Success Factors for Building and Managing High Performance Agile Software Development Teams

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Abstract

Information technology (IT) project success depends on having a project manager with effective decision-making, leadership, and project management (PM) skills. Project success also depends on completing the project in a given budget, time, and scope. However, there is a limited understanding of the Agile Leadership Effectiveness in Leading High Performance Team. Agile Software Development Team (ASDT) success factors such as organizational, people, process, project management, technical, trust, and so forth. The purpose of this paper is to present and synthesize the success factors generally accepted as critical in building and managing high performance ASDTs. These success factors consisted of ASDT (e.g., structure, member' competencies, commitment and trust, communications, goals, and collaboration), leading ASDTs (e.g., leadership styles), workplace factors (e.g., cultural, functional and organizational differences), technologies (e.g., development tools), and organizational, people, process, and technical factors. Organizational leaders and practitioners from various industries who are building or managing ASDTs could be of benefits with the researcher's study outcomes by implementing or developing strategies or processes that could improve ASDT performance for long term sustainable development. High performance ASDT outcomes include improve team overall performance, time to the market, project success rate, and a better safer and healthier organizations or society.

Keywords: Agile Leadership Effectiveness; High Performance Agile Team; Leadership;Workplace Factors.

1. Introduction

The management of software development productivity is a central issue in software firms, where the main drivers are lower cost and shorter time-to-market [32].

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To handle productivity effectively, it is substantial to distinguish the most relevant difficulties and grow strategies to deal with them. Agile software development (ASD) methods, such as Extreme Programming [4] and Scrum [25], have evolved as approaches to reduce the complexity the software development process, likely leading to improve productivity. They focus to reduce development time or cycle and manage the inevitable shifts resulting from market dynamics [14, 22].

In the past few years ASD life cycle seemed as a reaction to traditional avenues of developing software and recognizes the demand for an alternative to heavyweight documentation driven and heavyweight software development processes. Lifecycle of any framework is the time bridge between activities that consists of release of first version to last version. Software effort needed for development follows one lifecycle. The focus of software development [19] is to use the resources and time to its fullest but not at the cost of forfeiting caliber. Lifecycle models offer a beginning target for defining what will be done. There is a huge difference between process and life cycle. A process is a sequence of steps for accomplishing any goal. A process denotes to the particular steps utilized in a specific organization to develop systems. It indicates the specific activities or tasks that must be undertaken and artifacts that must be made. The process definitions encompass more detail than offered lifecycle models.

More traditional approaches, like the Waterfall model and its variances, alleviate knowledge sharing mainly through documentation. They also encourage utilization of role rooted teams and detailed plans of whole software development lifecycle. The allocation of work specifies "not only what is to be done but how it is to be done and the exact time allowed for doing it" [4]. This shifts the aim from people and their creative abilities to the processes themselves. These traditional approaches are frequently known as "plan-driven" or "task-based". On the contrary, ASD methods namely extreme programming [4, 10] emphasize and value people and interactions over processes.

Building and managing ASDTs can be a challenging task due to various barriers belongs to organizational, people, process, and technical dimensions [19]. A project manager or a leader with effective communication and coordination skills, and be creative assuring maximum attention span of team members during ASDT meetings are also some of notable success factors in managing ASDTs [17]. Additionally, leaders use effective leadership styles depend on certain settings can also have good effect on project outcomes. Kropp [16] qualitative study found that success factors with ASD project occur frequently consisted following factors: (a) Very good communication in the team; (b) Continuous delivery; (c) Delivery on time; (d) Very few bugs; (e) Satisfied customers; and (f) No overtime.

Furthermore, success factors commonly accepted for each team member include self-reliance, desire and experience in working virtually, good problem solving skills, honest reporting, cooperation with other team members, cultural sensitivity, ability to communicate exceedingly well using email, IM, telephone, etcetera, and goal oriented [17]. Moreover, communication tools are available, is the best or only method to conduct the project, management supports ASDT projects, a collaboration distance is available and accessible, the project manager is competent in building and managing ASDT projects, and the project completion can be documented [17]. In particular, very little has been written on ASDT project success, success factors for building and

managing high performance ASDTs [12, 14]. Very few authors have attempted to offer sets of success factors (SFs) and even fewer empirical studies have attempted to explore the relationship between SFs and project success in ASDT [12].

