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Achieving Agile Team Efficiency by the Application of Lean Approach Through Change Management

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Abstract

Agile teams are meant to function promptly to deliver product components on time, within budget and to the quality expected. With time, it becomes necessary to bring forward changes to the structure and processes in order to improve efficiency of the team. Unfortunately, new elements brought forward usually cause some disruptions in the smooth running of the team day to day activities. This study looks into the application of lean approach towards change management that aims at increasing team by performing proper people management and eliminating wastages. It is known that lean management is a way of analysing the way a business is being done and going forward with the elimination of rules and processes not bringing any value added. The study takes into account various projects categorized as small. medium and large to investigate whether the lean approach is beneficial in achieving team efficiency. A quantitative approach is used involving software developers with experience in using the agile methodology. The findings reveal that the application of lean approach is quite convincing in managing agile teams for the smooth integration of changes. While the benefits of lean approach is seen to be meagre on small sized projects, they are found to be quite substantial on large projects.

Keywords: change management; lean approach; team; agile; people management.

1. Introduction

Change management is the discipline that prepares and bolster people to effectively embrace change, keeping in mind the end goal to drive hierarchical achievement and results. While all changes are unique, and all individuals are unique, decades of research show there are actions that can be taken to influence people in their individual transitions. Change management provides a structured approach for supporting the individuals in organisations to move from their own current states to their own future states. It provides three transition phases in organisations where in the first instant the focus is on the understanding of how employees experience change and what will help them make a successful transition.

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In the second phase, management caters for change at project levels and in the last one, there is enterprise change management which ensures that organisations are able to respond quickly to market changes, embrace strategic initiatives, and adopt new technology more quickly and with less negative impact on productivity. Agile team for instance is considered as cross-functional group of people necessary to produce a working, tested increment of product. The team deals with great risks coming from the clients and the team members. Members of the agile team are highly pressured due to the very short deadlines of their assignment. Normally, the team should deliver working software in a matter of weeks or months, but obviously favouring the shorter timescale. The pursuit of business success coupled with the constant delivery of increased value to customers are major reasons for agile teams to accommodate organisational change [1], [2]. The application of change management to increase along team efficiency is very challenging due to the fact that it requires the time of the team members for its implementation which unfortunately the team cannot devote to. To cater for this lack of time, the use of the lean approach is helpful since its core focus is to maximize customer value while minimizing waste. Simply, lean means creating more value for customers with fewer resources. A lean organisation understands customer value and focuses its key processes to continuously raise it. The ultimate goal is to deliver perfect value to the customer through a perfect value creation process that has zero waste. Disposing of waste along entire value streams, instead of at segregated points, creates processes that need less human effort, less space, less capital, and less time to make products and services at far less costs and with much fewer defects, compared with traditional business systems. Changes may bring along elements of dissatisfaction among the members of the agile team causing them to bring resistances. The lean approach may cater for these shortcomings since it directly impacts the people with its people-oriented approach. For a highly pressured team like an agile one, it is imperative to use appropriate approach to be able to tackle human problems since change management primarily lead to employee problems. Another problem of agile teams is that they may get used to working with only a few members of the team. Agile methods break the team into smaller teams and this create gaps between the team members and thus, there is no bonding. The lean approach can make up for that, since they will have to work together while lean is very people-oriented. Lean is a method which aims at achieving more with less [3]. This study aims at reducing wastes in the process of change management whereby usually much wastage is cropped up in the team. It also look into the possibility of rendering change management more fluid in agile teams.

