Influence of Agile Leadership on Project Success; A Moderated Mediation Study on Construction Firms in Nepal

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Abstract- **Emerging leadership is recognized as a key role in influencing project success and has always been a topic of discussion in project management research. Nevertheless, consideration of how agile leadership affects project success is limited. For this article, the model designed to inspects the direct-indirect influence of agile leadership on project success in construction firms via a self-organized team built on a degree of project complexity considering complex adaptive system theory, social control theory, and contingency theory. The research collected and evaluated sample data from 310 project managers and engineers in construction companies based in Nepal through a self-administered questionnaire. This study used hierarchical regression analysis and bootstrapping analysis for mediation and moderation effects. The empirical study outcomes suggested a direct positive effect of agile leadership and a self-organized team on project success. Self-organized teams play a partial mediating role among agile leadership and project success. And the study also showed a positive moderation in project complexity with respect to the self-organized teams and project success whereas negative moderation with respect to the agile leadership and project success.**

Keywords: **Agile leadership; Project success; Complex adaptive system; Moderated mediation model; Construction industry**

I. Introduction

The construction industry is one of the key sectors that bring massive changes in infrastructure and contributes to the nation's development through employment creation, wealth distribution, technology adoption, creativity and innovation. In spite of availability of advanced and modern tactics, the intricacy in project and conflicts among leaders leads to the unsatisfactory results [1]. Especially developing nations are unable to exploit the optimum potential of construction industries efficiently due to inconsistency in projects, crossing deadline, over budgeting and downsides to the environment [2]. A number of hindrances like irregularity, political instability, poor safety practice, lack of synergy in teamwork asserts adverse impacts on project success. Moreover, these all elements are directly or indirectly be influenced by the leadership [3]. Thus, it was inevitable to draw attention of researchers in finding procedural tools, techniques and methods to achieve the optimum efficiency of project success. Many literatures inspected that leadership behavior is one of the key driving forces behind project success [4]. In construction industry, the project success can be evaluated on the basis of customer's satisfaction, stakeholders designed plan, completion within scope of work timeframe and budget, and need to consider environmental aspect as well [5]. The environmental ecosystem has to be taken in care of because it is also a major party in bearing pollution and responsible for global warming [6]. So, the present construction industry business ambient is accelerated by complexity, uncertainty, volatility and ambiguity seems not to be settling down soon. Additionally, due to the challenges postured by the global economy and surrounding environment, managements have to embrace faster decision-making processes in reply to rapidly increasing customer demands. Particularly, the era of technology and innovation have brought forward certain ideas, such as creating value and leading to change. Today's business world is consistently facing with uncertainty and unprecedented change. Which makes it extremely difficult for organizations to precisely forecast possible upcoming opportunities and risks. For this reason, the changes in recent years have compelled organizations to perform new research or to establish new methodologies. In these demanding circumstances, organizations wishing to succeed must step away from conventional approaches and continue to apply them more creatively. Hence, they need leaders who can capable to handle this change and adapt to the new situations. Because of their structure, successful effective leaders do not see their

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position as adequate, rather they are continuously upgrading and developing themselves and have to deliver their potential skills.

The notion of "agility," which has recently attracted its significance, comes to the fore in this context. Quickness, versatility, complexity, uncertainty and transition are illustrated in the meanings of agility. To describe in short, agility is more than pace. It is a very complex process involving transition and change. So the project leaders need to approaches with agility behavior to quantify volatility, uncertainty and complexity in order to stay ahead of competition and efficiently respond to prompt environmental changes. Agile leadership is concerned with the ability to follow an adaptively versatile approach based on external and internal dynamics and uses wider viewpoints to examine and analyze various scenarios and react rapidly to them. Agile leaders possess the skills of adaptability and resilience to lead in a range of complex and unpredictable circumstances. So in the context of agility, complexity and uncertainty, complex adaptive system (CAS) theory expedites to understand emerging leadership and project success [7]. The Interest in the CAS theory has recently been growing for leader's performance like shifting from natural science to social science [8]. The CAS suggests that leaders can understand, predict, prevent the most daunting problems, and adopt as per situation to make project success [9]. CAS theory also explains the behavior of leaders who think linearly to understand current affairs and also helps to formulate a framework for leaders how they should approach towards solutions linearly. Therefore, applying CAS in leadership makes project more likely to complete on time with measured quality as well as, taking environmental consideration.

Some preceding studies emphasized the predictor, such as communication conflict interaction, stakeholders' group perception, project governance, management attitude to the project success [10-12] in the light of CAS based leadership. However, Aga et al. [13] examined the transformational leadership's dimensions to project success. In their further study they examined about transactional leadership's dimensions to the project success as well [14]. Moreover, Yang el al. [15] have also described as project manager's leadership (transformational and transitional) influence to project success with different type of project via teamwork. Likewise, J. Shao [16] examined the program manager's leadership influence on program success with moderator program context. Although number of studies are reviewed the relationship between leadership and project success of construction firm, yet these are mostly focused on the conventional styles of leadership. Thus, there is still need to discover the influence of agile leadership to ensure project success.