This paper is significant for both researchers and practitioners because it has the possible to shed light on SFs as critical in building and managing high performance ASDTs. It also contributes more commonly to the evolving savvy of SFs in the specific and non-traditional mode of project management, used in ASDTs [12]. The research is important for project supervisors and for national project coordinators and their project teams in that its findings, if integrated into training programs, may direct to better understanding and use of SFs. If the supervision of ASDTs projects does in fact improve project success [12], then there is a lack of knowledge on SFs and their linkage to project success.

In this article, the researcher performed extensive literature review to determine the success factors (SFs) as critical in building and managing high performance ASDTs. The literature review (see Figure 1) consisted of ASDT (e.g., structure, member' competencies, commitment and trust, communications, goals, and collaboration), leading ASDTs (e.g., leadership competencies, skills, and styles and so on), workplace factors (e.g., cultural, functional and organizational differences), technologies (e.g., development tools, and information communication technologies), and organizational, people, process, and technical. The researcher emphasized on effective communication and communication techniques, and appropriate leadership styles in managing ASDTs. The researcher will put more emphasis on agile leadership, people, process, organizational, and technical. The researcher then provided recommendations for actions and direction for future studies. The researcher used the High Performance ASDTs Research Model as shows in Figure 1 to organize and present his study findings.
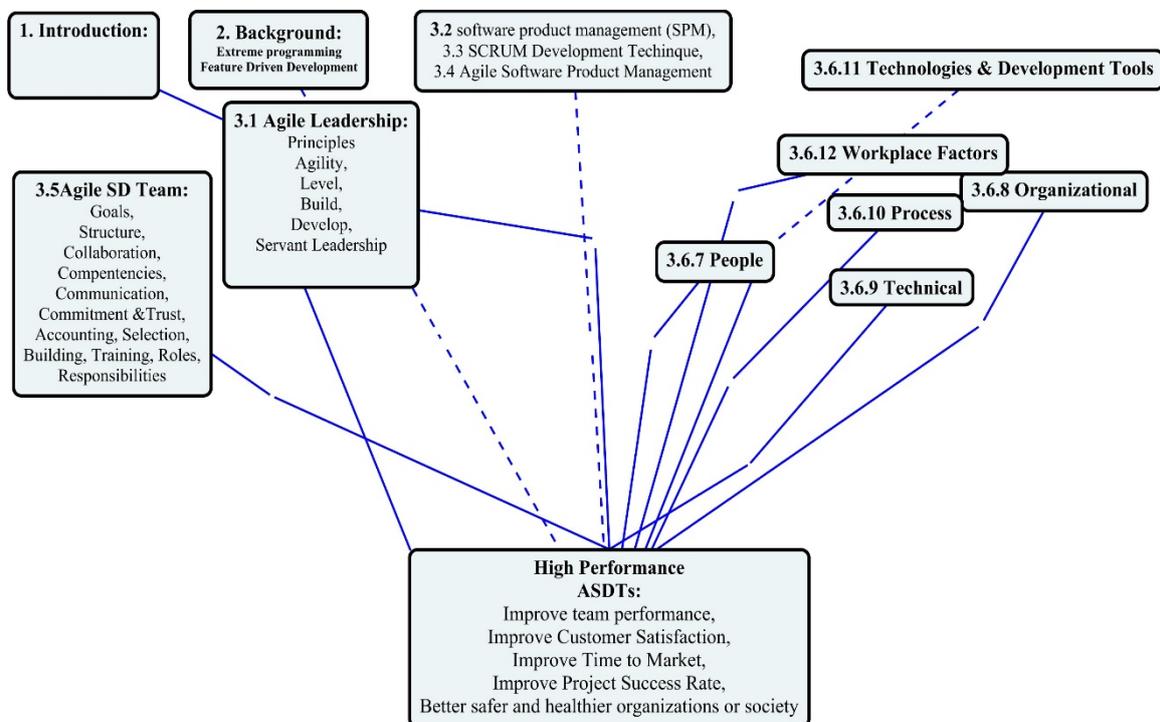

Figure 1: High Performance ASDTs Research Model

2. Background of the Study

The utilization of ICTs, a multicultural workforce, and changing organizational models that gain employee participation have changed the nature of multinational corporations. One of the important developments in organizational design is the foundation of team-based structures. An example is the virtual organization, of which ASDTs are the building blocks [29]. Members of these ASDTs are often dispersed around the globe [21]. Progressions in technology facilitate communication and the collaboration of information among ASDT members. By using ASDTs, organizations can unify the best technical expertise available around the globe for task performance regardless of geographic location [29]. As a result, the utilization of ASDTs offers organizations tap to a wider pool of skills and expertise, which can reduce development time to the market. Teams can gain organizational operation, lateral communication, and employee participation.

