

UPDATED QUESTIONNAIRE

The Role of Artificial Intelligence in Construction Project Management in the Kingdom of Saudi Arabia

Introduction

Dear Participant,

You are invited to participate in a research study examining the role of Artificial Intelligence (AI) in construction project management in the Kingdom of Saudi Arabia.

The purpose of this questionnaire is to examine the relationship between AI adoption, organizational readiness, and project performance in the Saudi construction sector. Your responses will be used for academic research purposes only and will be treated confidentially.

There are no right or wrong answers. Please select the response that best reflects your experience and opinion.

Thank you for your valuable participation.

Section A: Demographic and Professional Information

A1. Gender

- Male
- Female
- Prefer not to say

A2. Age

- Below 25 years
- 25–34 years
- 35–44 years
- 45–54 years
- 55 years and above

A3. Highest Educational Qualification

- Diploma
- Bachelor's Degree
- Master's Degree
- Doctoral Degree

- Other

A4. Professional Position

- Project Manager
- Project Director
- Construction Manager
- Engineering Manager
- Project Engineer
- Other

A5. Years of Professional Experience

- Less than 5 years
- 5–10 years
- 11–15 years
- 16–20 years
- More than 20 years

A6. Type of Organization

- Construction & Infrastructure Company
- Engineering & MEP Contracting Company
- IT/Technology Company
- Oil & Gas Company
- Government Development Authority
- Consulting Firm
- Other

A7. Primary Work Location

- Riyadh
- Jeddah
- Dammam/Eastern Province
- Other

بالنسبة لهذا البعد ، 5 فقرات غير كافية راجع الملاحظات في نهاية الاستبان
يجب ان يكون عدد الفقرات في هذا البعد ما بين 9 -12 فقرة على الاقل ، بحيث تعكس الفقرات

Section B: AI Adoption

ما تم ذكره في الاطار النظري في الجزء الخاص بالذكاء الصناعي

Please indicate your level of agreement with each statement.

B1. AI technologies are currently used in our construction project management activities. فقرة عامة جدا

B2. AI is used to support project planning and scheduling activities.

B3. AI is used to support project decision-making and problem-solving.

B4. AI is used to identify and manage potential project risks.

الصياغة المقترحة لفقرة 5
AI technologies are integrated into our existing project management processes.

B5. AI is integrated into our project management processes to support project performance. الفقرة 5 يوجد ربط مباشر مع الذكاء المتغير التابع

b2 , f1 هناك تداخل واضح بين الفقرة

الذكاء الصناعي يقيس الاستددام b2 في الفقرة

يفترض ان كفاءة التخطيط والجدولة دون ربطها بالذكاء الصناعي f1 بينما في

Section C: Technical Readiness

C1. Our organization has the technical infrastructure required to implement AI in construction project management.

C2. Our organization has adequate data systems to support the use of AI in project management.

C3. Our existing project management systems can be integrated with AI technologies.

C4. Our organization has sufficient technical expertise to implement and maintain AI technologies.

Our organization has sufficient specialized technical expertise to implement and maintain AI systems.
C5. Our organization has adequate cybersecurity and data protection capabilities to support AI adoption.

Section D: Organizational Support

D1. Top management actively supports the adoption of AI in construction project management.

D2. Our organization provides sufficient financial resources for AI adoption.

Our organization allocates sufficient financial resources for AI implementation.

D3. Our organization has clear policies and procedures supporting the use of AI.

D4. Management encourages employees to use AI technologies in project management activities.

D5. Management provides the necessary resources to implement AI-based solutions effectively.

Management provides the organizational support needed to implement AI initiatives.

Section E: Human Readiness

E1. Employees in our organization have sufficient knowledge to use AI technologies in project management.

E2. Employees receive adequate training to develop their AI-related skills.

Employees in our organization are adequately prepared to use AI technologies in project management.

E3. Project management staff are willing to adopt AI technologies in their work.

E4. Employees are able to adapt to changes resulting from AI adoption.

E5. Our organization has employees with the skills required to work effectively with AI technologies.