The purpose of this study is to understand the direct-indirect influence of agile leadership on project success in construction firms specifically in building sector and hence, fulfill in the literature gap. Herein, this study puts light on agile leadership and evaluates project success in construction industry from four aspects. First, the study explores the agility behavior of a leader to inspect the relationship between agile leadership and project success. Secondly, it is focused on multi-theoretical perspectives considering complex adaptive system (CAS), social control theory and contingency theory by considering. It deals with the consequence of agile leadership, self-organized team and project success in the construction industry in Nepal. Third, the use of Hayes analytical method to inspect the conditional process for path analysis and regression analysis including direct and indirect effects of agile leadership on project success at low complexity and high complexity. Finally, it also examines CAS in the field of project management and innovations rather than mostly researched on natural science.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

There have been several studies in the field of leadership research since semi-centennial, among them most of the researches were conducted in the context of project management [17, 18]. In recent literatures too, the significance and importance of agile leadership are palpable and profoundly introduced. Agile leadership is an arrangement of high awareness, fast execution and informed decision making [19]. Agile managers have shown more opennesstowards creativity and progress with great enthusia sm to adopt inclusive democratic leaderships. Agile practitioners are energetic and self-confident individuals who define and setup a positive goal, possess with all kinds of skills that are required to boost the team performance which establish them as a progressive influential leaders within organization [20]. Thus agile leadership behavior in a project ensures the time bound of the project, quality of a project, scope of project and client desire [21]. Parker et al. [22] described that the agile practices of an agile manager become an adaptive leader. In terms of theoretical framing, there are several leadership theories but as per our proposed research model, we focused on the theory of complex adaptive system (CAS). This theory used to investigate leadership styles, organizational changes, team dynamics, and sustainability as well.

Therefore, agile leadership style is essential in the field of the construction industry to ensure project success. There are limited studies related to agile leadership and project success even though some empirical studies have shown efficacy of the agile method for project success [23]. Dyba [24] have

found a technique, namely planning game activity used in agile methodology having a positive impact on company and customers' development process. Similarly, Magazinius [25] examined the results of using non-agile methodology was adverse result as incorrect project selection and over cost. Thus, lack of agility was the main cause for failure of the companies. Parker et al. [22] have also stated that self-organized team and agile leadership improve the productivity of organizations.

A. Agile leadership and project success

The Complexity Leadership Theory (CLT) explains the learning, imaginative and adaptive ability of complex adaptive system (CAS) in organizational units for better project performance in producing output [26].To obtain best possible outcome in project requires proper interaction within team members to achieve common goal. Lindsjorn et al. [27] revealed that agile teamwork has a positive effect on project success. The CAS helps to describe as agile leadership is an adaptive, self-organized team that determines the project success of the construction industry. Thus, agile leadership play a vital role in making project completion in time by satisfying client [28, 29]. Agile leadership contributes in forming a self-motivated team, robust coordination within team , adopt to change according to the situation and able to take decision in crisis [30].

The literature shows that the appropriate behavior of project managers does huge contribute to success in the projects and keeps uniformity [31, 32]. There is a substantial study found that the commitment of agile leadership enables reform of the goal of the organization [33]. The agile organization has better executives for development, hence, organizational performance will be better with the success of the number of projects [34]. Fagerholm el al. [35] described how an important agile environment is to adapt to work performance. De Smet et al. [36] pointed out to build a leading organization in present days requires agile environment. Agile leaders perform beyond their capacity with healthy relations between the team. Agile managers can guide the team, have a curiosity to learn including critical thinking, visionary, emotional resilience, flexibility [37]. This quality can form an environment where team members push their strength to accomplish in project success. Therefore, this study argues that agile leadership positively affects project success and implies the following hypothesis.

Hypothesis 1: Agile leadership positively influences to project success.

B. Self-organized team and project success

The importance of the self-organized team is well identified in the literature towards the organization's performance and productivity [38]. The capability of the team to be self-organized is the best achievement for an organization. Under the control theory, Hoda and Murugesan [39] propose that the self-organized team helps to increase the level of involvement in project activities. Thus, high participating in project activities with a strong team, a clear goal, standardized operating procedures and diversity helps the success of projects. Janssen et al. [40] showed that huge dynamic project has a high chances of failure due to poor teamwork among the project members.

A self-organized team is important to increase efficiency, continuous improvement and improve problem-solving for a project [41]. Standardized project management with teamwork has been recognized as one of the important constraints for project success [42]. For instances, some studies described that having collaboration and teamwork, competency, regular growth and improvement, trust and respect, motivation, continuity and ownership commitment has a positive correlation with sustainable project outcomes [43, 44]. Thus, we argue that self-organized team is positively associated with project success and implies the following hypothesis.

Hypothesis 2 Self-organized teams positively influence to the project success.

C. Agile leadership and self-organized team

The dynamic change in the business environment and organization flexibility needs agile leadership and a self-organized team. Parker et al. [22] proposed four arguments in describing the agile leadership and self-organized team. First, the traditional leadership style does not assist the principle of self-organized teams. Secondly, agile leadership concept is needed for understanding autonomous human behavior such as free to explore, self-decision technique, group discussion, problem-solving and joint task completion [45]. Third, agile leaders should share his experience, knowledge and information with team members to focus on the project work. Fourth, agile leadership is important because agile leaders enhance the team commitment with adaptive behavior such as direction setup, simplicity, generate the rule and encourage constant feedback.

Moreover, Moe et al. [46] argued that transforming individual effort to self-managed teams' effort require agility behavior to the leaders. A leader must create a suitable environment where team members can work together with

ability effort to achieve organizational goal. Thus, effective leadership style is born to the self-organized team so that in the absence of commanding leadership there is less chance of project failure [39]. The agile leaders get connected with the self-organized team through interaction and collaboration. The relationship between team members for common goals is influenced by leadership relationship behavior. According to these argument, we assert that agile leadership positive effect on self-organized team and imply the following hypothesis.

