

ASSESSING THE PERFORMANCE OF AGILE METHODOLOGY: A CUSTOMER PERSPECTIVE

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ABSTRACT

Agile methodology is growing as the preferred software development methodology in organisations, due to its adaptability to changing customer requirements and quicker times to market of its products. The methodology is based on the agile manifesto, with the highest priority believed to be the focus on customer satisfaction. While prior studies suggest that customers are satisfied with the agile methodology, there is no empirical evidence that attests to this and very little is reported in literature on the customer's perspective. This paper explores the customer's perspective of the products developed using the agile methodology as a measure for the methodology's effectiveness in fulfilling the manifesto's highest priority, 'Customer Satisfaction'. From a quantitative study followed, customer representatives participated in a self-administered survey, to provide insight into their experience of the products developed using agile methodology. A total number of 250 questionnaires were distributed for users in different areas of work and 152 (60.8%) responses were received. After the results were collected, they were then exported to Microsoft Excel for further analysis. The results of the study are used as a metric to measure the effectiveness and benefit of the methodology. The customer's experience of the product developed using agile methodology reveal that the bulk of agile products are failing with only 38 % being satisfactory. There is a clear difference between agile methodology as advocated for in theory and the practice, with a clear shift in focus from customer satisfaction to a mere driver of faster delivery of the product. This research makes a clear contribution as it unpacks the challenges and provides suggestions to improve practices.

Key words: Agile methodology; customer satisfactions; project management; customer's perspective; Product usability.

INTRODUCTION

The best scenario one hope for in handling software projects is that customers knows exactly what they want, that developers know how to build it and that nothing will change along the way. The realisation that this is nothing more than a wish list has led organisations to rely on agile methodology for delivering software projects.

Agile methodology has become the popular software development methodology and is now adopted by many organisations (Hussain, Slany & Holzinger, 2009; Lindvall *et al.*, 2002; Rodriguex *et al.*, 2009; Schlauderer & Overhage, 2013; Hoda & Murugesan, 2016). The agile methodology enable organisations to accept that customers discover what they want as they continuously provide requirements and see prototypes of their requirements, and that the developers discover how to build the solution as they go on, and that the requirements change along the way.

The Agile methodology is mainly used in project management to deliver products to customers in the quickest possible time (Hoda & Murugesan, 2016). The overall project is broken down into smaller packages called sprints. The customer/business representatives are included in the project team as subject matter expert (SME) from whom the requirements are elicited from. The methodology is based on the manifesto created in 2001. The agile manifesto believes in facilitating change instead of attempting to prevent it, and trusts in the ability to respond to unforeseen events such as changes in the customer's requirements. The purpose of the agile methodology is to have team collaborations, minimise documentation, and provide early software releases while being able to respond to rapid changes in customer requirements. "The methodology's highest priority is to satisfy the customer through early and continuous delivery of valuable software".

The methodology only aims to satisfy customers with a product that is working and not much effort is given to whether the product gives the customer competitive advantage in terms of usability. (Jurca, Hellmann & Maurer, 2014), stated that "Agile on its own does not address the usability of the software product". The purpose of developing products for customers is to assist the customers in becoming more efficient and effective in their work, therefore if the

delivered solution is not user friendly; customers are bound to be dissatisfied about the solution/product delivered. The aim of this paper is to add to the body of knowledge in the discipline in terms of supplying insight into the customer's experience and perspective of the product delivered using agile methodology and the extent to which the customers are satisfied with these products.

LITERATURE REVIEW

Agile methods are gaining popularity in software development organisations and therefore, many organisations are adopting them to improve their software products and customer satisfaction (Hussain, Slany & Holzinger, 2009; Lindvall *et al.*, 2002; Rodriguex *et al.*, 2009; Schlauderer & Overhage, 2013; Olszewska *et al.*, 2016). For agile to be adopted successfully, organisations need knowledge and understanding of how agile work and how can it benefits their software development process (Moravcová & Legeny, 2016). Agile methodologies are reliable engineering and management practices, capable of helping in the development of quality and successful software products in software development (Ghani & Bello, 2015).

Organisational drivers for the use of agile methodology

Agile methods are used in software development in order to address the need to fast track the delivery of IT products and ensuring that customers are happy with the deliverable (Fowler & Highsmith, 2001; Williams & Cockburn, 2003). Agile methods promote team collaborations, minimises documentation, and provides early software releases while being able to respond to the rapid changes in customer requirements (Cockburn & Highsmith, 2001).

