

Embracing Agile Mindset impacts on Communications
of Tabuk University Construction Projects

A research project submitted to complete the requirements for obtaining a
master's degree Specialized in Project Management

student preparation:

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1444 AH corresponding to 2023 AD

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Abstract:

This research aims to clarify the important role of applying Agile mindset in construction projects, which play a significant role in the health, social, and economic aspect of human life. Construction projects build and maintain roads, bridges, schools, hospitals, and safe shelters, provide job opportunities, and contribute to the overall prosperity of the community. This brings new opportunities and improves the overall quality of human life. Agile mindset has proven successful in the manufacturing and software industry, and the research is specifically focused on applying Agile mindset in effective communication.

Effective communication is crucial for the success of construction projects. Adopting Agile mindset can have a significant impact on effective communication within the team and all stakeholders involved. It encourages effective communication, collaboration, and adaptability, ultimately leading to increased team productivity and better construction project outcomes .

To achieve the research goals, a descriptive analytical approach was adopted, which is suitable for the nature of the research, and the use of SPSS statistical analysis to obtain results. One of the most important results is that, construction project teams confirm traditional communication tools are effective, and welcome the application of Agile mindset to increase communication effectiveness.

Key Words :Communication, Agile Mindset, Construction Projects.

Introduction:

Being agile is to adopt Agile Mindset, which is defined by the four values and guided by twelve principles, based on the publication of the Manifest for Agile Software Development (2001).

As Agile approaches were adopted publicly by Software Industry, and before that by manufacturing industry, some agile approaches and methodologies have been introduced to other industries, such as construction industry, which the research is about.

Why the research takes the Agile mindset instead of Agile methodology, framework, approach (Scrum, XP, Kanban) ? The answer is, not applicable to use specific approach to manage construction project unless it is broken into small projects or deliverables that can be used by customer. And generally, any project has own uniqueness due to environment, organization culture, team, stakeholders, and risks, changes level degrees, so due to PMI-Agile Guide (2017) recommends AGILE SUITABILITY FILTER TOOLS, to help organizations assess and discuss whether projects should be undertaken using predictive, hybrid, or agile approaches. Construction projects follow predicative life cycle as planning everything up front, low frequency of delivery, low degree of change. As well as they follow agile life cycle in some project development phases, as Project concept and design phase, in which the customer feedback is mandated.

Construction Project team members sometimes unconsciously use agile tools, particularly when risks occur, and issues surface, or urgent changes request by key stakeholders need to be executed. They use agile tools, such as review meetings, collaborative meeting, which are forms of face-to-face communication, and the feedback is important. Construction projects have complexity, ambiguity, and high stakeholders' expectations, although, formal contracts are signed by the parties (Owner, Consultant, Contractor, and Other) before project starts, applying time, cost, and resources constraints, which make the project team of each party adhere the contract terms, and focus to their company goals, not to the project goals and the business benefits it delivers. And make communications between parties not effective, and all communications deliverables subjected to contract constraints. The research proposes the Agile mindset as a solution to the construction projects problems, and takes communications as start point to adopt agile mindset.

Communications is key driver for project success, as convey business value, confirm stakeholders' expectations, help to monitor risks and issues, support quality assurance and control, and encourage team collaboration, transparency.

Communications help to convey and train agile mindset , and agile approaches to the teams .

“Project environments subject to various elements of ambiguity and change have an inherent need to communicate evolving and emerging details more frequently and quickly. This motivates

streamlining team member access to information, frequent team checkpoints, and collocating team members as much as possible.

In addition, posting project artifacts in a transparent fashion, and holding regular stakeholder reviews are intended to promote communication with management and stakeholders.” AGILE PRACTICE GUIDE (2017)

Research Problem:

As we have been practicing project management in the traditional way, we have noticed that the waterfall methodology is becoming more difficult in the area of communication.

Communication in construction projects need to be effective otherwise, a lot of expensive reworks will be needed which can lead to higher cost and longer time for the project to be completed. Daily, weekly and monthly reports are a good way to communicate the status of the project but it lacks human interaction and can mislead project status. Also, bad communication such as relying on reports without a real interaction with the team members could result in quality defects, high negative risks and issues between the team members because relying only on written communication will not give the full picture of the project status.