Hypothesis 3 Agile leadership positively affects to the self-organized team.

D. Mediating role of a self-organized team

Despite the direct impact of agile leadership on project success, there is indirect impact as well which is explained by social control theory. Hirschi and Gottfredson [47] explained the social control theory, stating that the people are less likely to commit abnormal acts for the performance if they have four types of social bonds such as attachment, commitment, involvement and belief. The literature explains the causes behind changes in people's bonds and behavior which force them to build the self-organized team. For instance, [48] have argued that the effects of attachments heterogeneity influence to the team functioning. Similarly, Bishop and Scott [49] discussed the team commitments supports for generating a self-directed team environment. The concept of control moves from managers to team members who responsible for managing themselves, supporting team members each other, common shared goal, continues learning and sharing, mutual decision, problem-solving nature are supporting to develop project team productivity and responsible for output, these components defined as a self-organized team.

According to Raziq et al. [50] possibilities of project success can increase when there is goal clarity within the team member and enthusiastic to achieve the goal through self-made team. There should more interaction and have two-way communication between team members to achievement project performance. Self-organized team observe their working environment which supports through self-motivation, energy, adaptive nature for project implementation. Moreover, agile leadership helps to team member by creating an effective working environment towards project success [51]. Agile leadership style shows a clear path to achieving the project goal. More specifically, agile leaders have the ability to handle the project in such a way that the project can be successful. The self-organized team are more focused on project goal with help of agility nature of leaders [52]. With the above discussion, we propose that agile leadership influence to self-organized team and then influence on project success. Hence, self-organized team may play mediates role between agile leadership and project success and propose the following hypothesis.

Hypothesis 4 Self-organized team positively mediates between agile leadership and project success.

E. The moderating role of project complexity

Previous hypotheses consider direct and indirect relationship between agile leadership and project success with no moderating variable. Impact of agile leadership on project success in the context of complexity level is supported by contingency theory. The Contingency theory state that the behavior of leaders' context should match according to the organization situation and design [53]. In this study, the impact of agile leadership style on project success may vary according to the degree of complexity in the construction project. The degree of project complexity considered high complexity and low complex projects. This statement match with Acıkgoz et al. [54] who revealed that project output depends on the degree of project complexity. Additionally Muller et al. [55] have studied project complexity as a moderator on the relationship between leadership style and project success. There is also a study on project complexity as a moderator between flexibility and performance [56]. Hence, depending on the level of complexity in the construction project, project success may vary. According to contingency theory high complex project may very hard to handle so that it may occur less possibility to sustain project success and low complex project may easy to handle so that it may occurs high possibility to sustain project success. Thus, project complexity is adversely associated with project success [57].

Based on the above literature, we argue that project complexity act as a moderator between a self-organized team and project success, and agile leadership and project success. Therefore, we hypothesized the following:

Hypothesis 5 Project complexities have negatively moderating effect on the relationship between the self-organized team and project success.

Hypothesis 6 Project complexities have negatively moderating effect on the relationship between agile leadership and project success.

The following conceptual model is anticipated depiction on the empirical observation and essence from the different theory like complex adaptive system theory, social control theory, and contingency theory. This conceptual model shows all the relationship between leadership style like agile

leadership and dependent variable project success, mediator self-organized team and moderator project complexity.

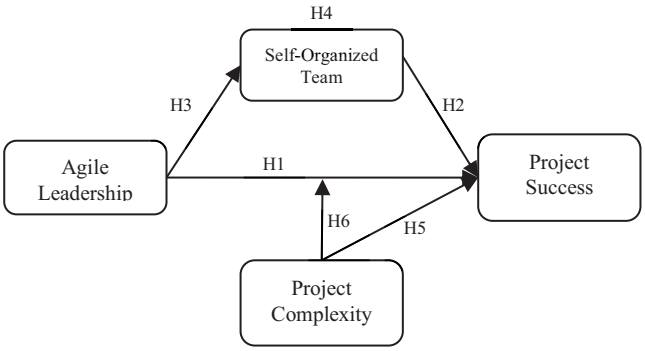


Fig 1: Conceptual Model

Figure 1 demonstrates the conceptual model attesting to the relationship between agile leadership and project success via mediating variable self-organized team, and moderating variable project complexity. Hence, we design a research framework (Figure1) that comprises of four primary latent constructs: Agile leadership, Self-organized team, project success, and project complexity.

III. METHODOLOGY

A. Sample Design and Data Collection

This study covered the populations from construction companies in Nepal. We selected the sample from the population of the construction company in the mid and southern part of Nepal because of 80 percent of construction companies run their projects in mid part (Hilly Region) and southern part (Terai region). It was difficult to find the data due to unavailable complete information about companies. Later, we visit the department of urban development & building construction and USAID Nepal and requested contact details of construction companies and projects who procure in Nepal. After that, we contacted personally to projects managers by telephonic conversation and we requested to participate in this research if they agreed we also visited their different construction sites around Nepal.