According to (Campanelli & Parreiras, 2015; Hoda & Murugesan, 2016), more and more IT organisations that are involved in software development are adopting agile methods because of their advantage over traditional software development methods, such as waterfall. Agile methods reduces the time to market significantly due to their flexibility that can be managed in increments (Campanelli & Parreiras, 2015). Agile also improves quality, productivity and the information technology, ensuring that there is business alignment and are improving customer's satisfaction (Campanelli & Parreiras, 2015). As stated by (Dikert, Lassenius & Paasivaary, 2016), agile methods have become extremely

attractive options for companies in refining the company's performance, of which the main purpose of introducing agile was for small and individual teams. According to (Gandomani & Nafchi, 2016), agile methods deals with the gaps that traditional methods could not cover, ensuring that customers are always satisfied. Customers are more satisfied with the deliverables of agile methods as they are always engaged and their inputs are encouraged throughout the process (Dikert, Lassenius & Paasivaara, 2016). The need for a dynamic methods that are able to respond to changing customer requirements, with fewer documentation and ability to deliver products early are of utmost importance and agile methods are a possible solution (Nerur, Mahapatra & Mangalaraj, 2005; Williams & Cockburn, 2003). Agile projects are more successful as compared to traditional projects and customers has shown much satisfaction with the end product (Ghani & Bello, 2015; Kamei *et al.*, 2017).

Intended Benefits of agile methodology

Agile methodology aims to achieve its purpose by having the customers as subject matter experts in the team during the development of the products; thus improving the product's chances of meeting customer's expectations (Ghani & Bello, 2015; Kamei *et al.*, 2017). The Agile Manifesto, states as a principle that "agile methodology's highest priority is to satisfy the customer through early and continuous delivery of valuable software" (Fowler & Highsmith, 2001), therefore, allowing for the "Agile processes to harness change for the customer's competitive advantage". The methodology thrives on close customer interactions and feedback. The overall objective of the agile methodology is to improve the services of IT to customers in terms of the delivery of new software products (Fowler & Highsmith, 2001; Lindvall *et al.*, 2002). At its core, the agile methodology aims to satisfy customers and deliver products that enable the customers to gain competitive advantage over their competitors (Ghani, Bello & Bagiwa, 2015). Agile methodologies follow the traditional software development life cycle (SDLC) in which the phases includes gathering requirements and analysis, design, development, testing, deployment and maintenance (Hussain, Slany & Holzinger, 2009; Sharma & Sarkar, 2012). The methodology differs from the traditional waterfall methodology in that, in an agile environment, the project deliverables are divided into smaller packages called sprints or increments instead of developing the customer requirements as a whole (Ghani & Bello, 2015). In an agile project, the development team works on each increment or

sprint until customers are satisfied with the product (Farlik, 2016). The agile methodology is aimed at having faster development times with as few as possible defects. “The Agile Manifesto and Agile Principles form the basis for defining the concepts of “agile” and “agility” (Hussain, Slany & Holzinger, 2009). Projects that follow the agile methodology require less planning as the project tasks are divided into small increments, allowing customers to be engaged throughout the development process and by so doing the success rate of such projects are very high (Huo *et al.*, 2004, Sharma & Sarkar, 2012). Agile methodology is mostly preferable for projects with volatile requirements and that are short in duration (Huo *et al.*, 2004; Nerur, Mahapatra & Mangalaraj, 2005). They require team collaboration between the developers and the customers, enabling fast changes before the final product is delivered unlike traditional methods where customers are only engaged at the end of the development life cycle (Cockburn & Highsmith, 2001; Huo *et al.*, 2004, Nerur, Mahapatra & Mangalaraj, 2005). Agile developments are iterative, have modularity, are incremental, adaptive, and collaborative and people oriented (Huo *et al.*, 2004, Sharma & Sarkar, 2012). Agile projects can be identified by their adaptive nature to the changing requirements of customers, short delivery periods and emphasis on customer focus and team collaboration. In the process on engaging and focusing on the customers, the delivery of satisfactory product to the customer becomes evident (Chan & Ying, 2014). The advantage of agile methodologies lies in their iterative nature and ability to adapt to changes in the customer requirements (Maurer & Hellmann, 2013; Sharma & Sarkar, 2012). The methodology’s reliance on close customer relations and feedback gives the developers an opportunity to deliver products that satisfies the customers (Chan & Ying, 2014). Another advantageous aspect of agile methodologies is that the close customer engagement improves the chances of the products developed meeting the customer’s expectations and acceptance.

In an agile project, no extensive documentation is required, only the product list, the customer user stories, duration for each iteration and the delivery date are documented (Maurer & Hellmann, 2013; Sharma & Sarkar, 2012). This saves time for development and allows for deliverables to be delivered in the least possible time. The methodology reduces the risks in development as customers provide constant feedback on each and every increment developed (Maurer & Hellmann, 2013; Sharma & Sarkar, 2012). This helps developers foresee any

risks that may occur at later stages of product development. There are various methodologies for implementing the agile process, and the three mostly adopted methodologies are extreme programming, scrum and feature driven development (Chan & Ying, 2014). The methodologies are focused on various aspects of the software development life cycle, for example, extreme programming is focused on agile practices and scrum is focused on managing the software project.

