et al((2022); Muhammad ( 2021 ); Jain & Suman ( 2016 ); Al Maamzi & Tawfik ( 2022 )
	DX1-DX5	
	KS1-KS3	
	CX 1- CX 4	
Project performance(JX)	XZ1 - XZ4	Matear et al.(1998); Walton ( 1985 ); Gonzalez-Mule et al.(2014); Tjosvold et al.(2006)
	JX1-JX6	

### 3.1.2. Sample and data collection

The questionnaire consisted of three essential parts. The first part investigates the background data of employees, including gender, age, highest level of education, position, tenure, and company size. The questionnaire survey targets engineering project employees who live and work across China. This study uses a questionnaire survey method to collect feedback from the engineering project industry. These people come from different regions in China, with different socioeconomic backgrounds and cultures. Therefore, although the interviewees were from the same country, they had different backgrounds. The data mainly comes from participants such as WeChat groups and QQ groups of professional construction management practitioners on the Internet, as well as the Xiaohongshu Questionnaire online community of related construction practitioners, and sample collection using a purposeful random sampling method, because this study is mainly to analyze the influence of employees' own learning and adaptive psychology on performance and the psychological process of the new environment based on agility management, which is universal, the purposeful random sampling already meets the purpose of sampling, and sampling of specific populations and companies is not required here.

In order to obtain more authentic and accurate data and relevant research results, in order to fully understand the correlation between employees' adaptability and perception ability in the face of new management models and project performance, as well as the necessity and advantages of the mediating role of agile management and the core element mediators To explore the role model, the author tried to collect 1,300 participants from all over China to fill in the questionnaire; after estimating the missing values, eliminating outliers and other samples, 1,075 samples were obtained, with an accuracy of 82.7%. This sample size fully meets the PLS-SEM sample statistical requirements.

The results of the demographic analysis of the questionnaire survey sample are shown in Table 2 The data shows that 99.8% of the sample survey respondents are employed in China's construction industry, achieving the purpose of studying China's average distribution.

Table 2. Basic information of investigators

	Demographic Variables	Frequency	Percentage (%)
Gender	male	566	52.7
	female	509	47.3
Age	18-25 years old	143	13.3
	26-35 years old	313	29.1

Educational qualifications	36-45 years old	374	34.8
	45 years and over	69	22.8
	High school and below	187	17.4
	College	443	41.2
	Undergraduate	376	35.0
Position	Master degree and above	69	6.4
	General staff	822	76.5
	Lower level managers	149	13.9
	middle managers	61	5.7
Company Size	top management managers	43	4.0
	Less than 50 people	333	31.0
	50-200 people	388	36.1
	200-500 people	319	29.7
Time in office	Over 500 people	35	3.3
	Within 1 year	113	10.5
	1-3 years	206	19.2
	Over 3 years	756	70.3

Table 3 shows the proportion of respondents who understand leadership, agile management, and on-time delivery. Likert scale responses ranged from 1 (strongly disagree) to 5 (strongly agree). The means, standard deviations, and descriptive analyses for each question and item are shown in Table 3 .

Table 3. Single sample statistics

C	stro	disagre	generall	agree	ery	M	Std.Devi
ode	ngly	e(%)	y(%)	(%)	much	ean	ation
	disagree(				agree(		
	%)				%)		
D	8.7	10.5	11.9	41.3	2	3.	1.226
X1					7.5	68	
D	8.5	9.6	13.0	39.0	3	3.	1.225
X2					0.0	72	
D	8.5	9.2	14.7	42.0	2	3.	1.195
X3					5.7	67	
D	8.5	10.5	11.2	42.8	2	3.	1.214
X4					7.1	69	
D	8.6	10.3	11.9	41.4	2	3.	1.220
X5					7.8	70	
D	7.5	8.4	14.7	38.5	3	3.	1.190
D1					0.9	77	
D	6.3	9.4	12.2	45.8	2	3.	1.129
D2					6.3	76	
D	6.8	8.2	13.5	44.3	2	3.	1.138
D3					7.3	77	
D	7.6	8.3	11.3	45.7	2	3.	1.161
D4					7.1	76	
D	6.0	9.5	11.5	43.3	2	3.	1.140
D5					9.6	81	
C	8.5	6.9	14.9	29.9	3	3.	1.252
X1					9.9	86	
C	7.4	7.8	19.4	29.3	3	3.	1.222

X2					6.0	79	
C					2	3.	
X3	7.5	8.0	14.6	42.1	7.7	75	1.165
C					2	3.	
X4	6.9	9.7	14.0	42.2	7.3	73	1.161
K					2	3.	
S1	8.0	11.6	14.3	39.8	6.2	65	1.211
K					2	3.	
S2	6.9	10.7	14.5	42.2	5.7	69	1.164
K					2	3.	
S3	8.7	11.5	11.3	40.0	8.5	68	1.243
X					2	3.	
Z1	4.8	9.5	15.6	43.4	6.6	77	1.09
X					2	3.	
Z2	6.7	9.5	12.1	44.7	7.1	76	1.148
X					2	3.	
Z3	6.3	9.3	13.8	41.8	8.8	77	1.148
X					2	3.	
Z4	5.3	9.4	16.0	43.2	6.1	75	1.102
Y					2	3.	
Y1	8.5	8.7	15.6	39.6	7.5	69	1.204
Y					2	3.	
Y2	7.2	11.3	11.7	40.0	9.8	74	1.203
Y					3	3.	
Y3	9.3	8.7	14.2	30.5	7.2	78	1.286
Y					2	3.	
Y4	7.4	9.1	16.5	39.6	7.3	7	1.177
Y					2	3.	
Y5	8.5	10.2	11.9	43.4	6.0	68	1.204
Y					3	3.	
O1	10.3	8.4	11.7	32.0	7.6	78	1.308
Y					3	3.	
O2	10.4	8.1	13.3	32.7	5.4	75	1.299
Y					3	3.	
O3	11.3	7.1	16.0	26.2	9.3	75	1.341
Y					3	3.	
O4	9.8	8.0	18.0	26.7	7.5	74	1.3
Y					2	3.	
O5	8.6	9.5	16.7	37.7	7.6	66	1.217
Y					2	3.	
O6	8.3	10.6	10.4	43.2	7.5	71	1.211
S					3	3.	
Y1	9.4	8.3	12.5	33.3	6.6	79	1.275
S					2	3.	
Y2	7.4	11.0	11.2	41.9	8.6	73	1.198
S					2	3.	
Y3	6.4	9.3	17.5	42.8	4.0	69	1.126
S					2	3.	
Y4	7.0	10.8	11.5	41.6	9.1	75	1.185
S					2	3.	
Y5	7.4	10.0	15.3	41.9	5.5	68	1.172