In order to answer research question, the data was collected through a self-administrative survey questionnaire and used deductive reasoning method to study relationship among variable. The preliminary investigation revealed that approximately a thousand (1000) construction companies could be found in Nepal. Based on this population size, the appropriate acceptable minimum sample size for this study is approximately 286 which was determined using the Kish method [58]. Kelloway [59] also suggested that the minimum sample size should be 200. Moreover, from G-power analysis we can able to gain 187 sample is enough for data analysis as soon in Appendix B. From above all prior cutoff value along with our sample data showed our sample data is sufficient for further analysis.

TABLE I
DEMOGRAPHICS DATA

Team Size	**Frequency**	**Percentage**
5–20 employees	2	0.65%
21–40 employees	21	6.77%
41–60 employees	107	34.52%
61–80 employees	91	29.35%
81–above	89	28.71%
Project Duration	**Frequency**	**Percentage**
06-12 Month	8	2.58%
13-24 month	41	13.23%
25-36 month	73	23.55%
37-48 month	161	51.94%
49- above	27	8.71%
Experience	Frequency	Percentage
1 -5 Years	26	8.39%
6-10 Years	18	5.81%
11-15 Years	50	16.13%
16-20 Years	192	61.94%
20-Above	24	7.74%

The questionnaire was finalized once a detailed study of the associated literature was accomplished. Hence, Total 318 questionnaires were distributed to the project managers and their team members of construction firms who has accomplished at least one project. We received 310 questionnaires back and the overall response rate was 97%. Table I represents participant's demographic information. The construction sector is preferred because, it has huge contributes to economic development by building infrastructure and generating employment.

B. Measurements

This study adapted the constructs proposed by Parker et al. [22] to measure the agile leadership and self-organized team. There were eight items for agile leadership and six items for self-organized team. With regard to project complexity, this study measured by using the eight-items scale which are adopted from the measures of He et al. [60] whereas project success measured by using eight items scale adopted from the measures of Wu et al. [61]. The complete item descriptions

of the indicators are listed in Appendix A. All were measured using five likert scales from (1 strongly disagree to 5 strongly agree). We considered experience, size and project duration as Control Variable.

IV. RESULTS

We conducted Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) with SPSS.25 and AMOS.25 respectively to verify research model. Thereafter, we used SPSS.25 and PROCESS for hypothesis test and empirical results [62]. This model helped for bootstrapping as well.

A. Exploratory Factor Analysis (EFA)

EFA was conducted to find the correlations among the variable and to confirm the hidden dimension among constructs [63]. The calculated items' skewness value was between +1 and -1 [64] and with value (p=0.00) hence it's confirmed that the variables were linearity normally distributed. We also calculate the Variation Inflation Factor (VIF) value and all values were below threshold value 3 [65] which means there was no multicollinearity issue. We tested the static value of Durbin Watson was close to 2 [66] hence the data was not auto correlated from one observation to next.

There were possible for being common bias because all the responses were collected from one source so could be predispositions of the respondents thus we conducted Common Method Bias (CMB). We used Harmon's one-factor test for CMB and the results were only 30.829% variance, the value was below cut off 50% [67]. It was proved that there were no CMB.

We measured Kaiser-Meyer-Olkin (KMO) for checking sampling adequacy for all variable and all KMO value were above 0.6 which consider it is supported (Kaiser & Rice, 1974). Bartlett's test of sphericity was also acceptable ($p<0.01$). The value of Cronbach's Alpha was greater than 0.7 which explored all data were reliable and consistent [68]. The factor loadings above 0.6 which consider for further analysis [69] as exhibits in table II and table III the factor extraction result.

TABLE II
CRONBACH ALPHA AND KMO

Dimensions	Cronbach alpha	KMO
Agile leadership	0.92	0.92
Self-organized Team	0.88	0.89
Project complexity	0.92	0.93
Project success	0.93	0.93

TABLE III
FACTOR EXTRACTION RESULT (EXPLORATORY FACTOR ANALYSIS)

Dimensions	Items	Factor Loading	Mean	Standard Deviation
Agile leadership	AL 1	0.86	4.25	0.55
	AL 2	0.74		
	AL 3	0.71		
	AL 4	0.72		
	AL 5	0.75		
	AL 6	0.71		
	AL 7	0.69		
	AL 8	0.91		
Self-organized team	SOT 1	0.86	4.05	0.58
	SOT 2	0.80		
	SOT 3	0.70		
	SOT 4	***		
	SOT 5	0.64		
	SOT 6	0.81		
Project complexity	PC 1	0.83	4.02	0.57
	PC 2	0.74		
	PC 3	0.81		
	PC 4	0.89		
	PC 5	0.84		
	PC 6	0.67		
	PC 7	0.78		
	PC 8	0.76		
Project success	PS 1	0.92	4.26	0.52
	PS 2	0.80		
	PS 3	0.82		
	PS 4	0.80		
	PS 5	0.67		
	PS 6	0.78		
	PS 7	0.77		
	PS 8	0.74		

*Notes: Factor loading above 0.6 acceptable; Alpha value of 0.7 or above acceptable; KMO statistics greater than 0.6 or above considerable; AL= agile leadership; PC= project complexity; PS= project success; SOT= self-organized team; *** indicates dropped due to less than 0.6 value.*

B. Confirmatory Factor Analysis (CFA)

After EFA we did CFA for confirmation of factor structure which we extracted. CFA ran through AMOS.25 and model fit including reliability and validity evaluations were determined. Reliability and validity measuring instruments were Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Variance (MSV), and