Possible changes to improve the success of agile products

Along the various agile methodologies, various enhancements and recommendations have been made in an attempt to enable agile methodologies to provide customers with products that are user friendly with the aim of improving customer satisfaction with the products developed (Sharma & Sarkar, 2012). One of the proposed enhancements was the user-centric designs that integrated the agile methodology with Usability Engineering.

In a survey study conducted by (Hussain, Slany & Holzinger, 2009), with a sample population comprised of project/programme managers, developers/software engineers/programmer, executives/directors, consultants, and other respondents, it was discovered that the integration of agile methods with usability/User Centred Designs(UCD) added value to products delivered to the customer. The results of the survey study showed that the respondents perceived that the integration added value to their adopted processes and teams, which resulted in the improvement of usability and quality of the product developed and thus increased the satisfaction of its end-users (Hussain, Slany & Holzinger, 2009). Still with all the efforts focused to delivering satisfactory products to the end-users/ customers, not much work has been done to establish if indeed the customers are satisfied with the products developed.

Challenges of agile methodology

Agile methodology places emphasis on the product to be delivered, time, and requirements gathering, not much consideration is given to understand the overall customer's perspective of whether the product is satisfactory and verify if customers are satisfied as stated in the agile manifesto (Ghani, Bello & Bagiwa, 2015). One of the major disadvantage of agile methodologies is that they rely heavily on the customer, so if the customer representative is not clear about the

product features the development process can go out of track (Hoda, Noble & Marshall, 2010; Sharma & Sarkar, 2012). As a result of the least documentation, it is not possible to keep track of all the changes done in development as the increments are continuously altered to accommodate customer's changing requirements (Kamei *et al.*, 2017).

The methodology is very time consuming on the developers side as they constantly change code based on the customers' requirements (Sharma & Sarkar, 2012; Olszewska *et al.*, 2016; Kamei *et al.*, 2017; Alsahli, Khan & Alyahyaa, 2017). It wastes the time, effort and resource required to develop one increment. Another possible disadvantage of the agile methodology is that due to the unlimited iterations accepted the products might not be delivered early. The biggest concern of agile methodologies is how the project manager and the development team understand the customer's requirements for development purposes (Olszewska *et al.*, 2016; Alsahli, Khan & Alyahyaa, 2017). (Schlauderer & Overhage, 2013), stated that "little research has focused on examining how customers perceive agile development" and (Huo *et al.*, 2004), further stated that, in an agile environment "customers help developers refine and correct requirements". Agile methodologies address the difficulties of development in organisations by putting practices such as collaboration between customers and developers to make the engineering process effective (Beyer, Holtzblatt & Baker, 2004). The main aim is to satisfy customers with a product that is working and not much effort is given to whether the product gives the customer competitive advantage in terms of usability (Jurca, Hellmann & Maurer, 2014), stated that agile on its own does not address the usability of the software product. The purpose of developing products for customers is to assist the customers in becoming more efficient and effective in their work, therefore if the delivered solution is not user friendly, customers are bound to be dissatisfied about the final product.

Literature shows that work have been done with regards to the benefits of adopting agile methodologies such as improved customer satisfaction, and yet none of the works done included the perception of end-users. Quoted from (Hussain, Slany & Holzinger, 2009), "The survey results support this as the majority of the respondents perceive that the integration of agile methods with usability/ user-centered designs has added value to their adopted processes and to their teams. They also perceive that the adoption of an agile user-centered

design process by their teams has resulted in the improvement of usability and quality of the product developed and has also increased the satisfaction of its end users.”

METHODOLOGY

The methodology followed in this research project was a quantitative research in which a structured self-administered questionnaire was used to collect data since the main aim of this research study is to evaluate customer’s perception in the performance of agile methodology. Expert sampling is a purposive non probability sampling method used when the researcher wants to find opinions from experts in a particular field (Etikan & Bala, 2017). This research study is looking for opinions from customers who are experts in using agile methodology on their daily activities and therefore expert sampling method was deemed more appropriate. The sample population was composed of people who work in corporate organisations in which the agile methodology is used for delivering solutions. The questionnaire was divided into three sections, namely Section A: Classification and Scoping, Section B: Customer’s perspective and Section C: General Perspective. The participants are classified by department, number of years in an organisation and their participation in the delivery of a project delivered using agile methodology. A total number of 250 questionnaires were distributed for users in different areas of work and 152 (60.8%) responses were received. The collected data was then exported into Microsoft Excel for further analysis

FINDINGS

The aim of the research was to uncover the customer’s perspective on software project’s products delivered using agile methodology. The survey results were aimed at providing empirical evidence on the performance of agile methodology, identify the challenges and provide suggestions for improvement.

Figure 1 Provide the profile of survey participant based on the department in which they have been working.