2. Literature Review

It has always been understood, from a managerial perspective, that emphasizing on activity-centered and control-oriented issues like project execution and delivery of products will determine the probability of success or failure of a software project. The agile approach is specifically intended to address the problem that have historically plagued software development and service delivery activities in the software industry- including budget overruns, missed deadlines, low-quality outputs, and dissatisfied users [4]. The agile method includes the replacement of planning with incremental planning based on the availability of the latest information, address out technical risks upfront and discuss quality issues as early in the process as possible to deliver frequent and continuous business value to the organisation, entrust and empower staff, encourage ongoing communication between the business areas and project team members, and increase in the client's involvement [5]. Nevertheless changes are imminent to happen and the agile processes need to make room for

accommodating these changes. However, the willingness of employees and managers to accept and implement changes recommended by projects need to be given due consideration [6]. Managing people effectively influences many results of a project [7]. This means that people are a key factor in determining the success or failure rate of a software project. Moreover, project managers should engage in activities that go beyond the traditional control agenda, and include in their skills set the ability to guide organisational change projects. Thus, it can be increasingly seen that project management processes must consider how to engage employees from the beginning so that they come to see any initiative as their own, and not simply something to be done because they are told [8]. Project success has much to do with if employees adopt the unavoidable changes that are advocated, leadership, organisational resistance, culture matching, ethics, user/customer satisfaction, and circumstances. Resistance to change at work will determine, at least partially even if the project has been successfully implemented, if the project is a success. The degree to which employees are expected to comply with the wishes of management and remain uninvolved affects the magnitude of employee resistance [9]. In other words, involvement in decision-making will positively or negatively affect resistance to change. Being part of decision-making will make the employees feel that their opinions count.

Lean is an approach to operations management that considers any resource expended that does not add value to the end customer to be waste. Lean emphasizes an array of tools and methods to aid managers and workers in improvement, each designed for specific types of problems to illuminate and remove sources of waste through systems redesign [10]. These methods include Demand levelling, Kanban, Kaizen events and Visual management. The Lean concept apply in software development may ultimately bring increased quality, shortening the time needed and cost reduction. The lean concept is characterised by managing the efficiency and effectiveness of organisation, by putting the emphasis on customer value and waste reduction [11]. Lean Software Development make team focus on conveying value to the client, and on the proficiency of the "Esteem Stream," the systems that convey that esteem and value. The main principles include Eliminating Waste, Amplifying Learning, Deciding as Late as Possible, Delivering as Fast as Possible, Empowering the Team, Building Integrity in seeing the whole. Lean methodology aim at eliminating waste through practices such as selecting only the truly valuable features for a system; prioritizing those selected and delivering them in small sets; emphasizing on the speed and efficiency of development workflow; relying on fast and dependable feedback between programmers and customers. Lean uses the idea of work product being “pulled” via customer request. It focuses decision-making authority and ability on individuals and small teams, since research shows this to be faster and more efficient than hierarchical flow of control. Lean likewise focuses on the proficiency of the utilization of group assets, attempting to guarantee that everybody is beneficial however much of the time as could reasonably be expected. It focuses on simultaneous work and the least conceivable intra-group work process conditions. Lean additionally firmly suggests that computerized unit tests be composed in the meantime the code is composed.

3. Research Methodology

To extract data about the challenges brought forward by the application of lean approach in agile team software development, a quantitative approach was used. Prior to this, semi-structured interviews were first conducted with five experienced software project managers. Discussions were held to identify the most probable problems

that emerge with the issue of change management in agile teams. Following which, a set of 23 questions were developed into a questionnaire which was administered to a set of 75 software developers at software houses where projects are handled using the agile methodology. The questionnaire contained section that included a number of Likert scale questions to rate the degree of agreement to issues pertaining to the implementation of the lean approach with rating scale 1-5 (1: Strongly Disagree (SD), 2: Disagree (A), 3:Neutral (N), 4:Agree (A), 5:Strongly Agree (SA)). The extent at which the lean approach help in meeting out scope, schedule, budget etc were also measured by rating through percentage with scale of (1%-20%, 21%-40%, 41%-60%, 61%-80%-,81%-100%). The 23 questions and was divided in four parts to:

(I) Check if participant knows about Agile Methodology;

(II) Check if participant knows about Lean Approach;

(iii) Check if Lean has helped in managing change and helped in waste removal;

(IV) General information about the participant.