TABLE IV
CR, AVE, MSV, CORRELATION METRIX AND DISCRIMINANT VALIDITY

	CR	AVE	MSV	AL	PC	PS	SOT
Agile leadership	0.93	0.62	0.18	0.79			
Project complexity	0.93	0.62	0.32	0.43	0.79		
Project success	0.92	0.58	0.02	0.01	-.04	0.76	
Self-organized team	0.88	0.56	0.32	0.35	0.56	0.14	0.75

Notes: CR=construct reliability; AVE= average variance extracted; MSV= Maximum Shared Variance; AL= agile leadership; PC= project complexity; PS= project success; SOT= self-organized team

Average Shared Variance (ASV). The Above details measures shown in Table IV. Convergent validity and discriminant validity are two types of measuring validity. The standard measure for confirm reliability and convergent validity are: CR > 0.7, CR > AVE and AVE > 0.5 [69]. The outcomes of convergent validity are accepted with standard criteria and confirm that Latent factor explained by its observed variable in a proper way.

The standard measure for confirming discriminant validity is MSV < AVE and squire root of AVE must greater than construct correlation [69]. The outcomes of discriminant validity matched with threshold assumptions and confirmed that the latent factor is only explained by own observed variable.

The entire variable found valid as CR value were greater than 0.7, CR value was greater than AVE and AVE was greater than 0.5. Also, MSV was lower than AVE and squire root of AVE were greater than construct correlations.

We also tested model fit indices to find inherent in the dataset. The recommended value for indices are GFI (>0.9), P-value (<0.05), CFI (>0.95), CMIN/df (<3), NFI (>0.9), IFI (>0.9), TLI (>0.95), AGFI (>0.8) and RMSEA (<0.05) [70, 71]. Initially we estimate the model for all variable, the result shown X2/df=1.75, RMSEA=0.049, GFI= 0.87, NFI=0.89 and TLI= 0.94. The indices value of GFI, NFI and TLI was not meet with the threshold value. Thus based on AMOS.25 modification indices results, we address the largest modification indices to the covariance. The modified indices of GFI (0.9), NFI (0.91) and TLI (0.96) indicate a good model fit.

TABLE V
DISCRIMINANT VALIDITY (FORNELL-LARCKER CRITERION)

	AL	OT	PC	PS
AL	0.81			
OT	0.457	0.802		
PC	0.084	0.313	0.822	
PS	0.46	0.376	0.111	0.815

The non-diagonal numbers signified correlations of the construct with other constructs, Fornell-Larker criterion [72], which showed satisfactory discriminant validity of the measurement model as soon in table V.

In addition, HTMT calculation in table VI, is carried out to evaluate discriminant validity. HTMT of correlation of indicator crosswise calculating various phenomena related to correlation of indicator within same construct [73]. If the calculated value of HTMT is greater than threshold value 0.85, it shows that there is absence of discriminant validity [74, 75].

TABLE VI
DISCRIMINANT VALIDITY: HETEROTRAIT-MONOTRAIT RATIO (HTMT)

	AL	OT	PC	PS
AL				
OT	0.477			
PC	0.093	0.338		
PS	0.494	0.388	0.112	

Note: This table shows that Heterotrait-Monotrait Ratio (HTMT) value is under the threshold of 0.9 [73]

A. Structural model and hypothesis testing

The purpose of the structure model was scrutinizing the hypothesis or the excellence bond between dependent and independent variable. As we had mediation (hypothesis 1-4) and moderated mediation model (Hypothesis 5 & 6), we apply model 4 of Hayes PROCESS macro for mediation analysis and model 15 of Hayes PROCESS macro for moderated mediation analysis in SPSS. AMOS was also used for confirmation of Hayes results. This analytical method has been broadly used to test in multipart model such as moderated mediation model as well [76, 77]. We used the bootstrap method with the number of bootstrap sample 5000 at 95% confidence intervals to evaluate the direct effects and indirect effects. By using of structural equation model (SEM), the standard path coefficient (β) with significant path exemplified with satisfactory model fit. The results (x2/df=1.6, GFI=0.99, CFI= 0.99, TLI=0.97, NFI=0.98, RMSEA=0.04, PCLOSE=0.5) describe acceptable model fit.

We tested the mediation hypothesis and the results represented in table VII. In details, Agile leadership had a direct effect on Project Success (β=0.11, P < .05) also the total effects of agile leadership on project success was (β= 0.15, P < .001) significance. Hence we concluded that Agile leadership is positively related to project success in the construction industry and the first hypothesis was supported. There was also the effect of the self-organized team on project success (β= 0.10, P < 0.05). Hence hypothesis 2 was also supported. The results also indicated that there was a direct effect of agile leadership on a self-organized team (β= 0.46, P < 0.001). Thus the third hypothesis was also supported.

TABLE VII
MEDIATION EFFECT OF AGILE LEADERSHIP ON PROJECT SUCCESS

Outcomes	Predictors	R^2	F	β	LLCI	ULCI	t value
PS (Direct effect)	AL	0.51	63.28	0.11	0.001	0.21	1.99*
	SOT			0.10	0.006	0.19	2.10*
	Team size			0.24	0.13	0.34	4.48***
	Project duration			0.19	0.05	0.32	2.76**
	Experience			0.33	0.21	0.46	5.33***
SOT (Direct effects)	AL	0.27	28.20	0.46	0.35	0.58	7.71***
	Team size			0.08	-0.05	0.21	1.21
	Project duration			-0.07	-0.23	0.09	-0.84
	Experience			0.07	-0.08	0.22	0.95
PS (Total effects)	AL	0.50	77.13	0.15	0.06	0.25	3.08***
	Team size			0.25	0.14	350.00	4.61***
	Project duration			0.18	0.05	0.32	2.64**
	Experience			0.34	0.22	0.46	5.42***
							BootSE
PS (Indirect Effects)	AL			0.05	0.004	0.09	0.02

Note: N=310, Bootstrap same=5000, AL= agile leadership, SOT= self-organized team, PS= project success, LLCI= low limit confidence interval, ULCI= upper limit confidence interval. *P < 0.05, **P < 0.01, ***P < 0.001.