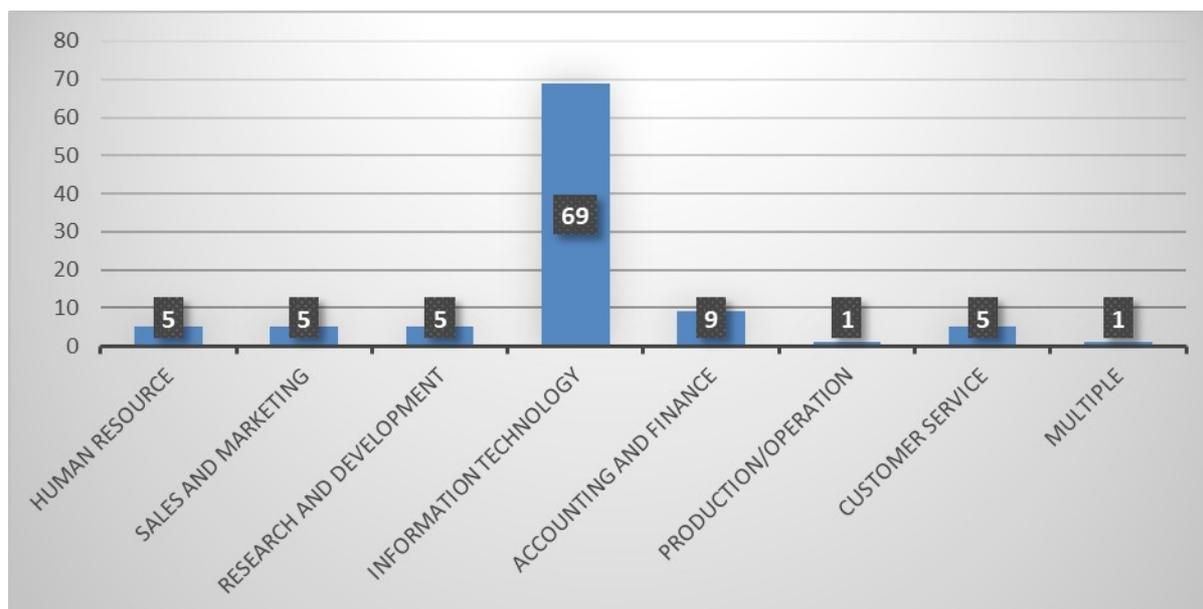


Figure 1: Participants' area of work

Figure 1 indicate that most respondents are from the IT departments. It must be clarified that these IT departments are not the actual developers of agile products but clients for whom agile products are developed. Given the fact that IT professional have a better understanding of how to judge the quality and performance of an IT product, it can then be assumed that the feedback provided reflect the real performance of agile products.

Figure 2 reflect on the success of agile products as experienced by the user of the products.

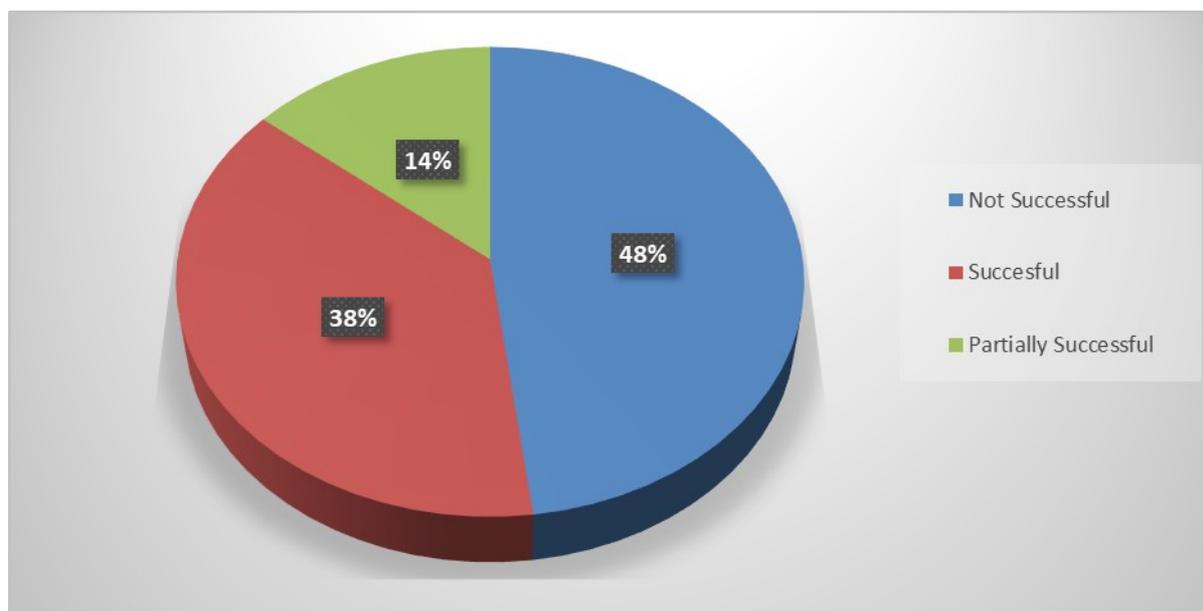


Figure 2: Success of agile product

Figure two (2) clearly indicate a considerable failure in products delivered using the agile methodology. This is contrary to the way the performance of agile methodology is being portrayed in the literature. With only 38% of agile products being considered as successful it is concerning given the increased adoption of agile methodology in organisations.