The importance and objectives of the research:

The objective of this research is to study the effectiveness of applying the communication aspect of the agile mindset in construction projects. The importance of the research is it may increase the effectiveness of the communication between the team members which

may lead to less work to be reworked, better transformation of knowledge and less issues in the project and among the team members. In addition, the research may help the organization to transfer from the traditional way of communication in projects to adapt the agile way of communication which can be beneficial for every participant in the project.

Research hypotheses:

This research will be testing the impact of the agile mindset applied in construction projects. We will examine how the communication in agile could lead to better outcomes in construction projects. We assume that lack of knowledge of agile communication is the main reason that people or team members are not applying agile communication in the construction projects. We also think that the waterfall approach lacks effective communication which led to many change orders and delays in the construction projects and increase in the cost of the projects. Using agile communication methodology, tools, artifacts and events such as daily meetings, face to face meetings and Kanban boards will increase the effectiveness of project team members' communication and will decrease the misunderstanding among the team of the project.

Theoretical Framework of the study

Agile Manifesto mindset, values, and principles:

Agile! is a project management methodology that was developed in order to minimize the gap between the traditional way of managing projects “Waterfall” which executed in a linear sequence and the need of rapid changes in some industries such as software development, product development and other.

According to the Agile Manifesto authors (2001), We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to values:

Individuals and interactions over processes and tools. Working software over comprehensive documentation. Customer collaboration over contract negotiation. Responding to change over following a plan.

That is, while there is value in the items on the right, we value the items on the left more.

From that Four Values, the Twelve principles were developed, which according to AGILE PRACTICE GUIDE (2017), the Twelve principles say:

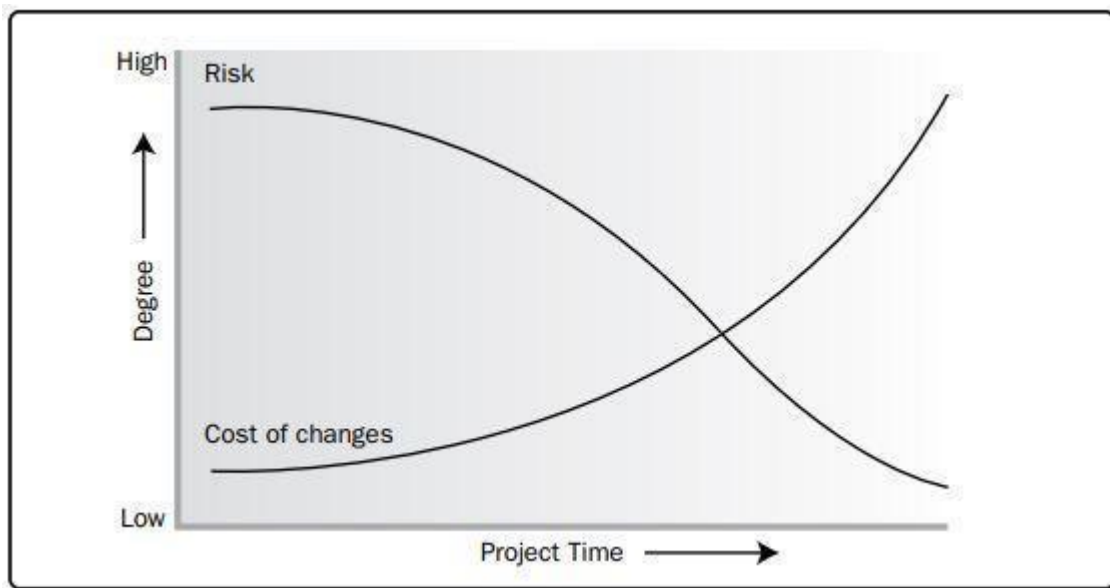
1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.

2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity—the art of maximizing the amount of work not done—is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Benefits of Using Agile Manifesto mindset, values, and principles in construction:

Due to the rapid changes in the requirements to satisfy the customer needs, adapting agile mindset could help in producing a product that satisfy all the parties involved in the project.