Table VIII
RESULTS OF MODERATED MEDIATED EFFECT OF SELF-ORGANIZED TEAM AND PROJECT SUCCESS

Outcomes	Predictors	R^2	F	β	LLCI	ULCI	t value
PS	Team size	0.52	40.93	0.22	0.12	0.33	4.20***
	Project duration			0.18	0.04	0.31	2.56*
	Experience			0.35	0.23	0.47	5.57***
	AL			0.11	0.00	0.22	2.02*
	SOT			0.10	0.01	0.19	2.09*
	PC			0.01	-0.08	0.09	0.12
	AL*PC			-0.11	-0.21	-0.02	-2.29*
	SOT*PC			0.11	0.02	0.20	2.31*
SOT	AL	0.27	28.20	0.46	0.35	0.58	7.71***
Conditional direct effect analysis at moderator value				β	BootSE	BootLLCI	BootULCI
M - 1 SD (3.45)				0.22	0.07	0.08	0.36
M - 4.017				0.11	0.05	0.00	0.22
M + 1 SD (4.58)				0.00	0.07	-0.15	0.14
Conditional indirect effect analysis at moderator value				β	BootSE	BootLLCI	BootULCI
M - 1 SD (3.45)				0.00	0.03	-0.06	0.06
M - 4.017				0.05	0.02	0.01	0.09
M + 1 SD (4.58)				0.10	0.03	0.04	0.17

*Note: N=310, AL= agile leadership, SOT= self-organized team, PC= project complexity, PS= project success, bootstrap sample= 5000, LLCI= low limit confidence interval, ULCI= upper limit confidence interval. *P < 0.05, **P < 0.01, ***P < 0.00*

The relationship between agile leadership and project success is mediated by a self-organized team which assumed hypothesis 4 and we found that the self-organized team had indirect significant effects. We concluded self-organized team play mediates role between agile leadership and project success because of not having zero value between upper (0.09) and lower (0.004) value with β= 0.05, SE=0.02 of bootstrapping results (95% confidence level) with the help of PROCESS macro. There was also significant when the self-organized team was not as mediates between agile leadership and project success. When we included the self-organized team in the model, the direct effect of agile leadership and project success was reduced and significant as well. Thus, the self-organized team was partially mediating between agile leadership and project success.

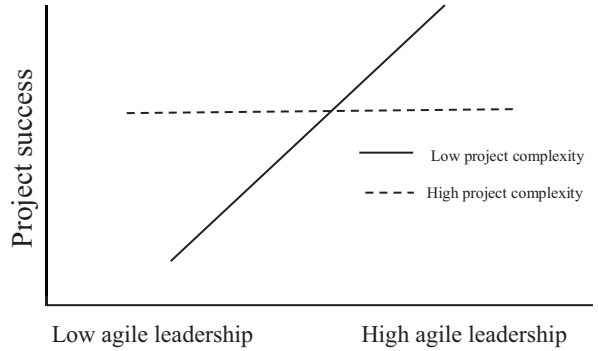


Fig 2: Project complexity moderates the relationship between agile leadership and project success

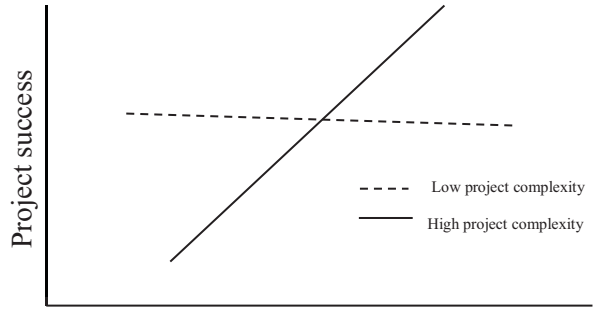


Fig 3: project complexity moderates the relationship between the self-organized team and project success.

In order to remaining Hypothesis 5 and 6, Self-organized team would poke intended and or unintended relationship between agile leadership and project success. Baron [78] mentioned that if path coefficient is statically significant means moderation effects are supported thus in table VIII, project complexity moderates between a self-organized team and in project success (β= 0.11, P < 0.05) and also moderated between agile leadership and in project success (β= -0.11, P= 0.05). Hence both hypotheses are supported. However, positively moderated resumed on indirect relationship instead of negative in hypothesis 5. The results describe that the indirect effect is also applicable when project complexity high and vice versa.