Figure 3 looks at the success component of the survey and analysis how successful products were delivered.

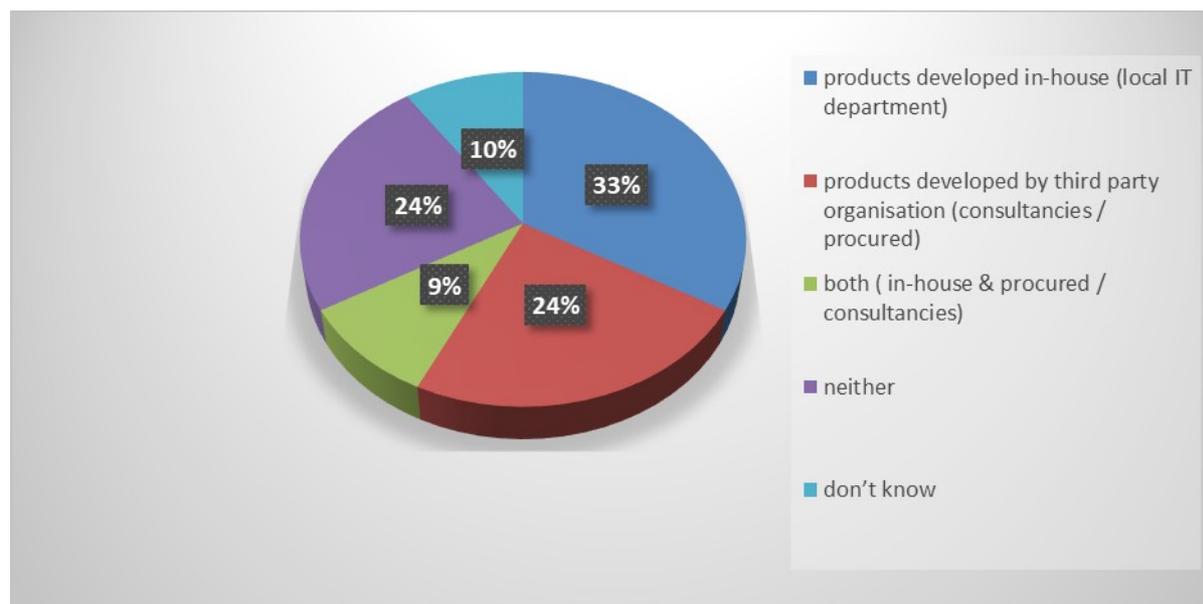


Figure 3: The mean through which successful products are delivered.

Figure three (3) reveals that most successful products are the one developed in house. This can be linked to the fact that when product are developed in house the proximity between developers and users enable real time interaction and collaboration, which result in product that reflect exactly the customer expectations. Moreover, the developer understanding of the organisational environment add to their ability to be responsive to the need of the customer.

The results in figure 4 can be confirmed by studies of (Ghani & Bello, 2015; Kamei *et al.*, 2017). Figure four (4) provide an overview of what organisation using agile methodology expect to achieve as benefit.