But in spite of their advantages, ASDTs face more communication challenges than face-to-face (F2F) teams; traditional communication mechanisms are lost or distorted, and vocal and nonverbal communication cues are often missed [29]. Additionally, with ASDT members in various time zones, logistics are more complex. As a consequence, building trust among ASDT members and overcome feelings of isolation and detachment becomes a challenge. Thus, ICT utilization in global organizations increases teamwork complexity and may affect its effectiveness. Finally, the culturally heterogeneous composition of many teams conduces to their complexity as cultural biases may distort communication.

For organizations just beginning to move from traditional hierarchical structures to team-rooted structures, neither team members nor managers may have the training and interpersonal skills to function co-operatively in ASDTs [31]. Additional literature shows that leaders of ASDTs must address challenges that traditional team leaders do not have to overcome. These challenges are based on the socio-spatial structure of ASDTs, which perhaps results in confined F2F interaction. At the same time, the goal for leaders remains unchanged: leaders must build and sustainable team members, and there is no difference with ASDTs. Clearly, it can be challenging for ASDT leaders to build and sustain their team when its attributes include physical dispersion and inter-organizational membership that is traversed primarily by new ICTs. Such uncertainties operate against the development of trust and challenge the validity and longevity of ASDTs. As a case in point, Panteli indicated possible benefits to ASDTs such as having shared goals [21]. Just like any other team, ASDTs trust on their leadership to set the stride for building a strong foundation based on clear goals and objectives.

Bunderson and Boumgarden indicated that there is a general assumption that too much management and structure is 'disempowering' and will vanquish innovation which is not ineluctably true for all cases [5]. In their study of teams performing stable tasks (as opposed to teams with imposed rules from the top), they found that the lack of structure more often than not resulted in squandered resources, and member frustration, inefficiency and poorly coordinated efforts while more extremely structured teams had less disputes and shared information more freely. They argue that this is because the more clearly specified (or structured) goals, procedures, authority relations, and rules make interactions more predictable and less risky, thus fostering psychological safety and a strong groundwork for intra group trust.

ASDTs are more susceptible to the dilemmas of poor structure because people are in distinct locations, cultures, and times. In terms of psychological safety, they generally start off in the hole. ASDT members have fewer data with which to assess each other and less shared settings in which to establish trust. Researchers like Ruhleder and Jordan discovered that reliance on ICT implies they are more probably to misinterpret each other, and yet they have lesser chances to repair these misunderstandings [24]. Others like Bell and Kozlowski add that ASDT members are less cognizant of the bigger picture and the adjustments going on that may impact their project [3]. Moreover, ASDT leaders cannot coach, facilitate, and monitor team member operation and advance in the traditional feel to uphold everyone together, so these works must be replaced by processes and structures and permit the team to regulate and check themselves.

Leadership is about influencing people. Leaders are visionary thinkers who inspire, motivate, and serve as persona models to accomplish organizational goals. Leaders steer companies toward creating their vision a reality. At its most fundament, leadership is about working with and through other people. Organizational effectiveness is the measure of how well the leader performs his job. There is no one avenue to be an effective leader. Each organization needs distinct leadership skills and it's depends on each circumstance. Likewise, each individual must establish a leadership style around personal strengths and weaknesses. What works well for one leader may not function for another. Some styles, however, have proven track records of success.

All leaders are not alike, nor should their acquiring programs be. Conceive what phase of development they are in and progress them accordingly [14]. Firms adept at driving the accelerating drift and mounting complexity discovered in today's business climate are called agile firms. Organizational agility is necessary for business success, and agile firms frequently outperform their less agile counterparts. However, most executives recognize their firms are not as agile as they need to be. A 2010 survey carried out by consulting and training firm ChangeWise and research organization the Institute for Corporate Productivity discovered that the key factor for gaining a firm's agility is the degree of agility displayed by an organization's leaders and leadership culture [14]. The implication is that chief logistic officers (CLO)s and other leadership development professionals have a vital persona to play in developing organizational agility.