The direct effects of agile leadership on project success significantly perceived (β = 0.11, P < 0.05) as presented in table VI. Figure2 represents the simple slope test of conditional direct effect between agile leadership and project success with low and high complexity. The agile leadership favors the project success significantly concerning the lower project complexity (β= 0.22, P < 0.05) while with higher project complexity the effect was insignificant (β= 0.00). Moreover, the effects of a self-organized team on project success were significant (β = 0.10, P< 0.05), likewise project complexity (β =0.11, P < 0.05) significantly moderates the relationship between the self-organized team and project success. Figure3 represents the relationship between the self-organized team and project success with lower and higher complexity. The analysis shows that agile leadership and a self-organized team lead to the higher project success despite the high project complexity (β = 0.10, P < 0.05) whereas with lower complexity the effect was insignificant. The moderated mediate analysis indicates agile leadership, self-organized team and project complexity explained 52% variation in the project success (R2= 0.52) and agile leadership explained 27% variation in the self-organized team(R2=0.27).

As per guidelines provided by pioneer researcher [79] and implemented by the researcher [80], potential control variable experience is omitted from the main analysis model Accordingly, with guidelines and implemented study from past, in this study the hypotheses are inspected without controlling for the experience of the frontline staff of the construction firm's (respondent) in the survey. The following hypothesis is posited accordingly.

Hypothesis (H7): There are significant differences in project success level, with demographic experience parameter.

TABLE IX
TEST OF EQUALITY OF PROJECT SUCCESS WITH DIFFERENT EXPERIENCE RESPONDENT GROUPS

Features		Sum of squares	df	Mean square	F	Sig.
Experience and SP	Between groups	9.931	4	2.473	3.106	0.014**
	Within groups	236.72	610	0.699		
	Total	221.46	614			

This output in table IX showed that with the higher experience of worker greater the project success in construction firms through anova analysis by using SPSS.

V. DISCUSSION

The purpose of the study was to explore the relationship between agile leadership and project success in construction firms. We examined the direct and indirect influence of agile leadership on project success. The result found that there is a positive influence of agile leadership on project success in a construction firm. As obtained results agree with [15] who also revealed that project managers' leadership had a positive impact on project success. Furthermore, agile leadership provides growth in construction projects as they ensure to adapt to the environment and improve team efficiency to achieve project goals [33]. Additionally, we identified agile leadership as an important distinctive behavior of project leaders which is in line with the result obtained by [23, 81], that agile leadership assists in project success.

This study found that a self-organized team as partial mediator in between the agile leadership and project success and had also direct positive influence on project success. Agile leadership creates the environment to adopt current situation, solve the problem and makes self-team for common goals resulting in enrichment of project success. Generally, the lacking of the proper project manager's leadership and team work takes to project letdown [13]. The analysis suggested by [82, 83] that self-organized team correlates to emergent leadership and shared leadership eases to the virtual team; present study too, supports the same argument.

This study also examines project complexity negatively moderated in between agile leadership and project success. The project performance may get vary with changes in the degree of project complexity. These results are in agree with the result gained by [57]. Hence, hypothesis 6 is consistent with obtained results. Furthermore, project complexity has significant positive moderation influence on the self-organized team and project success that rejects H5. In both moderation situations, project complexity was statistically significant.

The clarification behind significant positive moderation of project complexity for H5; on indirect effect agile leadership to project success through the self-organized team. The cause behind significant positive moderation, project leaders might requires (adopts) dynamic agility behavior and organized team for the project success on the basis of complexity degree [84]. Possibly requires a new idea for a complex project. The leaders having high agility might have to think beyond and follow a systemic approach to handle the projects [85]. In other words, the leaders should collect new evidence from different sources and grave flexible behavior for agility and ability to make the best team with superior members. A high complex project requires proper continuous coordination with team members in mitigating the associated risks to sustain project success [86]. A complex project could have an inverse impact on the project's success thereby to avoid project catastrophe, the project manager may need high agility behaviors [87]. Henceforth, if project complexity is high, agile leaders may involve to bring new ideas with energetic team members for problem-solving and can more influence project success in the construction firm.

A. Implication, limitations, and future research

For theoretical implication, this study considers multiple theories and concepts to explain how agile leadership affects construction firms. Agile leadership has mainly been considered in software development firms and is barely applied to the construction industry. The study addressed this by developing moderated median structural equation model to test the hypothesis on project success. Similarly, the implication for project managers and team members of the construction firm has also discussed. Communication with team member is possible through counseling, training and development, and seminar to improve the leadership quality of the construction project team. Besides, might need of open interaction and knowledge sharing between account and finance, human resources, marketing and procurement department. The top-level leaders should maintain the environment for being self-organized team. Thus, this study helps to project managers for maximum possible success in their projects and to sustain the construction firms.

With a high contribution to the construction firm, there exists some limitation as well. First, in this study we consider only project complexity as moderator, there may consider other moderators such as culture or social interference in the future study. Secondly, this study comprises only one mediator in the relationship between agile leadership and project success, so other mediator can also be added in the future study. Additionally, [88] argued that the size of construction company also influences the project performance owing to larger firms have enormous scale of resources which leads to high possibility of project success. Therefore, company size can also be considered as control variable in future study.

B. Conclusions

This study attempted to find how agile leadership style influence to the project success including mediated role of the self-organized team and moderated role of project complexity in construction firms. Thus, this study conducted the moderated mediation model in the field of the construction industry. We used complex adaptive system theory, complexity theory and social control theory to develop the model and performed the preliminary and

confirmatory analysis from SPSS/AMOS. Moreover, study tested the hypothesis with the help of PROCESS by Hayes and Amos considering 310 data from construction companies in Nepal. The results showed agile leadership and self-organized team directly affect to the project success. Also, agile leadership indirectly influences the project success through the self-organized team which was partially mediated. Hence, we concluded that agile leadership is a crucial important predictor for self-organized team and project success. Project complexity plays a negative significant moderation role in the relationship between agile leadership and project success whereas positive significant moderation in between self-organized team and project success. Moreover, this research helps to the project management literature by accessing agile leadership, self-organized team to ensure project success especially in a developing country.