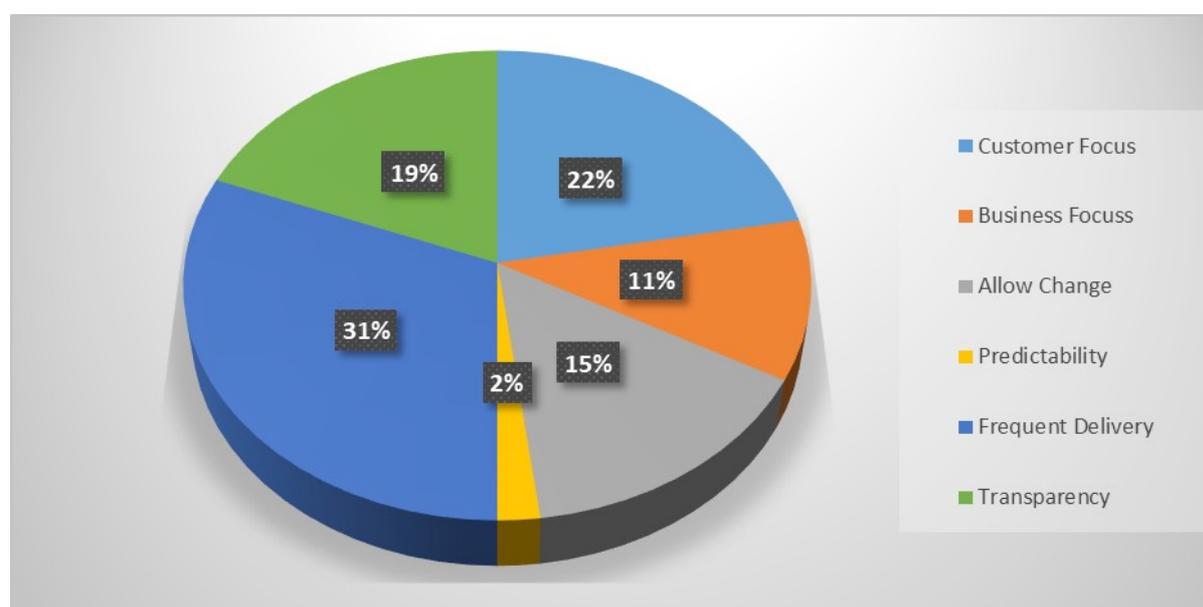


Figure 4: Expected benefit of agile methodology

From figure four (4) it is clear that there is shift in the benefit organisations strive to achieve by using agile. While literature consider customer focus as the main goal of agile methodology, the results from practices indicates that this has been overtaken by the need for frequents delivery of the product's components.

Figure 5 illustrate the assessment of what drives organisations in the use of agile methodology instead of traditional methodology. It can be concluded according to Dikert, Lassenius and Paasivaary (2016) that customer satisfaction, early return on investment and faster time to market remains the drivers for agile methodology.

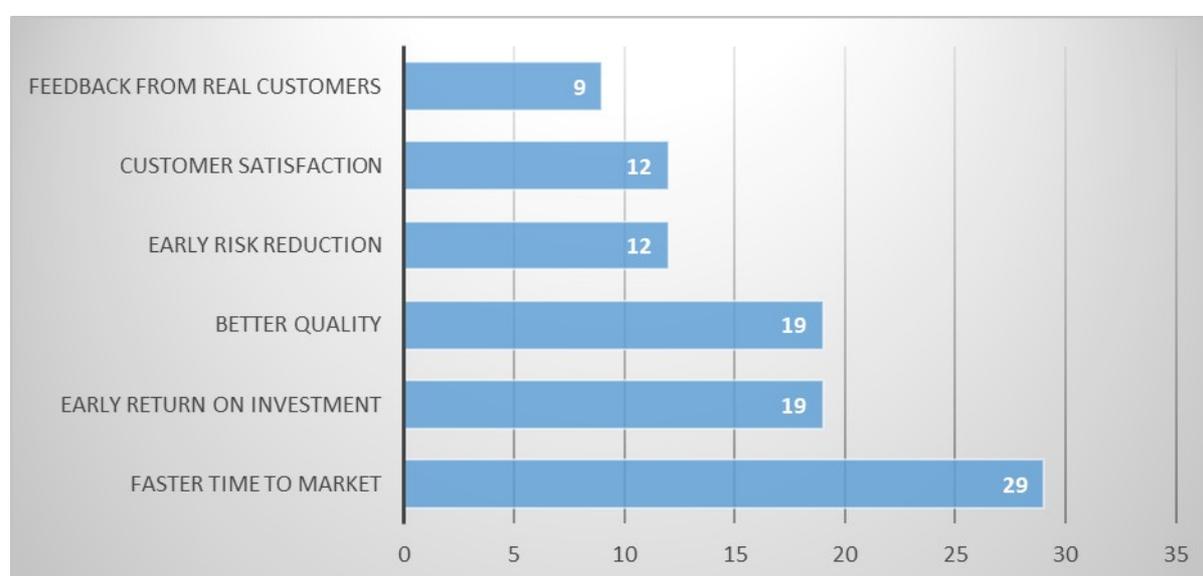


Figure 5: Organisational drivers for the use of agile methodology

Following from figure four (4), figure five (5) also indicate that what currently influences organisations to go agile with their projects has more to do with faster time to market than customer satisfaction as intended in the agile manifesto. The fact that risks detection, customer satisfaction, and feedback from customers are the last of organisational drivers speaks volume to the quality of the outcome.

Figure six (6) reflect the challenges faced by organisations using agile methodology for the delivery of their projects, at the least from the customers' perspectives.