2.1. Extreme programming

Extreme Programming (XP) is one of various popular agile processes. It was originally depicted by Kent Beck (one of the authors of Agile manifesto) and has been proven to be very successful at many organizations of all distinct sizes and within several industries. The aim of this approach is on customer satisfaction so it empowers software developers to be able to respond to altering customer requirements and to extradite high-quality software rapidly and continuously. Working software solution is extradited to customer typically within 1–3 weeks duration. XP better software projects by espousing communication, courage, feedback, respect, and simplicity. The original XP recipe comprised 12 rules: Test-Driven Development, Refactoring, Continuous Integration, Collective Code Ownership, Coding Standards, Metaphor Planning Game, Small Releases, Customer Acceptance Tests, Simple Design, Pair Programming, and Sustainable Pace. Same in every agile process these rules are not written in stone and over time certain rules were altered, new rules appeared and for instance in Shore and Warden [31] authors make different between two versions of XP depicted by Beck and

Andres [4] and even present their own approach to XP which came forth from their practical experience.

2.2. Feature driven development (FDD)

FDD was presented by Jeff De Luca in 1997 and later as an outcome of collaboration with Peter Coad first incarnations of FDD appeared [20]. FDD is a framework-driven, short-iteration process. It starts with building an overall model embodiment and recognition of features. Features are then assembled in work packages. One work package can be completed within a single iteration and it in fact portrays working software solution which can be demo to customers for feedback. FDD designs the rest of the development process around feature extradite employing the following eight practices: (a) Domain object modeling; (b) Developing by feature; (c) Component/class ownership; (d) Feature teams; (f) Inspections; (g) Configuration management; (h) Regular builds; and (i) Visibility of progress and outcomes When comparing FDD to XP it appears that XP is better accommodated for volatile projects where customer requirements are alter frequently [14a]. This is chiefly because XP invalidates any activities that are not promptly needed for the current development stage. In the same analysis FDD is ascertained to be more scalable than XP because XP severely depends on communication within a team which becomes tougher as team develops. FDD is better fitted for large teams and within organizations atmosphere.

3. Scrum

3.1. Agile Leadership

Today's global, high speed, complex, and disruptive business climate requires a new set of leadership competencies [23,14]. New products, technologies, organizations and services are emerging, evolving and converging into more consummate and complex collaborative partnerships and solutions. Knowledge and product and lifecycles and profit windows are reducing. In response, leaders are attempting to create their companies more changeable, synergistic, adaptive, and agile across multiple spheres with increasingly blurred boundaries. Leadership effectiveness in this climate demands leaders play numerous personas with distinct mind-sets as they navigate through each day.

3.1.1. What is Agile Leadership?

The ability of a leader to be able to lead well in a broad range of settings especially new, altering and ambiguous situations. Agile Leadership is linked with mode four leaders (Modes of Leadership) who have the ability (and agility) to function in any mode (system of thinking) and most significantly see from the views of the other modes [14]. Agile Leadership is the application of the Agile principles (as defined in the encompassing the processes, tools and rules of Agile Scrum, Agile Leadership extrapolates them to alter how teams and projects are handled within the setting of the work climate and new leadership paradigms to extradite better outcomes.
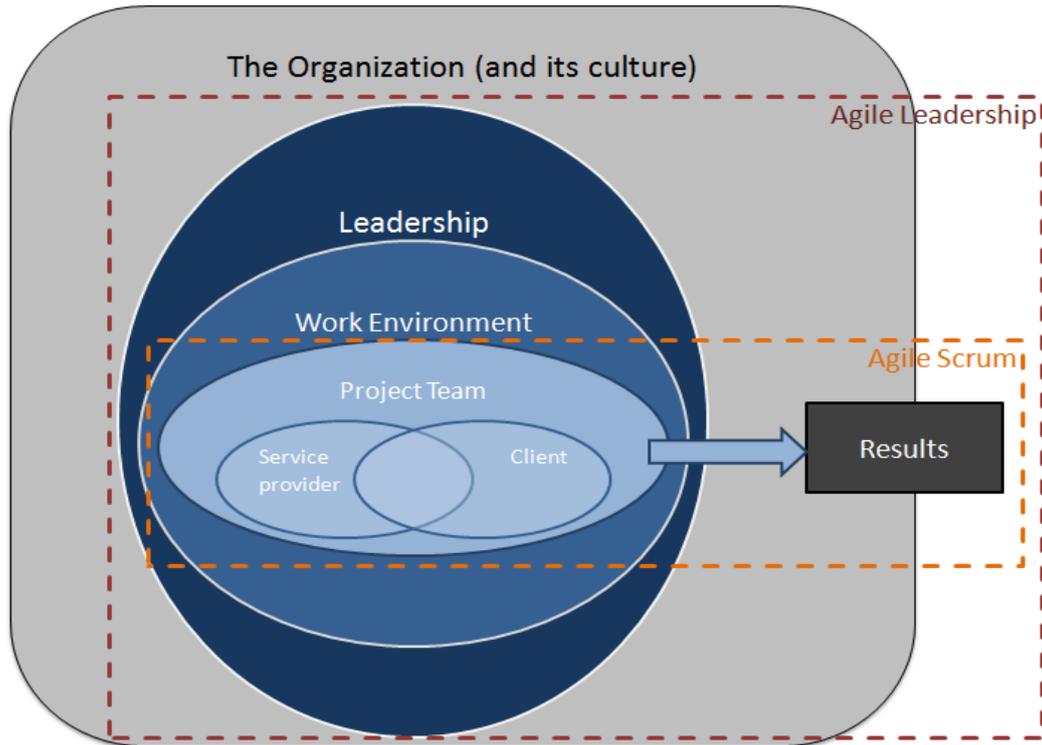
Figure 3: Agile Leadership Model