Table 3. Single sample statistics

C ode	stro ngly	disagre e(%)	generall y(%)	agree (%)	V ery	M ean	Std.Devi ation
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	disagree( %)				much agree( %)		
S							
Y6	9.0	7.9	16.3	28.5	3	3.	1.278
J							
X1	6.0	10.0	12.4	38.3	3	3.	1.169
J							
X2	8.0	7.6	12.5	30.9	4	3.	1.245
J							
X3	5.7	9.6	16.1	42.6	2	3.	1.117
J							
X4	5.0	9.8	13.5	44.9	2	3.	1.096
J							
X5	5.8	10.2	12.2	43.7	2	3.	1.133
J							
X6	7.9	7.3	12.5	31.9	4	3.	1.234

### 3.1.3 Reliability analysis

Table 4. Questionnaire reliability analysis

Variable	Question number	Alpha coefficient (a)
Perceived ease of use(Y Y)	YY1-YY5	0.898
Perceived usefulness(YO)	YO1-YO6	0.918
Adaptation (SY)	SY1-SY6	0.912
	DD1-DD5	0.900
	DX1-DX5	0.906
Agile Management (MJ)	KS1-KS3	0.857
	CX1- CX4	0.865
	XZ1 - XZ4	0.865
Project performance(JX)	JX1-JX6	0.914
Total variable	YY1-YY5,YO1-YO6 SY1-SY6, DD1-DD5 , DX1-DX5 KS1-KS3 ,CX1- CX4 XZ1-XZ4 ,JX1-JX6	0.974

Table 4 also analyzes the reliability of survey data at all levels. Each scale level has a Cronbach's alpha coefficient, ranging from 0.857 to 0.917 (Cronbach's alpha > 0.7). The reliability of the overall scale was 0.974 (Cronbach's alpha coefficient >0.7). The reliability of the questionnaire is excellent.

### 3.1.4. Validity analysis and variable dimension analysis

Based on Kaiser-Meyer-Olkin values (KMO) and Bartlett's test of sphericity, it was used to analyze the data. The sample data is appropriate for exploratory factor analysis (EFA) since the P value is 0.000 (P<0.001), passing the Bartle sphericity test, and the KMO value is 0.981, higher than 0.70.

Table 5. KMO and Bartlett test

KMO		0.981
Bartlett's Test of Sphericity	Approx. Chi-Square	33686.828

df 946  
Significance 0.000

The data use the principal component analysis method. As can be seen from Table 5, the research results show that the nine common factors account for 71.9% of the entire questionnaire, exceeding the required 60%, meeting the criteria of exploratory factor analysis, and then obtaining the factor dimensions through the rotation matrix.

Table 6. Total Variance Explained

Component	Initial Eigenvalues			Extraction Squared Loadings			Sums of Rotation Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	20.644	46.919	46.919	20.637	46.539	46.539	4.637	10.539	10.539
2	2.066	4.615	51.615	2.0238	4.631	20.170	4.238	9.631	20.170
3	1.678	3.828	55.428	1.6175	3.888	29.658	4.175	9.488	29.658
4	1.459	3.3744	58.744	1.4784	3.300	38.258	3.784	8.600	38.258
5	1.380	3.1880	61.880	1.3723	3.162	46.720	3.723	8.462	46.720
6	1.320	3.0880	64.880	1.3535	3.033	54.753	3.535	8.033	54.753
7	1.129	2.5446	67.446	1.1821	2.512	61.165	2.821	6.412	61.165
8	1.032	2.3793	69.793	1.0654	2.331	67.196	2.654	6.031	67.196
9	.914	2.0770	71.870	.91057	2.074	71.870	2.057	4.674	71.870
10	.499	1.133	73.003						
11	.496	1.128	74.131						
12	.478	1.086	75.217						
13	.459	1.042	76.259						
14	.436	.990	77.249						
15	.428	.974	78.223						
16	.426	.967	79.190						
17	.417	.947	80.137						

18	.41	.93	81.069					
0	2							
19	.40	.90	81.978					
0	9							
20	.39	.89	82.876					
5	8							
21	.39	.88	83.762					
0	6							
22	.38	.86	84.626					
0	4							
23	.37	.85	85.478					
5	1							
24	.36	.82	86.298					
1	0							
25	.36	.81	87.116					
0	8							
26	.35	.80	87.917					
3	1							
27	.34	.79	88.709					
8	2							
28	.34	.78	89.490					
4	1							
29	.33	.76	90.256					
7	5							
30	.33	.76	91.018					
5	2							
31	.32	.74	91.763					
8	6							
32	.32	.73	92.494					
2	1							
33	.31	.71	93.213					
6	8							
34	.31	.70	93.917					
0	4							
35	.30	.69	94.614					
7	7							
36	.30	.69	95.305					
4	1							
37	.28	.65	95.960					
8	5							
38	.28	.63	96.596					
0	6							
39	.27	.61	97.211					
1	5							
40	.25	.58	97.797					
8	6							
41	.25	.58	98.380					
6	3							

42	.25	.56	98.947						
0	7								
43	.23	.53	99.485						
7	8								
44	.22	.51	100.000						
7	5								

Extraction Method: Principal Component Analysis.