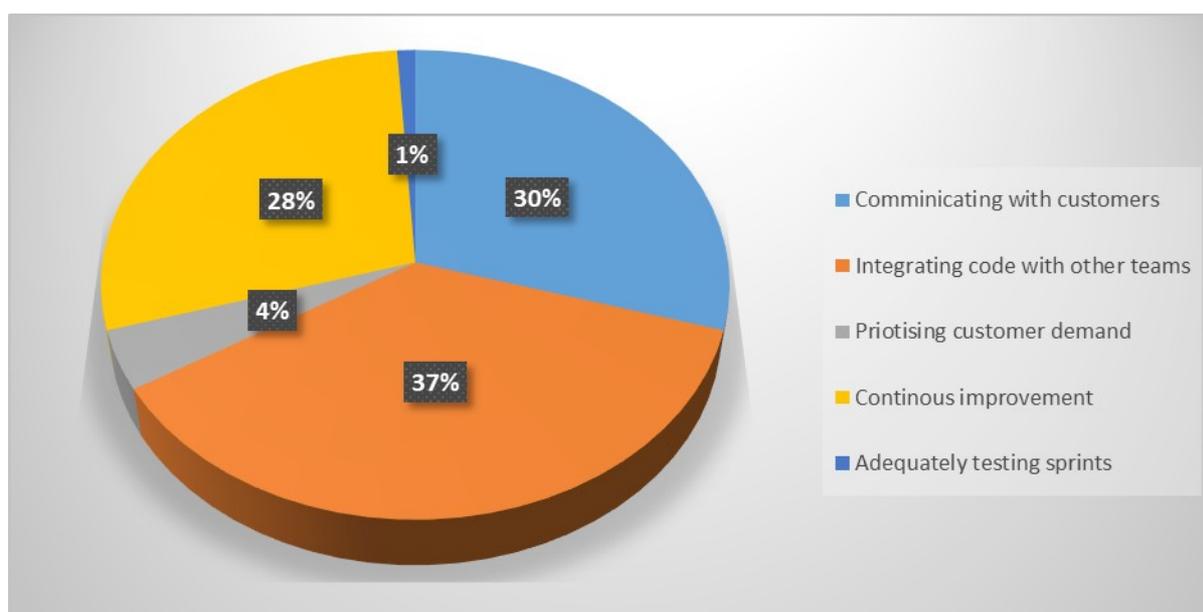


Figure 6: Challenges of using agile methodology

Figure six (6) highlight the key challenges that participants singled out as the one hampering the success of agile methodology. While integrating codes tops the list, the concerns with regards to communication between the project team and the customer represent 30% of the problems. Given the impact of communication on project succes, these results speaks to the success rate reported earlier.

Figure seven (7) report on the suggestion for improving the success of agile products.

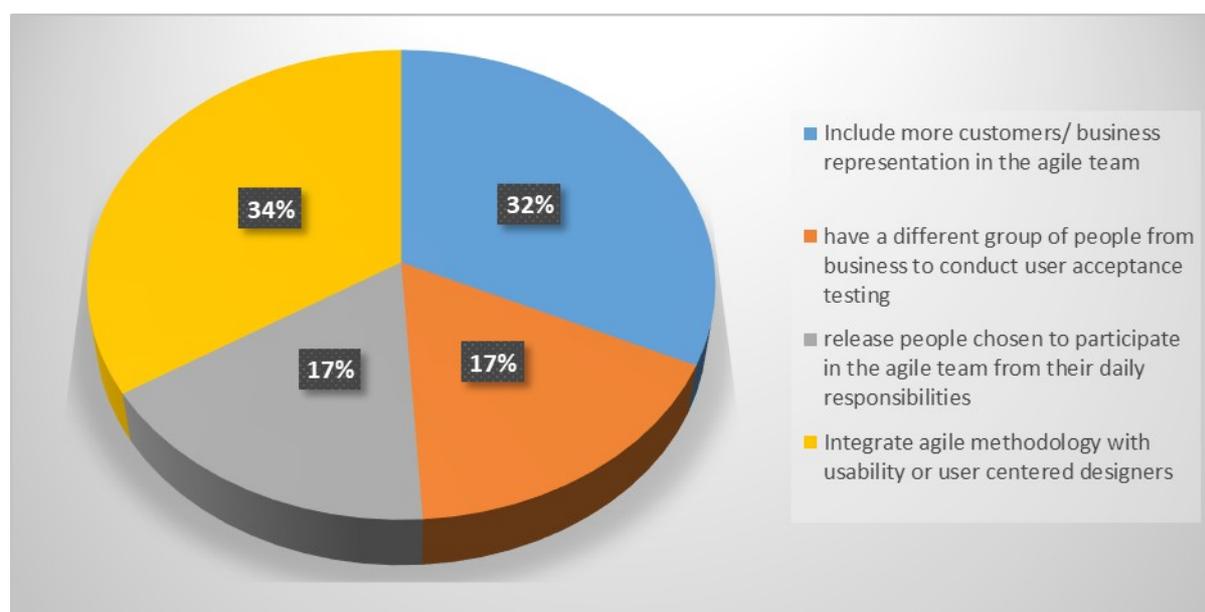


Figure 7: Possible changes to improve the success of agile products

Figure seven (7) indicate that much of the changes needed to address the shortfall of agile methodology are related to users or the customers of the product being developed. Including more people from business into the project team, having business people others than those part of the project team to conduct the test, and developing the project product with a focus on its usability represent 93% of the suggestion made for improving agile practices.