Where Agile Scrum mostly aims on the firm of the project team, the personas and responsibilities of the team members, the artifacts, and the rules under which the project team functions, Agile Leadership encompasses the work climate and the particular leadership abilities expected from the managers and stakeholders.

Agile Leadership is an underlying paradigm change with the objective of making the project team successful and the people within the team happier in order to extradite improve outcomes [23]. The change mostly comes from the leadership team and the rules utilized to govern the actions, the behaviors and the outcome of the team.

Getting managers or leaders to turn more Agile requires altering behaviors and to utilize a more democratic approach to management. More particularly, Agile Leadership requires to:

- Transfer certain powers to the team members themselves to let them ascertain how best to achieve their assignments;
- Empower the project team through self-organization and dedication to outcomes;
- Transfer decision-making to people who are closest to the activities;
- Illustrates a greater openness to innovations and ideas emerging teams;
- Clearly specify the desired vision and to adapt to the context of each team to ensure coordination with the overall objective of the project and to make sure cohesion between the team members;
- Offer the essential support and resources to the project team so they successfully achieve the expected outcomes;

- Systematically involve business people in the definition and execution of solutions;
- Adapt the style of management so as to utilize an inclusive and democratic approach.

3.1.2. Agile Leadership Principles

To be truly effective and sustainable development, an Agile transformation must reach every place of the firms and this obviously encompasses leadership. Organizational leadership encompasses team member from front-line managers on up – as specified by who has someone reporting to them. Frequently, managers are the final one to take part in the transformation or they may not recognize how much they will need to change in this new globe. Following are a few Agile Leadership Principles to begin the dialog with managers or leaders about the expectations of leadership in an Agile firm [23].

As organizational leadership team in an Agile enterprise, we will:

- Support and empower the establishment and development of self-governing and self-accountable teams;
- Fully empathize, espouse, and support our Agile framework – discovered on the principles stated in the Agile Manifesto;
- To lead, but not by command-and-control but the just expectation we will have of our team members is excellence, pure unadulterated excellence;
- Advocate for the simplest viable solutions to our challenges as we recognize that complexity may not scale very well;
- Remove barriers as rapidly possible when escalated by our teams and realize that the barrier may in fact, be ourselves;
- Believe in the significance of amply dedicated product development teams and will perform everything possible to shrink assigning our members to multiple teams and unplanned movement of members between teams;
- Interview and hire the best team members who will flourish in an open, collaborative, and social environment and will put their team before of everything else – and be excellent;
- Serve our team members with humility and understanding.

3.1.3. The Need for Agility

While specific future developments are progressively difficult to foretell, there are two deep trends we can foretell with great certainty: The pace of alter will remain to gain, and the degree of complexity and interdependence will remain to develop. For more than a decade, organizational change experts, sharply cognizant of these powerful trends, have been discussing about the need to grow 'agile' organizations — organizations that anticipate and answer quickly to altering conditions by leveraging extremely productive internal and external relationships [14].