Table 7. Rotated component matrix

Code	Component								
	1	2	3	4	5	6	7	8	9
JX5	.768								
JX3	.749								
JX4	.735								
JX2	.727								
JX1	.721								
JX6	.714								
SY5		.705							
SY4		.703							
SY6		.697							
SY3		.680							
SY2		.673							
SY1		.626							
YO6			.736						
YO5			.699						
YO3			.686						
YO1			.648						
YO2			.647						
YO4			.638						
DX1				.735					
DX5				.717					
DX4				.712					
DX3				.704					
DX2				.699					
YY1					.751				
YY5					.717				
YY4					.709				
YY2					.703				
YY3					.672				
DD1						.704			
DD2						.701			
DD3						.691			
DD5						.682			
DD4						.643			
XZ4							.723		
XZ1							.687		

XZ3						.683		
XZ2						.646		
CX4							.704	
CX3							.651	
CX2							.634	
CX1							.634	
KS3								.708
KS2								.678
KS1								.669

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.  
 a. Rotation converged in 7 iterations.

According to the rotated component matrix (see Table 7), the factor attribution of various questions can be judged. YY1, YY2, YY3, YY4, and YY5 belong to factor 1, and their factor loadings are more significant than 0.6. According to the title content, they are used as perceived ease of use; YO1, YO2, YO3, YO4, YO5, and YO6 belong to factor 2, and their factor loadings are more significant than 0.6, according to the title content. As perceived usefulness, SY1, SY2, SY3, SY4, SY5, and SY6 belong to factor 3, and their factor loadings are greater than 0.6, according to the title content. As adaptability, DD1, DD2, DD3, DD4, and DD5 belong to factor 4, and the factor loading is greater than 0.6. According to the title content, it is called iterative development; the five topics DX1, DX2, DX3, DX4, and DX5 belong to factor 5, and the factor loading is greater than 0.6, based on the title content as customer orientation; CX1, CX2, CX3, and CX4 belong to factor 6, and the factor loading is more significant than 0.6. Continuous improvement is named according to the title content; KS1, KS2, and KS3 belong to factor 7, and the factor loading is more significant than 0.6. , according to the title content, it is called visualization and information flow; the four themes XZ1, XZ 2, XZ3, and XZ4 belong to factor 6, with factor loadings greater than 0.6, and are named teamwork according to the title content; JX1, JX2, JX3, JX4, JX5, JX6, six titles belong to factor 7, and their factor loadings are greater than 0.7, the content named according to this project is project performance. According to the results of the principal component analysis method, it is completely matched with the items designed in this questionnaire.

### 3.2. Data

#### 3.2.1. Use statistical analysis

Smart-PLS 4 performs statistical analysis and research on the model. It was deemed appropriate due to some of the following reasons: (1) Predictive models and variance levels; (2) Research prototypes are complex; (3) Understanding the interactions between various constructs serves as a new element in the study.

Table 8. Evaluation of measurement model  
(N = 1075 ).

Code	CR	Factor Loading	AVE	VIF
DX	0.906		0.714	
DX1		0.855		2.461
DX2		0.852		2.378
DX3		0.841		2.278
DX4		0.856		2.432
DX5		0.86		2.492
DD	0.901		0.727	
DD1		0.835		2.224
DD2		0.846		2.342
DD3		0.835		2.216

DD4		0.855		2.377
DD5		0.855		2.395
CX	0.866		0.712	
CX1		0.85		2.073
CX2		0.836		1.969
CX3		0.851		2.089
CX4		0.839		2.055
KS	0.858		0.778	
KS1		0.887		2.183
KS2		0.877		2.074
KS3		0.882		2.187
XZ	0.865		0.712	
XZ1		0.837		1.992
XZ2		0.85		2.061
XZ3		0.842		2.038
XZ4		0.845		2.072
YY	0.899		0.711	
YY1		0.834		2.233
YY2		0.859		2.461
YY3		0.835		2.159
YY4		0.825		2.122
YY5		0.861		2.487
YO	0.918		0.709	
YO1		0.848		2.468
YO2		0.852		2.525
YO3		0.841		2.43
YO4		0.833		2.337
YO5		0.828		2.354
YO6		0.849		2.574
SY	0.913		0.694	
SY1		0.842		2.384
SY2		0.854		2.546
SY3		0.818		2.187
SY4		0.843		2.438

### 3.2.2. Data measure and Evaluation of structural models

In the measurement model, all factor loadings are more significant than 0.7. Since the significance is less than 0.05 (see Figure 2), this demonstrates convergent validity at the item level shown in Table 9 Composite reliability considers that Cronbach's alpha value is more significant than 0.70 (see Table 4), so the reliability is good. At the construct level, the AVE value of the items exceeds 0.50, indicating good discriminant validity between constructs. As can be seen from Table 9, all VIF values are lower than 3.5, meaning that collinearity does not affect the results of the structural model (Diamantopoulos & Siguaw, 2006; Mittal et al., 2023).