The first part, questions one to three, targets the knowledge of Agile methodology of the participants. These three questions will find out if the participants have used Agile and if they find it better than other traditional software methodologies. The second part, questions four to eight, find about Lean Approach and if the user has ever used it or if they have ever heard of it. Third part, questions nine to eighteen, ask about change management with respect to Lean Approach and all the benefits from using Lean Approach. From this part of the questionnaire, we will know the past experience of the participants from using Lean Approach to manage change and eliminating waste; how the approach helped in boosting the revenues/profits of the project by eliminating or controlling waste and defects. The last part, questions nineteen to twenty-three, are demographics information asked from the participants like their work experience, age and level or position in their respective teams among others. These information will allow the analysis with respect to their seniority and work experience and the benefits of Lean Approach.

4. Results and Discussion

The quantitative data were analysed using SPSS version 22. Respondants in terms of gender was quite equal with almost same number of male and female in the study. the participants involved in the study are quite matured. We have only 5% of the participants which are under 25 years old. 25% of the population has between twenty-six to thirty years. We have 70% of the population who are above thirty-one years old participating in the study. As regards to the size of the project teams, they are found to be quite large enough, that is, we have 45% of the population having a large team of more than twenty-five team members. Larger teams will imply that a better change management, people management and best leadership will be needed. The sizes of these teams fit perfectly for the purpose of this study. The population represents 5% of juniors, 27.5% of seniors, 32.5% of team leaders and 27.5% of managers who have participated in the study. The majority of the participants, being seniors, are more reliable with the data they will provide to the study. The results would be accurate with respect to their seniority as they would have worked on several projects before. 47.5% of the

participants were between three to five years of work experience and 45% of the participants having more than five years of work experience. This implies that we have a really reliable pool of data on which we based our study. Only 7.5% of the respondents have little or no work experience and this is quite meager in comparison to the persons having experience. These participants are experts in their domains and field and have valuably accurate data to provide to us for the purpose of this study.

Table 1: How far do you agree that agile is better than traditional methodologies?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	17.5	17.5	17.5
	Disagree	4	10.0	10.0	27.5
	Neutral	7	17.5	17.5	45.0
	Agree	12	30.0	30.0	75.0
	Strongly Agree	10	25.0	25.0	100.0
	Total	40	100.0	100.0	

Table 1 above shows that 27.5% of the population does not agree that agile is better than traditional methodologies; we also have 17.5% who are neutral and have no opinion. But the majority of the population, i.e. 55%, all agree or strongly agree that agile is better. We use regression analysis on the number of work experience and size of team with respect to the project completed using Agile Methodology, from which we can see that R-squared (R^2) is approximately 75% which is quite high as shown in Table 2, 3 & 4.

Table 2: Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.161[a]	.026	-.028	1.42381

a. Predictors: (Constant), Size of project (No. of members), Work Experience.

Table 3: ANOVAa.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.943	2	.971	.479	.623[b]
	Residual	72.980	36	2.027		
	Total	74.923	38			

a. Dependent Variable: What percentage of your projects were completed using agile methodology?

b. Predictors: (Constant), Size of project (No. of members), Work Experience

Table 4: Coefficients.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.714	1.240		2.189	.035
	Work Experience	-.041	.332	-.021	-.125	.901
	Size of project (No. of members)	.290	.297	.162	.979	.334

a. Dependent Variable: What percentage of your projects were completed using agile methodology?

From these tables, we can see that the amount of experience and size of teams are quite high, and we have all these participants having high amount of work experience using Agile in past and present projects. As regards to speeding delivery, Agile Methodology is usually known for rapid delivery of projects or small chunks called deliverables. Adding Lean Approach with Agile methodology has helped the quick delivery of the projects. As per Table 5., 68% of the population agrees that Lean Approach has helped to deliver their projects more rapidly.