To enjoy sustained success, organizations need to grow a level of organizational agility that matches the gaining degree of alter and complexity in their business climate. Yet, for the immense majority of organizations, full-fledged "strategic and operational" agility is still more an ambition than a reality [14]. One of the major

rationalities for this remaining "agility gap" is the need to grow more agile leaders. To grow teams and companies with the degree of agility demanded by today's turbulent business climate, organizations need leaders who personify a corresponding degree of agility.

3.1.4. Levels of Leadership Agility

To assist leaders grow the capabilities required to create agile firms, Chief Logistics Officers (CLOs) first need to empathy what leadership agility is and how leaders develop this capacity [14]. These questions were at the heart of a five-year research project carried out by ChangeWise, outcome in publication of Leadership Agility. The researchers employed quantitative studies, on-site observations, in-depth interviews and manager journals to analyze the thought patterns, behavior and organizational results of more than 600 managers across a variety of industries, functions and organizational levels.

They discovered that leadership agility travels beyond acquiring agility, a more familiar term that denotes to how well a manager adapts to new tasks. The study discovered that leadership agility encompasses how effectively managers set up their initiatives, how well they function with stakeholders, how proactively they search and acquire from feedback on their own effectiveness and how creative they are in solving complex problems. There are four types of leadership agility [14] as shown in Figure 3.1.
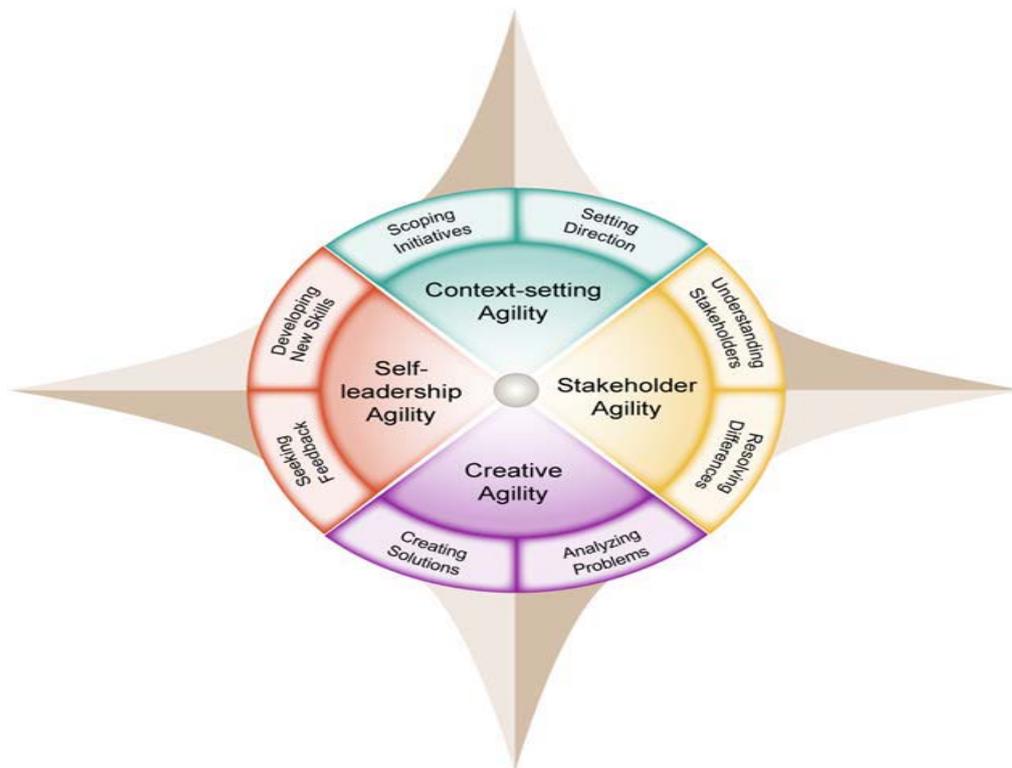

Figure 3.1: Four Types of Leadership Agility. Courtesy of ChangeWise.biz

3.1.4.1. Context-setting Agility

Joiner [14] asserted that leaders employ context-setting agility to scan their environment, anticipate significant

alters, and determine what initiatives they necessitate to take. This type of leadership agility also encompasses the ability to decide the optimal scope of an initiative and the results it necessities to accomplish. When leaders develop into the Catalyst degree, they amplify their way of thinking to encompass relevant longer-term trends that expand beyond the boundaries of their organization's industry. When the timing is good, they have the ability to undertake visionary initiatives that are personally beneficial and meaningful for their company and its core stakeholders[14]. For instance, while Robert's Achiever-level predecessor aimed on elevating share price, Robert arrange this target in a larger setting. He made a vision of turning the best regional in North America, a company whose innovative and performance practices would be benchmarked by organizations from many distinct industries [14].