This study presents the coefficient of determination ( $R^2$ ) of structural model measurements and path coefficients using a bootstrapping method using SmartPLS 4 with 5,000 responses as t-values and standard errors for the original sample ( $n = 1075$ ) (Hair et al. al., 2013). The path coefficients and dimensions are shown in the structural model (see Figure 2), which shows the path relationships between the variables. The endogenous variables in Figure 2 show a coefficient of determination ( $R^2$ ) higher than the 20% level and are therefore acceptable in this study.

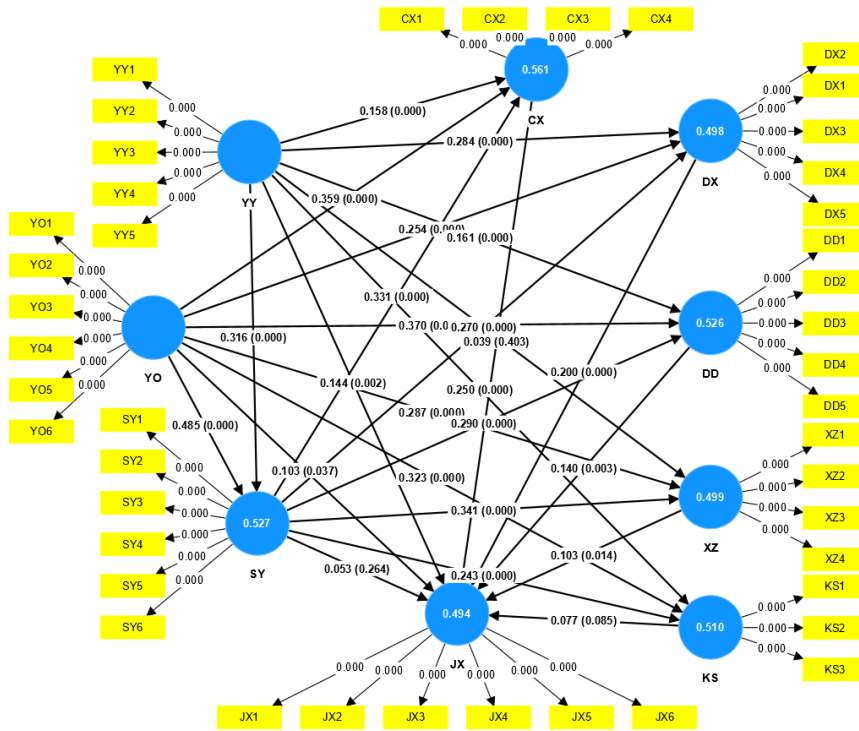


Fig.2: Measurement Model Statistics (Path coefficient , P-Value & R<sup>2</sup>)

Beta value and P-value results are shown in Figure 3; perceived ease of use and perceived usefulness have a direct relationship with project performance, indicating that adaptability has no direct relationship with project performance, and perceived ease of use has an immediate positive response to project performance. Impact ( $\beta = 0.144$ , t-value = 3.08, p-value = 0.002); Perceived usefulness has a direct positive impact on project performance response ( $\beta = 0.103$ , t-value = 2.089, p-value = 0.037); Adaptability There is no direct positive impact on response to project performance ( $\beta = 0.053$ , t-value = 1.116, p-value = 0.264). By studying the relationship between the two factors of perception and the total factors of adaptability and agile management (MJ), it is shown that perceived ease of use has a direct positive relationship with agile management ( $\beta = 0.247$ , t-value = 8.987, p-value = 0.000), Perceived usefulness has a direct positive relationship with agile management ( $\beta = 0.381$ , t-value = 14.033, p-value = 0.000), and adaptability has a direct positive relationship with agile management ( $\beta = 0.355$ , t-value = 11.925, p-value = 0.000). Moreover, through research, it was found that some of the five major elements of agile management have a direct positive effect on project performance. Among them, iterative incremental development ( $\beta = 0.140$ , t-value = 2.971), customer orientation ( $\beta = 0.200$ , t-value = 6.321), and team collaboration ( $\beta = 0.103$ , t-value = 2.460) have a direct positive impact on project performance. However, visualization and information flow ( $\beta = 0.077$ , t-value = 1.720) and continuous improvement ( $\beta = 0.039$ , t-value = 0.836) are not adequate for project performance. It was found that adaptability does not directly affect project performance. Still, adaptability indirectly affects project performance through agile management management intermediary elements ( $\beta = 0.168$ , t-value = 5.267, p-value = 0.000), and adaptability is also partially mediated by strategy. The relationship between perceived ease of use and project performance ( $\beta = 0.053$ , t-value = 5.267, p-value = 0.000) and also partially mediates the relationship between perceived usefulness and project performance ( $\beta = 0.081$ , t-value = 5.646, p-value = 0.000), therefore, when the P-value is less than 0.05. The t-value is more significant than 1.96, The results of the representation hypothesis are significantly influential, and therefore, among the hypothesis conditions in this study, parts hold and parts do not. The subhypothesis also partially supported (see Table 9).

Table 9. Hypothesis results.