Table 5: Speed at which delivery is made.

	Lean approach has helped in delivering projects as fast as possible.					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Junior	0	0	0	0	2	2
Senior	2	3	0	0	3	8
Team Lead	0	1	1	2	4	8
Manager	0	0	1	4	2	7
Total	2	4	2	6	11	25

Having a high-spirited team will yield wonderful results and outcomes for the projects. Lean Approach can be used to help motivate and keep the team members in high spirit, for example, by giving recognitions to the best employee. We have asked questions to the participants on this part. It was found that 60% of the pool of participants agreed that Lean Approach has helped in keeping the spirit of the team members high. With reference to the waiting time for a resource, in general this is a stressful situation for team members, using lean approach we found from Table 6 that for small projects Lean Approach does not really matter since for small projects it amounts to approximately 22%. However, for large projects it is clear that the project with Lean Approach waits shorter time to have their requested resources than the other project.

Table 6: Waiting time for resource.

		What is the percentage of waiting time for the following on your projects? (Using Lean Approach) [resource (PC/Laptop/Hardwares)]					
		1%-20%	21%-40%	41%-60%	61%-80%	81%-100%	Total
Size of project (No. of members)	1-10 (Small)	2	2	2	0	2	8
	11-25 (Medium)	3	1	4	2	2	12
	25-more (Large)	7	5	3	0	2	17
Total		12	8	9	2	6	37

As regards to manage changes in teams, this is always considered as a hard task because it involves people and anything involving people is hard. Not all people are the same nor do they think alike and thus there is no standardization as such to take into consideration. Using regression analysis, we can see from Table 7, 8 & 9 that the R-squared (R2) coefficient is approximately 82% which is quite high. We can interpret this data as the size of the team will matter in the change management process when using Lean Approach. The greater the team, the better and easier it will be to manage the change.

Table 7: Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.026[a]	.001	-.026	1.48587

a. Predictors: (Constant), Size of project (No. of members)

Table 8: ANOVA[a].

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.054	1	.054	.025	.876[b]
	Residual	81.689	37	2.208		
	Total	81.744	38			

a. Dependent Variable: The lean approach has helped in managing project risks and opportunities in my projects.

b. Predictors: (Constant), Size of project (No. of members)

Table 9: Coefficients[a].

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.379	.732		4.614	.000
	Size of project (No. of members)	.048	.307	.026	.157	.876

a. Dependent Variable: The lean approach has helped in managing project risks and opportunities in my projects.

Table 10: Time wasted in implementing change management.

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.151	4.094	1	23	.055	4.101	-.578

The graph below indicates that, for a project using Lean Approach, the bigger the team is; the less time is lost while going through the process of change management. Even for the small and medium size teams, the percentage of time loss is minima while using Lean Approach.

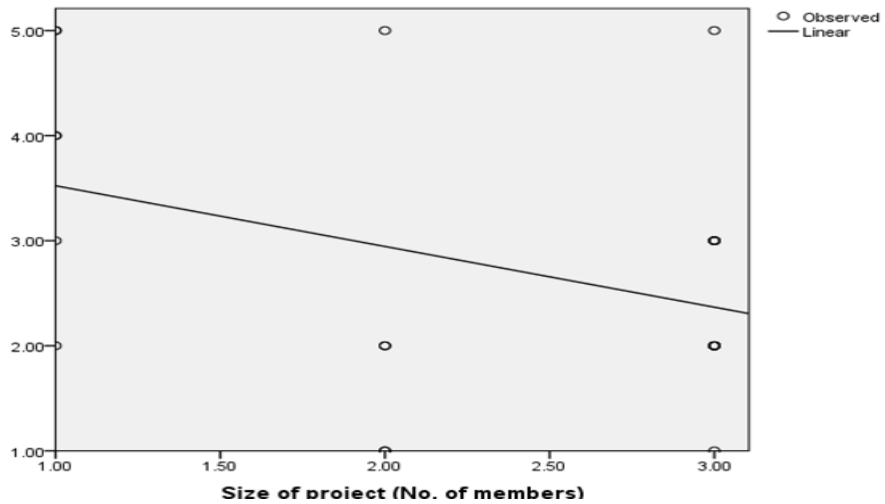

Figure 1: % of time wasted in implementing change management.