Using agile mindset in the communication can reduce the cost, produce higher quality and satisfy the customer since all parties are able to engage in productive ways of communication. For example, in the design phase of a construction project, all parties will be able to meet each other and do the required changes that the customer needs which according to PMBOK® GUIDE Sixth Edition, changes in a project could be costly as the project advances and can lead to delay in the schedule. The ability of stakeholders to influence the final characteristics of the project's product, without significantly impacting cost and schedule, is highest at the start of the project and decreases as the project progresses toward completion.



PMBOK 6th Edition.

Impact of Variables Over Time

As Mario Moreira mentioned in his book *Being Agile: Your Roadmap to Successful Adoption of Agile* (2013), Communication is the enabler for individuals to interact with their team members. The inspect-and-adapt model is an enabler for communication to occur throughout a project. The benefit is the continuous feedback. This helps us understand the process in which we work and how we may adapt it over time. This also ensures that a predefined process or tool set does not dictate how we interact.

According to (PMBOK® GUIDE) Seventh Edition, establishing a frequent rhythm or cadence of review and feedback sessions from a broad selection of stakeholders is helpful for navigating project risk and being proactive with risk responses. Daily standup meetings can be used in any project and are a source for identifying potential threats and opportunities. Frequent demonstrations of increments of the

product or service, interim designs, or proof of concepts can surface threats and opportunities. Addressing risk at weekly status meetings ensures that risk management remains relevant. These meetings can be used to identify new risks as well as identify changes to existing risks. Retrospectives and lessons learned meetings can be used to identify threats to performance, project team cohesion, etc., and to seek improvements.

According to (PMBOK® GUIDE) Seventh Edition, Effective and efficient engagement and communication include determining how, when, how often, and under what circumstances stakeholders want to be—and should be—engaged. Communication is a key part of engagement; however, engagement delves deeper to include awareness of the ideas of others, assimilation of other perspectives, and collective shaping of a shared solution.

As the AGILE PRACTICE GUIDE (2017) suggested that Projects are subjected to various elements of ambiguity that need to be communicated in transparent fashion, which can motivate the team members positively by having all the information needed easy to access and can be reviewed. Also, holding regular stakeholder reviews are intended to promote communication with management and stakeholders

Obstacles:

Construction projects tend to rely heavily on definable work and the excessive amount of documentation. According to AGILE PRACTICE GUIDE (2017), Definable work projects are characterized by clear procedures that have proved successful on similar projects in the past. The production of a car, electrical appliance, or home after the design is complete are examples of definable work. Also, face to face meetings could sometimes become difficult due to the number of people involved in the project. According to Denise Canty (2015), We know that the agile team communicates face to face with each other and this is another reason why they are able to be so effective. In addition, Team commitments to change to agile mindset

can be challenging. According to Turner (2014) Now ideas go through three stages which are: First, people think it is stupid. Then they think it is dangerous. And finally, they think they believed that all along.

Gaps in the Existing Literature:

As we have reviewed some of the existing resources that discuss using agile in construction projects, we found out that most of the research focuses on using agile management approaches. In APPLYING AGILE METHODOLOGIES TO MANAGING CONSTRUCTION PROJECTS, by Abeer N. Al-Ismail and others (2022) they discuss the usage of agile approaches in construction

projects which is commonly unapplicable, because of focusing in agile frameworks not agile mindset.

Problems in the Existing Literature:

In some research we found out that the researchers tend to focus on many aspects of using agile in construction projects which made the research too broad and hard to follow the outcomes. Also, using the exact researches that were published made a problem in the existing literature.

Research Methodology:

In light of the nature of the research and the objectives we seek to achieve, both the descriptive and analytical methodologies.

We referred to books written about Agile mindset, Agile managements, and Agile tools and techniques, to study and assess the possibility of applying Agile mindset in construction project.

From work experience in construction industry, as we are currently involved in construction projects.

We observe construction projects lack effective communication, and collaboration.

So we predict that as long as construction projects embrace Agile Mindset at the project teams level, the communication will be more effective.

We take the current construction projects in Tabuk University as study case , gathering data by Google Form Survey.

Through conducting a survey we will be able to collect data about the understanding of the existing traditional communication, the agile mindset impacts on communication effectiveness. The data will be analyzed and studied to get the results by using SPSS program. The data that will be collected will come from Engineers, Project management practitioners, Owners of projects, Contractors and consultants.