3.1.4.2. Stakeholder Agility

Joiner [14] noted that leaders employ stakeholder agility to distinguish the core stakeholders of an initiative, empathize what they have at stake, and evaluate the extent to which their and objectives and perspectives are coordinated with their own. This type of leadership agility also encompasses the ability to operate with stakeholders in avenues that direct to more optimal alignment. Catalyst leaders have an ability to embark deeply into frames of reference that dissent from their own perspective while still honoring their own view. They look for feedback from core stakeholders not just to increase buy-in, but because they feel that genuine dialogue will better the quality and effectiveness of their initiatives [14].

For instance, while the former oil organization president aimed on customers and shareholders, Robert sought feedback from a broad diversity of additional stakeholders in making new strategies, encompassing bankers, suppliers, industry thought-leaders, environmental groups, and a wide cross-section of employees. Robert and his management team sought this feedback not simply to make people sense engaged; they employed it to assist create their strategies [14].

3.1.4.3. Creative Agility

Joiner [14] asserted that leaders employ creative agility to transmute complex, new issues into desired outcomes. Catalyst leaders set out their initiatives with a sharp admiration of the freshness inherent in the situation they are handling, even if it appears highly familiar. Because they have a deep empathizing of the limitations of any single perspective, they carry out their initiatives in a fashion that promotes the expression of multiple perspectives and the questioning of fundamental assumptions [14]. When they face evident opposites (long-term vs. short-term, idealistic vs. practical), their willingness to experience the tension between them gains their ability to detect creative solutions.

For instance, when Robert asked WiseChange to design and facilitate a series of "idea factories" that encouraged out of the box thinking about strategic possibilities [14]. He then set up a two-day off-site meeting where WiseChange staff assisted him and his team accept the hundreds of thoughts that were generated and out of the box synthesize them with other thoughts produced by his team and the world-class strategy organization. This approach led to various significant strategies that came almost exclusively from possibilities rendered by

other stakeholders and employees.

3.1.4.4. Self-Leadership Agility

In *Mastering Self-Leadership* Charles Manz and Christopher Neck say, "If we ever hope to be effective leaders of others, we need first to be able to lead ourselves effectively"[14]. Joiner [14] asserted organizational managers involve in self-leadership by deciding the form of leader they desire to be, employing their everyday initiatives to experiment toward this inspiration, and then shining on these experiences. Catalyst leaders empathize that their self-awareness is more partial than they acquired at previous degrees. Consequently, they grow a firm interest in turning aware of feelings, behaviors, and assumptions that would commonly escape their conscious attention. They are incited to gain their self-awareness and more fully coordinate their behavior with their values and inspirations. As their self-awareness heightens and turns more consummate, they increasingly discover that personal growth fuels their professional growth.

3.1.5. How to Build an Agile Leader

The ChangeWise research on leadership agility asked: How do leaders or managers at the most relevant adult stages act when leading teams, leading change, and in pivotal conversations? The researchers distinguished qualitatively distinct leadership behaviors that correlate with each phase, and clarified the mental and emotional capacities that enable these behaviors [14]. Together, the constellation of mental, emotional and behavioral skills rooted in each developmental phase is a degree of leadership agility (Figure 3.5).