Figure 2 shows that lean approach helps in managing risks and opportunities for all size of projects. The difference between the sizes of the projects does not really show big contrast with regards to the management of risks. When we say risks in a project, it also includes change management because change is a big risk to the project. Some risks may be high employee turnover; newcomers' training requires time which is rarely enough for the work on the project itself and making the team members understand the ever-changing requirements.

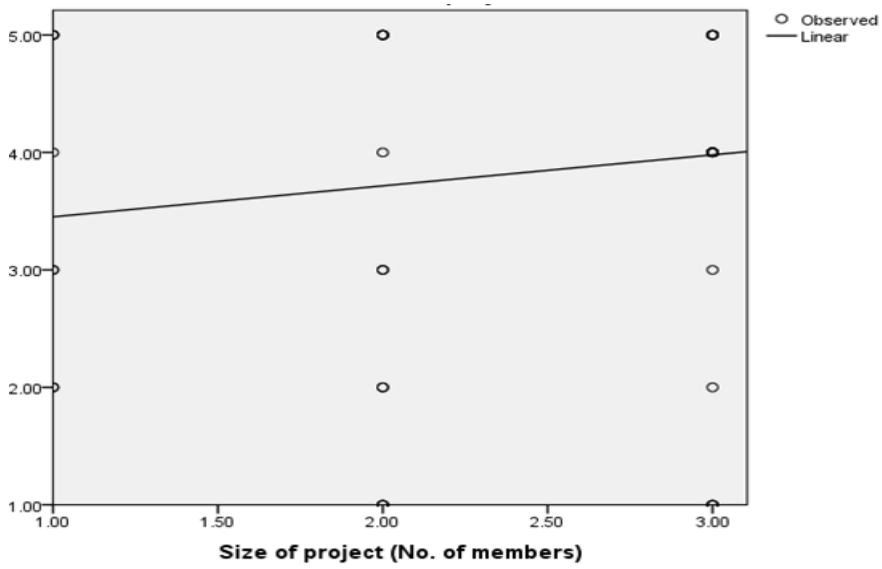

Figure 2: Lean approach in managing project risks.

5. Conclusion and Recommendation

The software development industry is constantly accommodating changes and the need to use appropriate approach in order to improve efficiency is more than ever a must especiallay on agile projects. The capacity to manage the capricious exigencies is guaranteed by coordinating agile methodology in software development processes. The agile methodologies allow the client to give consistent criticism, taking out the hazard that the team may convey an item that does not satisfy the client needs any longer by the time that it reaches the market. The other advantages related with agile methodologies, for example, small to medium development teams, the autonomy to organize and settle on decisions about their work, and so forth enhance communication among colleagues and increase their productivity. Indeed, the efficiency of the team is a primary factor to be considered when expecting to make hierarchical progress, along these lines the point of this study was to discover approaches to gauge and enhance productivity. As seen in the study, Lean Approach has been a key factor for success in many managers and team leaders' projects by giving them the edge. With the Lean Approach it is found that change management is smoother and it also helps with the increase of productivity of team members. The analysis above confirmed that Lean Approach facilitated the Change Management process. Less time is needed for the process and it is very much people-oriented. Implementing the Lean Approach to cater Change management in Agile teams is a way to set up clear structures to ensure that members of the same team will work together using a standardize process. The staff should also be helped by making them understand the methodology clearly. Lean Approach should be used to manage project risks with aim to reducing and minimizing it. Lean Approach as demonstrated in the study facilitate change management making up the teams understand and accept changes.

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