Research limits:

- The research survey on community of Current Construction projects in Tabuk University in Saudi Arabia-2023, which is small community.
- To adopt agile mindset at project development teams,(Sponsor, contractor, consultant teams), exclude organizations.
- Start to share agile mindset knowledge, and adopt it in communications, exclude other project key drivers.
- Organization support to agile not addressed.

Practical study and its methodological procedures

Methodology:

Along with the distribution, collection, and statistical analysis of a survey, a literature review was carried out. The initial stage involves gathering information from scientific papers that have been published on scientific websites like ResearchGate, Scientific Direct, Google scholar. The second phase includes the completion of survey.

Data Collection:

Relevant studies would be discovered by extensive searches across several electronic databases. ResearchGate, Scientific Direct, Google scholar would all be used as research databases. The search terms that utilized are “Agile”, “Communications”, “Construction Projects” “Saudi arabia” “Tabuk University”, When search terms are combined, the Boolean operators ‘OR’ as well as ‘AND’ will be applied.

The validity of Instrument:

The validity of the tool means ensuring that it will measure what it was designed to measure. Validity also means the tool’s inclusion of all the elements that must be included in the analysis on the one hand, and the clarity of its paragraphs and vocabulary on the other hand, so that it is understandable to everyone who uses it.

The validity of the study Instrument was confirmed by.

Face validity:

After the completion of the preparation of the questionnaire and the formulation of the statements, the initial questionnaire was presented to the supervisor of the research and to a group of professors in order to ascertain the extent to which each statement was related to the domain to which it belongs and also to check the clarity and integrity of the formulation of the statements.

The reliability of Instrument:

The reliability of the study tool means that the tool will give approximately the same results when applied multiple times to the same sample. This means to what degree the study tool gives close readings each time it is used.

And we conclude that the total degree of reliability was (.785) which is high value and approaching the correct one and it refers to the reality of the questionnaire for the application

Data analysis

After the scanning process, questionnaires which are eligible to be included in the analysis and using a numerical coding system will be uploaded to the Statistical Package for Social Sciences (SPSS), version 23. Appropriate descriptive and analytical statistical techniques will be used to analyze the data and draw conclusions.

Results & Discussion:

CRONBACH ALPH:

Reliability Statistics

Cronbach's Alpha	N of Items
.785	30

Tabel (1)

The value of CRONACH ALPHA (.785) is accepted.

MEAN & Std. Deviation:

Descriptive Statistics:

	N	Minimu m	Maximu m	Mean	Std. Deviation
Q1	30	2	5	4.23	.679
Q2	30	2	5	4.17	.913
Q3	30	2	5	4.20	.925
Q4	30	1	5	4.13	.860
Q5	30	3	5	4.57	.568
Q6	30	2	5	4.30	.877
Q7	30	3	5	4.40	.724

Q8	30	3	5	4.53	.571
Q9	30	1	5	3.77	1.135
Q10	30	3	5	4.50	.682
Valid N	30				
(listwise)					

Tabel (2)

From the above table explain the MEAN and Std.Deviation, we conclude that (4.23) of mean your work period in Tabuk University Construction Projects, (4.17) of mean your awareness of Agile Mindset (The 4 values, 12 Principles), (4.20) of mean the Email tool as a formal communication, gives clear information, (4.13) of mean the Daily Report fully showcases the Project Status, (4.57) o mean weekly Meeting always increases collaboration between project parties teams, (4.30) of mean response to Formal Letter is most important feedback, (4.40) of mean daily Meeting longs for 15 minutes between project parties teams promotes collaboration, (4.53) mean of face to face communication is most effective method to solve project issues, (3.77) mean of using LED Screen in the meeting room , to showcase project progress promotes transparency between project teams, (4.50) mean of lessons learned sessions during the project help in avoiding defects.

CORRELATION:

Correlations			
		TRADITIONAL COMMUNICATION	ADOPTING AGILE
TRADITIONAL COMMUNICATION	Pearson Correlation	1	.593**
	Sig. (2-tailed)		.001
	N	30	30
ADOPTING AGILE	Pearson Correlation	.593**	1
	Sig. (2-tailed)	.001	
	N	30	30
**. Correlation is significant at the 0.01 level (2-tailed).			