APPENDIX A

This section presents the literature used to develop the questionnaire.

Agile leadership

AL1: Manager does intrinsic ability to deal with change.
AL2: Manager's view of organizations as fluid, adaptive systems composed of intelligent people.
AL3: Manager recognition of the limits of external control in establishing order and of the role of intelligent control that employs self-organization.
AL4: Manager scans the environment according to the awareness of the situation.
AL5: Manager relies on the collective ability of autonomous teams as the basic problem-solving mechanism.
AL6: Manager thinks with critical way in emergency problem.
AL7: Managers react accordingly to emergent outcomes from the self-organized team.
AL8: Managers removes the obstacles for outcomes that prevent the team from achieving their goals.

Self-organized team

SOT1: Team members support each other.
SOT2: Commonly shared goals within teams.
SOT3: Team do not behave demarcation with the job.
SOT4: Members are thirst for feedback and personal learning.
SOT5: Members celebrate success as a team.
SOT6: Members always finding time for each other preparedness to make decisions.

Project complexity

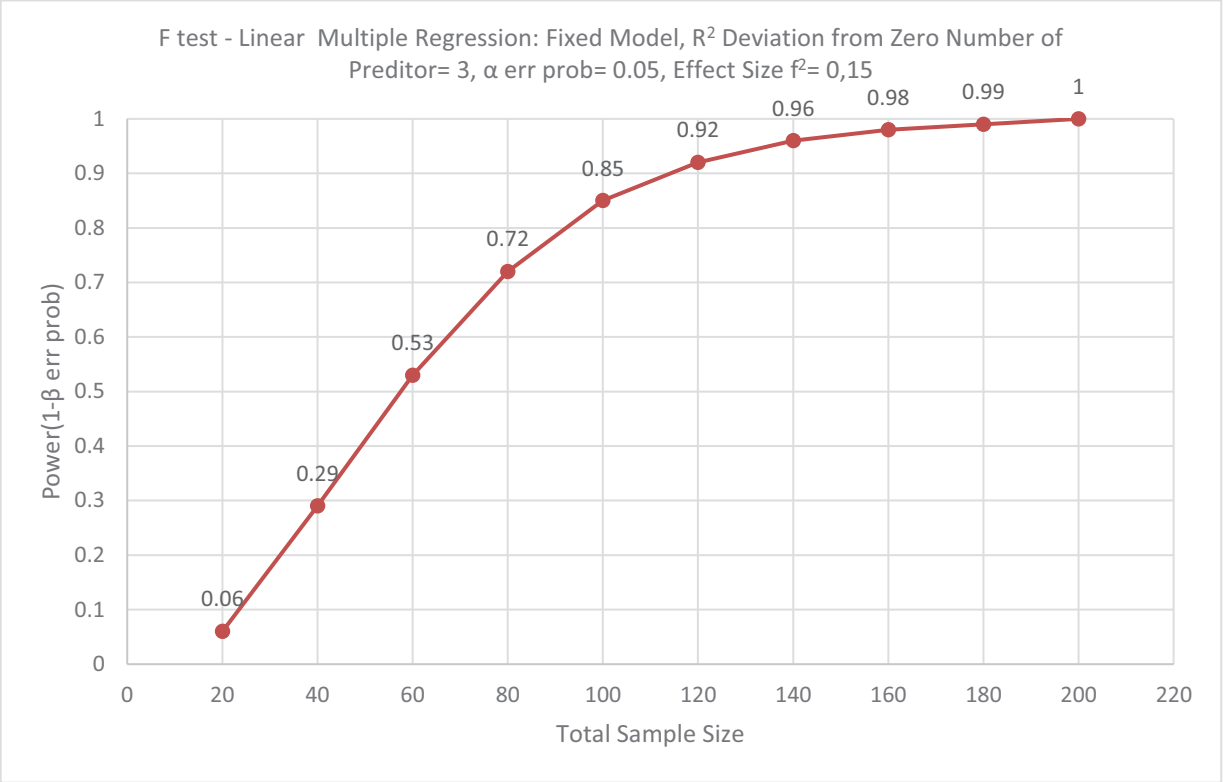
PC1: Having complexity with number of organizational units and departments.
PC2: Being project complex with the lack of experience and social background of organization members.
PC3: Complexity due to absence of the project team's trust.
PC4: Difficulties for project due to cultural differences.
PC5: Environment of changing policy and regulation effects project.
PC6: Risk of using highly difficult technology in the project.
PC7: High degree of obtaining information.
PC8: Impendence of relationship among tasks to achieve a goal.

Project success

PS1: The project was completed on time.
PS2: The project was completed according to the budget allocated.
PS3: The project has maintained quality.
PS4: Health and safety are highly considerable at the project work.
PS5: The Project met its environment goals for environment Performance.
PS6: Project team members/participants were satisfied with the process by which the project was implemented.
PS7: The client was satisfied with the project work.
PS8: The project contributed the commercial value to the company.

APPENDIX B

SAMPLE SIZE FROM G-POWER ANALYSIS



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