Hypothesis	Relationship	$\beta$	t-value	p-value	Result
H1	YY->MJ	0.24	8.987	0.00	Supported
H2	YO->MJ	0.38	14.03	0.00	Supported
H3	SY->MJ	0.35	11.92	0.00	Supported
H4	MJ->JX	0.47	8.079	0.00	Partially supported
H4a	DD->JX	0.14	2.971	0.00	Supported
H4b	KS->JX	0.07	1.720	0.08	Not Supported
H4c	CX->JX	0.03	0.836	0.40	Not Supported
H4d	DX->JX	0.20	4.428	0.00	Supported
H4e	XZ->JX	0.10	2.460	0.01	Supported
H5	YY->JX	0.14	3.080	0.00	Supported
H6	YO->JX	0.10	2.089	0.03	Supported
H7	SY->JX	0.05	1.116	0.26	Not Supported
H8	YY->SY->MJ->JX	0.05	5.267	0.00	Partially supported
H9	YO->SY->MJ->JX	0.08	5.646	0.00	Partially supported
H10	YY->MJ->JX	0.11	5.983	0.00	Partially supported
H10a	YY->DD->JX	0.02	2.433	0.01	Supported
H10b	YY->KS->JX	0.01	1.673	0.09	Not Supported
H10c	YY->CX->JX	0.00	0.786	0.43	Not Supported
H10d	YY->DX->JX	0.05	3.732	0.00	Supported
H10e	YY->XZ->JX	0.01	2.072	0.03	Supported
H11	YO->MJ->JX	0.18	7.514	0.00	Partially supported
H11a	YO->DD->JX	0.05	2.737	0.00	Supported
H11b	YO->KS->JX	0.02	1.667	0.09	Not Supported

H11c	YO->CX->JX	0.01	0.824	0.41	Not Supported
H11d	YO->DX->JX	0.05	3.617	0.00	Supported
H11e	YO->XZ->JX	0.02	2.258	0.02	Supported
H12	SY->MJ->JX	0.16	6.264	0.00	Partially supported
H12a	SY->DD->JX	0.05	2.667	0.00	Supported
H12b	SY->KS->JX	0.01	1.618	0.10	Not Supported
H12c	SY->CX->JX	0.01	0.830	0.40	Not Supported
H12d	SY->DX->JX	0.05	3.627	0.00	Supported
H12e	SY->XZ->JX	0.03	2.339	0.01	Supported

According to Table 9 and Figure 2, the average P values of H4b, H4c, H7, H10b, H10c, H11b, H11c, H12b, and H12c are more significant than 0.05, proving that these paths are not statistically significant or statistically significant, so they were deleted. Reduce the path. According to the research purpose of this article, we explore the impact of employees' perceived ease of use and perceived usefulness on project performance under the chain mediation effect of adaptability and agile management. Therefore, we delete irrelevant variables and finally obtain the adjusted conceptual model. , for subsequent analysis.

### 3.3. Evaluation of the adjusted model

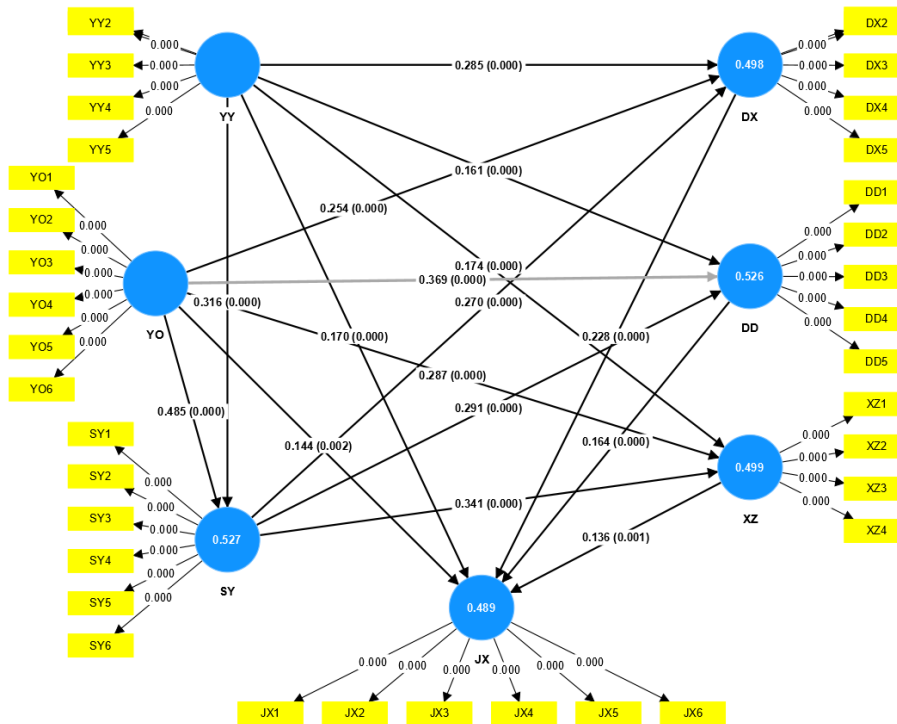


Fig. 3: Measurement of Adjusted Model Statistics ( Path coefficient , P-Value & R<sup>2</sup> )

Figure 3 shows the partial least squares algorithm model, It shows the specific values of the path coefficients, P-values and R<sup>2</sup> of this model, and here deleted the invalid paths in the model mentioned in Table 9, and the irrelevant variables with unqualified significance.

Table 10. The Fornell-Larcker test

	DD	DX	JX	SY	XZ	YO	YY
D	<b>0.84</b>						
D	<b>5</b>						
D	0.61	<b>0.85</b>					
X	2	<b>3</b>					
JX	0.58	0.596	<b>0.83</b>				
JX	5		<b>7</b>				
SY	0.64	0.62	0.566	<b>0.83</b>			
SY	3			<b>3</b>			
XZ	0.64	0.549	0.554	0.645	<b>0.84</b>		
XZ	4				<b>4</b>		
Y	0.66	0.617	0.587	0.683	0.629	<b>0.84</b>	
O	9					<b>2</b>	
Y	0.57	0.611	0.571	0.62	0.566	0.627	<b>0.84</b>
Y	3						<b>3</b>

This study assessed the discriminant validity using the FornellLarcker criteria (Table 10) and the heterotrait-monotrait ratio (HTMT) (Table 11) (Hair et al., 2017) . Table 11 clearly indicates that all the values in bold on the diagonal or the square root of AVEs values are higher than the inter-construct correlations' values, thus satisfying the Fornell-Larcker criteria (Fornell & Larcker, 1981; Hair et al., 2017).