Tabel (3)

The Pearson correlation coefficient value in SPSS is 1, it indicates a perfect positive correlation between the variables being analyzed. This means that there is a strong linear relationship between the variables, and as one variable increases, the other variable also increases in a perfectly predictable manner.

Regression:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.593 ^a	.351	.328	.43721

a. Predictors: (Constant), ADOPTING
AGILE

Tabel (4)

The value of R is 0.593. This statistic represents the strength and direction of the linear relationship between the predictor variables and the dependent variable in the regression model. In this case, $R = 0.593$ indicates a moderate positive correlation between the predictors and the dependent variable.

The value of R-squared is 0.351. This statistic represents the proportion of variance in the dependent variable that can be explained by the predictor variables in the regression model.

One way- ANOVA:

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
TRADITIONAL COMMUNICATION	Between Groups	1.505	4	.376	1.395	.265
	Within Groups	6.747	25	.270		
	Total	8.252	29			
ADOPTING AGILE	Between Groups	2.697	4	.674	4.049	.011
	Within Groups	4.163	25	.167		
	Total	6.860	29			

Tabel (5)

The "one-way" analysis of variance (ANOVA) is used to compare means across two or more groups. Here is the interpretation of the ANOVA results with the given F-values:

1. F-value (1.395): The F-value represents the ratio of between-group variability to within-group variability. A smaller F-value suggests that the group means are similar, while a larger F-value indicates a greater difference between the group means. For the given F-value of 1.395, it suggests a relatively small difference between the group means.
2. F-value (4.049): Similarly, for the second F-value of 4.049, it indicates a larger difference between the group means compared to the

previous F-value. The difference between the group means is relatively larger.

Results:

1. Traditional Communication tools in Construction Projects is considered effective by most construction project team members.
2. Agile mind awareness by construction project team members is low.
3. Most construction project team members confirm the importance of adopting agile mindset in construction projects.
4. Face to face communication tools, such as weekly meeting from the traditional method, and daily stand-up meeting from the agile methodology increase communication effectiveness, and promote collaboration between team members.
5. The daily report is agreed by most project teams members, to reflect project status.
6. Feedback is the most important response to formal letter.
7. Using LED Screens as example of Agile artifacts similar to Kanban board, Burndown and Burnup charts, promotes transparency between project teams.
8. Retrospective meeting from agile methodology, which is mainly about process improvement by lesson learned discussions, help in avoiding work defects.
9. Agile review meeting attended by the owner increase project success.
10. Monthly report as traditional communication tool is effective to communicate project progress.

Recommendation:

The search reveals the importance of embracing Agile mindset in communication effectiveness, because Agile mindset allows individuals and teams to be adaptable and flexible in the face of change. This is crucial in today's fast-paced and dynamic business environment, where the ability to pivot and adjust quickly is a key competitive advantage. So, we recommend to increase Agile mindset awareness by training, and coaching from organizations of center of excellence in Agile Management.

An agile mindset emphasizes collaboration, communication, and teamwork. This is important for creating a positive and productive work environment, and for fostering innovation and creativity.

Future study is expected to explore the other drivers of construction project success than communication, such as quality, risk, and business values, in respect to Agile Mindset Adoption. For the following potential benefits :

1. Individuals and teams are going to focus on continuous improvement and learning. This can lead to higher levels of productivity, quality, and customer satisfaction.
2. Individuals and teams can be resilient in the face of challenges and setbacks. This is important for maintaining motivation and morale, and for overcoming obstacles in order to achieve their goals.
3. Focus on delivering value to customers, and on understanding and responding to their needs. This is crucial for creating products and services that are truly impactful and successful in the marketplace.
4. Individuals and teams can thrive in today's complex and rapidly changing world, and to deliver better results for themselves and their organizations.