Section F: Project Efficiency

لا يجوز ان تبدأ فقرات المتغير التابع بـ الذكاء الصناعي لان الذكاء الصناعي يمثل المتغير المستقل وهذه تؤثر مباشر على صدق النموذج ، وقد تم التنويه لهذه الجزئية في اللقاء الاخير

F1. AI adoption improves the efficiency of project planning and scheduling.

صياغة بديلة مقترحة Project planning and scheduling activities are performed efficiently in our organization.

F2. AI adoption improves the utilization of project resources.

F3. AI adoption improves the efficiency of project management processes.

F4. AI adoption helps project teams complete tasks more efficiently.

F5. AI adoption improves the productivity of project management teams.

هذا قد يؤدي إلى تضخيم العلاقة بين المتغير المستقل والتابع، ويضعف الصدق التمييزي ويجعل اختبار أقل إقناعاً H1 الفرضية

Section G: Cost Reduction

- G1.** AI adoption helps reduce overall project costs.
 - G2.** AI adoption helps reduce unnecessary resource expenditures.
 - G3.** AI adoption helps control cost overruns during project execution.
 - G4.** AI adoption improves the accuracy of project cost estimation and monitoring.
 - G5.** AI adoption helps project teams identify potential cost increases at an early stage.
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Section H: Time Performance

- H1.** AI adoption improves the accuracy of project time and duration estimates.
 - H2.** AI adoption helps reduce delays in construction project activities.
 - H3.** AI adoption improves adherence to project schedules.
 - H4.** AI adoption helps identify potential schedule delays at an early stage.
 - H5.** AI adoption helps improve the timely completion of construction projects.
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Response Scale for Sections B–H

Please select one response for each statement:

این المقياس الذي سوف يعتمد عليه المستجيب
لم يوضح الباحث آلية القياس في كافة فقرات ابعاد الرسالة
وهذا خلل منهجي

Summary of Questionnaire Dimensions

Section	Dimension	Role in Model	Items
A	Demographic & Professional Information	Control/Descriptive	7
B	AI Adoption	Independent Variable	5
C	Technical Readiness	Moderating Variable	5
D	Organizational Support	Moderating Variable	5
E	Human Readiness	Moderating Variable	5
F	Project Efficiency	Dependent Variable	5
G	Cost Reduction	Dependent Variable	5
H	Time Performance	Dependent Variable	5
	Total		42

لمشكلة الجوهرية:

بما أن الإطار النظري يُعرّف تبني الذكاء الصناعي ضمن 3 ابعاد فإن 5 فقرات فقط
يعني أن:

البُعد الأول (الاستخدام في مجالات المعرفة): مغطى بفقرة أو فقرتين فقط
البُعد الثاني (التكامل عبر المراحل): مغطى بفقرة واحدة فيها مشكلة صياغة
البُعد الثالث (أنظمة دعم القرار): مغطى بفقرة واحدة فقط

:هذا لا يسمح بـ

- ✗ إجراء تحليل عاملي استكشافي لكل بُعد
- ✗ حساب ثبات مستقل لكل بُعد فرعي
- ✗ التمييز بين مستويات التبني المختلفة
- ✗ بناء مؤشر مركب موثوق

بالإضافة إلى ذلك الفقرات لا تميز بين انواع الذكاء الصناعي ولا تقيس بشكل واضح
مستوى التبني بل تقيس مستوى الاستخدام
يجب زيادة عدد الفقرات ما بين 9-10 فقرات كحد ادني

UPDATED HYPOTHISIES:

- (H1): There is a statistically significant positive effect of Artificial intelligence adoption on the project performance in the Kingdom of Saudi Arabia
- (H1a): AI adoption in project management has a statistically significant positive effect on project efficiency.
- (H1b): AI adoption in project management has a statistically significant effect on cost reduction.
- (H1c): AI adoption in project management has a statistically significant positive effect on time performance.
- (H2): Organizational readiness positively moderates the relationship between AI adoption and project performance.
- (H2a): Technical readiness positively moderates the relationship between AI adoption and project performance.
- (H2b): Organizational support strengthens the relationship between AI adoption and project performance.
- (H2c): Human readiness strengthens the relationship between AI adoption and project performance.

Updated conceptual Model :