Figure 8 deals with the competency of project team members

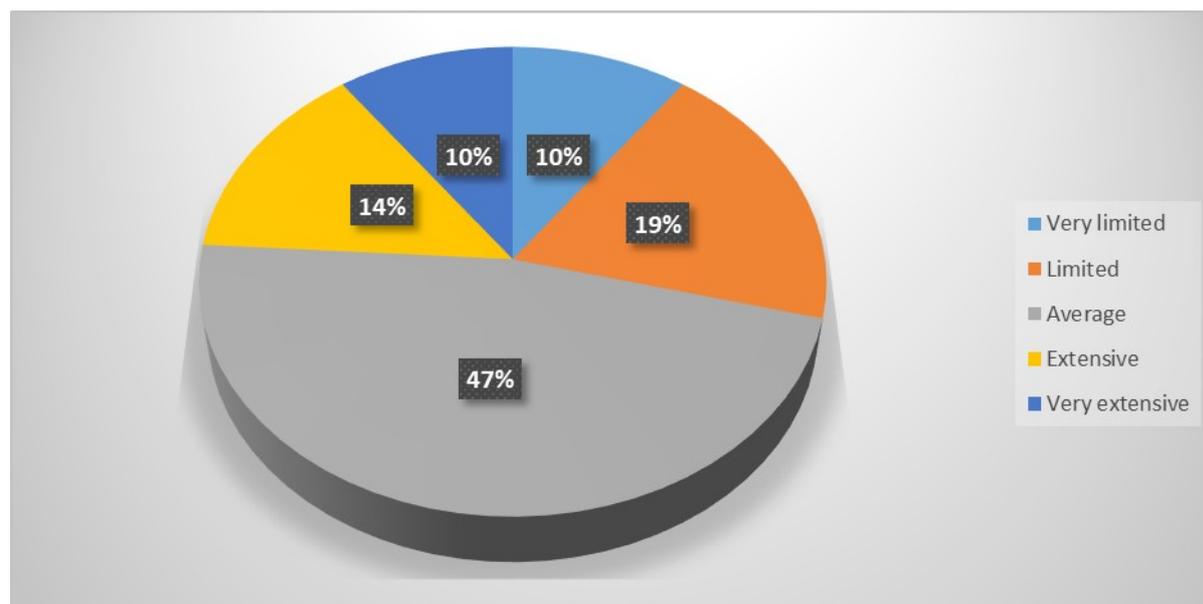


Figure 8: Agile team's knowledge of agile methodology

The results pictured in figure eight (8) indicate that the bulk of agile team members have from average to limited or very limited knowledge of the methodology. By looking at people with extensive and very extensive knowledge of agile methodology among agile team members, it can then be concluded that only 24% of team members have an understanding of how to develop projects using agile methodology.

CONCLUSION

In this paper, we have carried out a quantitative study to provide empirical evidences of customers' perspectives of product developed using agile project management methodology. This was coupled with the analysis of the benefit and challenges of using agile methodology as well as way of improving current practices. Organisations are increasingly adopting agile methodology as the preferred way of managing the delivery of IT products. The main finding of this study is that while agile methodology is being perceived as the best approach for managing IT projects, the projects' products resulting from agile processes are considered as unsuccessful by their intended customers.

Given the fact that the agile manifesto consider customer satisfaction as the key focus, our finding questions why organisations adopt agile methodologies. If 48 % of agile products are failing and a further 14% as partial failure what then drives organisation to adopt agile, and what are organisations achieving by using agile methodology. One factor emphasised strongly in our finding is that there is a gap between theories and practices around agile methodology. This is illustrated by the shift in the key driver and benefit of agile methodology, from customer satisfaction advocated for in theory to faster time to market and frequent deliveries indicated in practice. By turning the focus away from customer

and neglecting to satisfy them, the quality and usability of the final product cannot be guaranteed. In addition to the gap identified between theory and practice, we also identified the challenges hampering the success of agile methodology. These challenges includes code integration, communication with customers, continuous improvement, prioritising customer demand, and adequately testing the sprints.

Furthermore, respondents provided suggestions for improving current agile practices. The analysis of these suggestions reveals that the majority of them relate to improving customer satisfaction. They include merely including more business representation into the project team to ensure that the customer voice is heard throughout the project lifecycle, have different people from the business to conduct user acceptance tests, and integrate agile methodology with usability. The results of this study could have been strengthened by focusing on specific industry.

It must also be noted that it was find that less team members have knowledge of agile methodology. This is critical, as success cannot be expected when people driving the process are clueless about the methodology itself. This might also require that academic institutions changes the focus of their offering from traditional project management methodology to agile methodology to fill the gap.

FUTURE RESEARCH

Possible future research study could be to investigate the extent to which agile products deliver on the benefit for which the project is undertaken, after implementation. Future research study can also focus on specific customer and specific industry as currently the results depicts different angles from different industries and no conclusion can drawn on challenges, benefits and drivers of agile methodology on specific industry.

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