Appendix

1- Reference:

- 2- A guide to the Project Management Body of Knowledge , 7th Edition, 6th Edition
- 3- AGILE PRACTICE GUIDE, PMI
- 4- Agile for Project Managers, Denise Canty.
- 5- Agile for Everybody, by Matt LeMay.
- 6- APPLYING AGILE METHODOLOGIES TO MANAGING CONSTRUCTION PROJECTS
- 7- Being Agile, Your Roadmap to Successful Adoption of Agile, Mario Moreira
- 8- PRINCE2 Agile
- 9- <https://eprints.hud.ac.uk/id/eprint/25965/> Is Agile Project Management Applicable to Construction?
- 10- <https://www.tandfonline.com/doi/abs/10.1080/15623599.2019.1644757> Prioritizing agile project management strategies as a change management tool in construction projects
- 11- <https://www.sciencedirect.com/science/article/abs/pii/S2214785320336014> An analytical approach in usage of agile methodologies in construction industries – A case study

2- Survey Questions:

Your experience in construction industry*

1 to 5 Years
6 to 10 Years
11 to 15 Years
16 to 20 Years
More Than 20 Years

which party you work for in Tabuk University Construction Project

Owner (Tabuk University)
Project Management Office (PMO)
Consultant
Contractor

your work period in Tabuk University Construction Projects

1 to 3 Years
4 to 6 Years
7 to 9 Years
10 to 12 Years
More Than 13 Years

your awareness of Agile Mindset (The 4 values, 12 Principles)

Fully Aware
Aware
Neutral
Not Aware
Fully Not Aware

the Email tool as a formal communication, gives clear information

Strongly Agree
Agree
Neutral
Disagree

Strongly Disagree

the Daily Report fully showcases the Project Status

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

weekly Meeting always increases collaboration between project parties teams*

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

response to Formal Letter is most important feedback *

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

daily Meeting longs for 15 minutes between project parties teams promotes collaboration

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

face to face communication is most effective method to solve project issues

Strongly Agree

Agree
Neutral
Disagree
Strongly Disagree

using LED Screen in the meeting room , to showcase project progress promotes transparency between project teams

Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

lessons learned sessions during the project help in avoiding defects

Strongly Agree
Agree
Neutral
Disagree
Strongly Disagree

المخلص :

يهدف هذا البحث الى توضيح الدور المهم لتطبيق عقلية الادارة الرشيقة في مشاريع التشييد ، التى دور مهما في حياة الانسان الصحية والاجتماعية والاقتصادية، إذ تقوم ببناء وصيانة الطرق والجسور والمدارس والمستشفيات والمأوى الآمن، وتوفر فرص العمل، وتساهم في الازدهار العام للمجتمع. كما تقلل التلوث وتحافظ على الموارد وتستخدم مواد وتقنيات صديقة للبيئة. وتجلب فرصاً جديدة وتحسن الجودة العامة لحياة البشر. ولقد اثبتت الادارة الرشيقة نجاحها في مجال التصنيع وصناعة البرمجيات. وتخصص البحث في تطبيق عقلية الادارة الرشيقة في التواصل الفعال.

يعد التواصل الفعال أمراً بالغ الأهمية لتحقيق نجاح مشاريع التشييد. وتبني العقلية الرشيقة يمكن أن يكون له تأثير كبير على التواصل الفعال داخل الفريق وكافة الأطراف المعنية. فهو يشجع التواصل الفعال والتعاون والقدرة على التكيف، مما يؤدي في النهاية إلى زيادة إنتاجية الفريق ومخرجات مشاريع التشييد.

ولتحقيق أهداف هذا البحث تم اعتماد المنهج الوصفي التحليلي الذي يتناسب مع طبيعة البحث، والاستعانة بالتحليل الاحصائي SPSS للتوصل الى النتائج من أهمها تعتبر أدوات الاتصال التقليدية في مشاريع البناء فعالة من قبل معظم أعضاء فريق مشروع التشييد ، والذين يرحبون في تطبيق الادارة الرشيقة لزيادة فعالية التواصل .

الكلمات المفتاحية: التواصل، عقلية الرشاقة، مشاريع التشييد.

أثر تبني عقلية الرشاقة على التواصل في مشاريع التشييد بجامعة تبوك السعودية

مشروع بحثي مقدم لاستكمال متطلبات الحصول على درجة الماجستير في تخصص إدارة المشاريع

أعداد الطالب:

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إشراف:

د. وليد عبد الجواد سليمان صديق

د. الفيصّل عبد الحميد محمد حسن

الفصل الدراسي الثالث

١٤٤٤هـ الموافق ٢٠٢٣م