Table 11. HTMT result

	DD	DX	JX	SY	XZ	YO	YY
DD	-						
DX	0.677	-					
JX	0.644	0.653	-				
SY	0.708	0.681	0.618	-			
XZ	0.729	0.619	0.622	0.725	-		
YO	0.735	0.676	0.639	0.745	0.705	-	
YY	0.636	0.677	0.628	0.684	0.641	0.689	-

The results of the HTMT (Heterotrait-Monotrait) test provide insights into the discriminant validity between latent variables in the structural model. In this study, the correlation coefficients between variables, as shown in the table above, are all less than 0.900. According to the accepted criteria, this indicates that the structural model demonstrates good discriminant validity(Table 11).

Table 12. Model fit

	Saturated model	Estimated model	Suggest the standard
SRMR	0.032	0.04	<0.08
d_ ULS	0.72	1.112	Does not fall within the 95% confidence interval
d_G	0.273	0.292	Does not fall within the 95% confidence interval
Chi-	1694.43	1768.235	-

square			
NFI	0.941	0.938	>0.90

In addition to the previously mentioned fit indices, there are other model fit indices used to evaluate the goodness of fit for the structural model in a study. These include SRMR, d\_ ULS, d\_ G and NFI. When these additional fit indices, such as SRMR, d\_ ULS, d\_ G, and NFI, meet the recommended criteria (e.g., SRMR < 0.08, d\_ ULS < 0.10, d\_ G < 0.10, NFI > 0.90), it indicates that the structural model in the study fits the observed data well. This shows that the relationship between variables in the model is supported by data and the results are reliable (Table 12) .

Table 13 summarizes the r-squared results. The r-squared number shows the extent to which the input variables explain the maximum variation in the output variable. In this study, factors such as perceived ease of use and perceived usefulness explained 52.7% of employee adaptability, and the R square was 0.527. The five critical aspects of perceived ease of use, perceived usefulness, and adaptability, and agile management explained 49.4% % of project performance; the r-squared value is 0.494. The r-squared values of the five elements of agile management are DD(0.526 ), KS( 0.51 ), GJ( 0.561 ), DX( 0.498 ), and XZ(0.499 ), indicating perceived ease of use, perceived usefulness, and adaptability. It explains 52.6 % of the five elements of agile management iterative development, 51 % of visual information flow, 56.1 % of continuous improvement, 49.8 % of customer orientation, and 49.9 % of changes in team collaboration. Since the r-squared values in Table 9 are all greater than 20%, they all meet the essential criteria. The adjusted R-squared value is almost the same as the unadjusted R-squared value. Therefore, according to the general rule of thumb, the r<sup>2</sup> values are 0.25, 0.50, and 0.75, respectively, which are weak, medium, and firm (Hair et al., 2011 ), the five elements of perceived ease of use, perceived usefulness, adaptability, and agile management have a good explanation for project performance and can explain 49.4 % of the changes in project performance, and perceived ease of use and perceived usefulness have a significant impact on adaptability changes. There is a robust explanation, and the two factors of adaptive joint perception also have a good explanation of changes in each element of agile management.

Table 13. Summary of R-Squared Results

	R-square	R-square adjusted	Q-square
DD	0.526	0.525	0.372
DX	0.498	0.497	0.359
JX	0.489	0.487	0.339
SY	0.527	0.526	0.363
XZ	0.499	0.498	0.352

Furthermore, it was evaluated the model’s predictive relevance using Stone-Geisser’s Q-square value (Stone, 1974) for all the endogenous constructs (Table 9) (Hair et al., 2017). The table shows the following values: DD (0.372); DX (0.359); JX(0.339); SY(0.363); XZ(0.352). They are all larger than zero and therefore suggest that all the exogenous constructs have acceptable predictive relevance for the dedicated endogenous constructs selected for the proposed research model (Hair et al., 2017).

Table 14. F-square.

	MJ	JX	SY
MJ	-	0.149	-
SY	0.181	-	-
YO	0.187	0.016	0.302
YY	0.102	0.03	0.128

In addition, the effect size of each predictor was assessed using Cohen’ s f-square formula and compared to the proposed threshold values of 0.35 or large, 0.15 or medium, and 0.02 or small (Cohen, 2013). JX on MJ; 0.149, MJ on SY; 0.181, MJ on YO; 0.187, JX on YO; 0.016, MJ on SY;0.302.YY on YO; 0.102, JX on YY; 0.03 on SY; SY; 0.128. YO and YY have f<sup>2</sup> for JX, indicating that YY and

YO explain less performance, but according to the total effect of YO and YY on performance in Table 14, YY and YO affect JX through other indirect.

It can be seen from the total effect in Table 15 and Figure 3 that the impact of agile management iterative development (0.164), customer orientation (0.228 and team collaboration (0.136) on project performance are all around 0.2, and the p values are all less than 0.05. As a general rule of thumb,  $r^2$  values are 0.25, 0.50, and 0.75, respectively, which are weak, medium, and strong (Hair et al., 2011). It means that the overall impact of the three elements of agile management on project performance is a significant, medium-positive impact. The total effects of employee adaptability, employee perceived usefulness and perceived ease of use on project performance are 0.156, 0.377, and 0.334, respectively. As shown in Table 15, the total effect of adaptability (0.156) on project performance ( $P < 0.05$ ) indicates that employee adaptability has a significant and medium impact on project performance. Employee adaptability affects project performance indirectly by affecting the three elements of agile management. Employee perceived ease of use (0.334) and perceived usefulness (0.377) have an essential impact on the project. The effects of performance and the P-value are both less than 0.05. Hence, employees' perceived usefulness and perceived ease of use have a significant, medium, and robust direct positive impact on project performance.

Table 15. Summary of total effects

	DD	DX	JX	SY	XZ
DD			0.164		
DX			0.228		
XZ			0.136		
SY	0.291	0.27	0.156	-	0.341
YO	0.51	0.385	0.377	0.485	0.452
YY	0.253	0.37	0.334	0.316	0.282

When calculating the significance of the mediation effect, the non-parametric bootstrapping method was used (Hair et al., 2012; Hair et al., 2013). The VAF results of the three elements of agile management, adaptability on perceived usefulness, perceived ease of use, and project performance, are close to 20% and 15%, respectively ( $P < 0.05$ ). The correlation path coefficients are all positive (see Figure 3). Therefore, there is an indirect mediating effect between agile, the three elements, and adaptability on perceived ease of use, perceived usefulness, and project performance; see Table 16. Therefore, the three core elements of agile management and adaptability significantly and positively mediate the relationship between perceived ease of use and perceived usefulness and project performance.

Table 16. Partial mediation test

Mediating effects	Indirect effects	Total effects	VAF	Test results	P
YY -> SY -> MJ(DX & DD & XZ) -> JX	0.05	0.334	15%	Partial mediation	0.000
YO -> SY -> MJ(DX & DD & XZ) -> JX	0.075	0.377	20%	Partial mediation	0.000

## 4. Discussion

Employees' perceived usefulness, perceived ease of use, and adaptability of a new technology or new management model play an important role in changes in project performance. This study explores

the impact of core dual elements of employee perceptions on project performance and the mediating role of agile management strategies in this impact.

Concerning the inconsistency of assumptions H4b, H4c, H7, H10b, H10c, H11b, H11c, H12b, H12c, the establishment of the final model and the establishment of related assumptions, as well as the analysis of partial mediation paths, and the study of related total effects It can be seen from H4b, H4c, and H7 that visualization and information flow, continuous improvement, and adaptability will not directly affect project performance. Therefore, in the same way, it can be concluded that the relevant visualization and information flow, continuous improvement, and adaptability in the appropriate models None of the paths are feasible, so the analysis shows that visualization and information flow, and constant improvement will not affect changes in project performance. After the author's analysis, visualization and information flow do not produce changes that affect performance. It may be that visualization and information flow are in a particular situation. In this sense, it may speed up the efficiency of production and construction but may not be directly related to project performance. In other words, visualization and information flow are limited in some engineering project areas due to the characteristics of the engineering work site and engineering tasks. , visualization, and information flow are only suitable for use in centralized office spaces of some project software companies. Since the engineering project site is vast, the links between various tasks tend to be inflexible, and the tasks are single and fixed. Implement visualization panels and information flow. The display does not have a good effect on the engineering project, and it will not improve the project performance to a certain extent. As for continuous improvement, it cannot improve performance. The author believes that constant improvement can indeed enhance the quality of goods, but it constantly corrects the quality of products. However, this endless continuous improvement needs to meet the timely delivery requirements of engineering projects. , because the ultimate goal of the output and improvement of project products is to obtain product sales and related profits so as to improve the performance of the project, the premise of continuous improvement must have certain limitations. For example, the product must meet the minimum requirements of the customer—complete project delivery of product standards, etc.

In the absence of the intermediary role of agile management strategies, adaptability does not directly affect project performance. The author believes that this phenomenon may be that when employees adapt to relevant technologies or a new management model, work burnout may occur. This kind of job burnout will not be beneficial to project performance, so adaptability can only indirectly affect project performance through related core strategies of agile management. For example, adaptability involves three central agile management: customer orientation, iterative development, and team collaboration. The core elements are generally adapted to a specific technology and management model of career or job burnout. Due to the limitations of iterative development and customer-oriented frameworks, they can only always follow customer demand orientation and requirements, as well as the characteristics of teamwork, maintaining a positive work attitude, and Efficient teamwork to complete target tasks, thereby improving project performance.

According to the data listed in Table 12, employees' perceived ease of use and perceived usability also have a positive impact on project performance under the chain mediation influence of perceived adaptability and the three core elements of agile management. , employees' psychological process and understanding and adaptation to a new technology and management model have an impact on changes in project performance. At the same time, adaptability can also be a good mediator between employees' perceptions and Project performance, improving project performance.

## 5. Conclusion

### 5.1. Theoretical implications and practical implications

This study examined the relationship between employee perceptions, adaptability, agile management elements, and project performance in the Chinese architecture industry. By establishing

the final analysis of the data, a theoretical model of employee psychology and cognition on project performance is derived. , analyze which factor variables have a more significant impact or have a noticeable effect on project performance. This introduces the theory and experience of agile management into the management field of different projects. Currently, agile management is mainly used in the software field, but there needs to be more research on large-scale projects such as engineering projects. Because the nature of projects in the software field is different from the characteristics of engineering projects, the introduction of agile management into the engineering field is cross-domain. This is a valuable research. The findings highlight the significant direct and indirect effects of perceived ease of use and perceived usefulness on project performance, and the indirect effect of adaptability through agile management elements.

Among them, the link between the two elements of perception and the core elements of adaptability and agile management has a mediating effect on project performance, which can more reasonably analyze the relationship between employees' psychological processes and project performance. Visualization, information flow, and continuous improvement cannot directly promote project performance. Improvement is worth pondering, among which adaptability can only affect project performance based on the framework of agile management. At the same time, it can be seen that perceived ease of use, perceived usefulness, and adaptability have direct or indirect effects on project performance, which also shows that the psychological cognition and adaptability of project employees, as well as the core elements of agile management, have a positive and direct or indirect effect on project performance.

In terms of practice, the introduction of agile management in engineering can directly realize the timely delivery of engineering projects, reduce project costs, and improve performance through the flexibility, sustainability, and mutual assistance of project agility. Among them, employees' perception, cognition, and adaptability also need to be organized through agile management training and practical teaching of relevant agile management methodologies to employees so as to improve project performance. The final theoretical model researched has well determined the process of employees' perception and recognition of adaptability, fully demonstrating the superiority of agile management strategies. At the same time, the creation of the model will serve as a better reference for scholars who want to study this direction in the future. The study contributes empirical evidence on the factors influencing project performance in an agile environment and suggests the importance of fostering positive employee perceptions and adaptability. Implications for theory include advancing our understanding of the complex interplay between employee characteristics, agile practices, and project outcomes. Practical implications suggest the need for targeted interventions to enhance employee perceptions and adaptability, as well as the effective implementation of agile management elements. . Overall, this study provides valuable insights into the enablers of project performance in an agile setting, but further research is needed to develop a more comprehensive understanding.

## **5.2. Limitations and suggestions for future study**

The limitation of this study is that due to the use of an online platform to collect questionnaires, the primary research method is questionnaire statistical analysis, and it does not combine questionnaire surveys and interviews to demonstrate the paper. This needs to be more rigorous and convincing. Furthermore, the research on strategic agility combined with changes in employee psychological states is limited in the literature, and the literature needs to better portray the hypotheses, a fact that limits comparisons with other research results. Other limitations include measuring all scales through a single form; All used Likert scales. To address these issues, scales were used, the validity and reliability of which have been demonstrated in the literature. Emphasize the meticulousness of keeping research results confidential. When designing the questionnaire, questions about the dependent variable are asked first, and then questions about the mediating variable and the independent variable; these proportions appear on different pages. Limitations of the study also include the cross-sectional design

and focus on a single industry. Future research should examine these relationships in other contexts, use longitudinal designs, and incorporate additional variables.

As for the future research direction, I hope that subsequent scholars can conduct qualitative research based on case analysis, grounded theory, and other methods through qualitative research on employees' understanding of the new technology and new model of agile management, the changes in employee psychology and project performance, and thereby research results and provide Designers of regulations establish work environments and rules that are more aligned with agile management. At the same time, we can study specific agile management methodologies to analyze the substantive changes in project management, the improvement of project performance, and the advantages of agile management in all aspects of the project. Through these methods, the application fields and scope of agile management can be better broadened so that employees can better complete their work tasks under the better management model.

#### **Appendix 1. Survey measurements**

On a 1 to 5 scale (1= strongly disagree, 5= strongly agree), please indicate whether you agree/disagree with the following statement.

##### **MV:Agile management elements**

##### **Visualization and information flow**

1. The project regularly creates and maintains a project visualization dashboard to display project progress and information.
2. Projects use information boards and visualization tools to display employee tasks, progress, work processes, and issues.
3. Projects use visual tools to share project information and improve project transparency.

##### **Iterative and incremental development:**

4. The team will conduct regular reviews and evaluations of short-term goals to check progress
5. During each iteration, the team will adjust and optimize requirements and product functions.
6. The project team will collect feedback regularly to continuously improve the delivery quality and efficiency of each iteration.
7. The project will break down the requirements into small parts and discuss them in detail with the team
8. The project emphasizes meeting customer needs through step-by-step, continuous delivery

##### **Continuous improvement:**

9. Projects encourage employees to bring innovative ideas to projects and improve them
10. Projects always encourage analysis of actual versus planned results
11. Project adjusts plan and team performance based on review results
12. Project collects feedback and adjusts based on feedback

##### **Customer orientation:**

13. Customer needs will be prioritized so the team knows how to start the project
14. The project required a comprehensive review of key aspects to ensure client expectations were met
15. Always involve the client from the start of the project
16. Project encourages input and feedback from team members and customers
17. Projects will be encouraged to define the project with clear customer needs or business vision through strategy meetings

##### **Teamwork:**

18. The project encourages teams to brainstorm, collaborate and innovate
19. The project focuses on how the team interacts internally and externally
20. The project will establish an autonomous collaborative community to share responsibilities
21. The project encourages daily stand-up meetings to share project progress and tomorrow's plans

#### **IV: Perceived ease of use, perceived usefulness, and adaptability**

##### **Perceived ease of use**

1. Agile management method is easy to use and easy for construction practitioners to get started

2. I find it easy and enjoyable to use agile management methods in construction projects
3. Agile management methods feel simple to operate
4. I feel that it does not take much time to learn how to use agile management methods in construction
5. I am confident that I can quickly learn and skillfully use agile management methods

#### **Perceived usefulness**

1. Agile management brings benefits to construction projects
2. Agile management method has practical application value in construction projects
3. Adopting agile management methods in the construction process will be more conducive to the success of the project
4. Agile management has application potential in various construction situations
5. Agile management can meet my management needs in construction projects
6. If the benefits of agile management are understood, it will be widely accepted by construction practitioners

#### **Job adaptability**

1. Under agile management, employees will think about what my future will be like
2. In Agile management, employees realize that the choices they make today shape their future
3. How do employees plan to achieve my goals under agile management
4. In agile management, employees care about their careers
5. Under agile management, employees prepare for the future
6. Under agile management, employees overcome obstacles in their work

#### **DV:Project performance factors**

1. The project achieved its objectives.
2. This project has achieved high performance.
3. The project is highly profitable.
4. Project productivity is high.
5. Project tasks are always met or exceeded.
6. Timely delivery of projects

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