Level of Agility	View of Leadership	Agility in Pivotal Conversations	Agility in Leading Teams	Agility in Leading Organizational Change
Pre-Expert (~10%)				
Expert (~45%)	*Tactical, problem-solving orientation.* Believes that leaders are respected and followed by others because of their authority and expertise.	Style is either to strongly assert opinions or hold back to accommodate others. May swing from one style to the other, particularly for different relation-ships. Tends to avoid giving or requesting feedback.	More of a supervisor than a manager. Creates a group of individuals rather than a team. Work with direct reports is primarily one-on-one. Too caught up in the details of own work to lead in a strategic manner.	Organizational initiatives focus primarily on incremental improve-ments inside unit boundaries with little attention to stakeholders.
Achiever (~35%)	*Strategic, outcome orientation.* Believes that leaders motivate others by making it challenging and satisfying to contribute to larger objectives.	Primarily assertive or accommodative with some ability to compensate with the less preferred style. Will accept or even initiate feedback, if helpful in achieving desired outcomes.	Operates like a full-fledged manager. Meetings to discuss important strategic or organizational issues are often orchestrated to gain buy-in to own views.	Organizational initiatives include analysis of external environment. Strategies to gain stakeholder buy-in range from one-way communication to soliciting input.
Catalyst (~10%)	*Visionary, facilitative orientation.* Believes that leaders articulate an innovative, inspiring vision and bring together the right people to transform the vision into reality. Leaders empower others and actively facilitate their development.	Adept at balancing assertive and accommodative styles as needed in particular situations. Likely to articulate and question underlying assumptions. Genuinely interested in learning from diverse viewpoints. Proactive in seeking and utilizing feedback.	Intent upon creating a highly participative team. Acts as a team leader and facilitator. Models and seeks open exchange of views on difficult issues. Empowers direct reports. Uses team development as a vehicle for leadership development.	Organizational initiatives often include develop-ment of a culture that promotes teamwork, participation, and empowerment. Pro-active engagement with diverse stakeholders reflects a belief that input increases the quality of decisions, not just buy-in.

Figure 3.5: Three Levels of Leadership Agility. Courtesy of ChangeWise.biz

These leadership agility degrees are not rooted on personality types like those assessed by the MBTI or the

DISC. They are sequential phases in a leader's development, and leaders hold the skill sets developed at preceding agility levels. Approximately 10% of leaders are at the pre-Expert stage, 35% at Achiever, and 45% at Expert. Currently, merely about 10% have developed the mental and emotional capacities required to lead at the Catalyst level. This is important because research shows that leaders who can lead at the Catalyst level are much more effective in today's business climate than Experts and Achievers. CLOs who assist their leaders develop into their next degree of agility can greatly gain their organizational agility.

This new shape of assessment is being used in leadership development programs, with senior teams and in organization growth interventions [14]. A key advantage of this type of assessment is that executives and high potentials who max out on traditional, implicitly Achiever-aimed 360s frequently discover a new Catalyst zone of development into which they can grow.

The other significant stride is to analyze the company's current leadership development programming. As with assessment processes, leadership development programs can be designed to gain agility degrees and aim on company-specific competencies [14]. For this purpose, the most effective approach is to use well-planned action learning programs that combine multiple learning modalities: workshops where participants apply new views and skills to their real work, coaching rooted on 360-degree feedback, acquiring circles and individual or group projects.

Action acquiring alone is not adequate for raising agility degrees. Most acquiring and development programs aim on the Achiever level, sometimes with a sprinkling of Catalyst. Programs for executives and high potentials, in specific, require to actively aid participants in developing into Catalyst mindsets and skill sets, then lead them in applying them to challenging conversations, team leadership and organizational change projects [14]. Further, the coaches chosen to accompaniment these multi-modal action acquiring programs should have solid training and experience in alleviating a leader's growth from one agility level to another.

Eighteen senior leaders received 360-degree feedback on their agility levels. The collective outcomes were addressed at a leadership summit where the leadership agility framework became the general language to establish a shared leadership culture. The outcome, a highly successful integration that was more like a merger versus a traditional acquisition, was attributed in part to senior leaders' gained agility, an enhanced ability to drive change and to handle the interdependencies required for business success.

3.1.6. How to Develop Agility

A good place to begin is to analyze the assessment instruments utilized in the company's current leadership development programs [14]. Competency-rooted instruments tailored to an organization's unique requirements still may be necessary. However, most of these assessments aim mainly on Achiever-level competencies. Leadership development professionals who empathy the divergence between Achiever and Catalyst leadership will supplement these assessments with 360-degree feedback to pinpoint a leader's level of agility in three different action arenas: leading change and teams, and pivotal conversations.

3.1.6.1. How It Works

When engineering and construction firm Balfour Beatty concurred to acquire RT Dooley, a smaller construction firm based in Charlotte, N.C., in 2009, Bill Blank, the southeast division president of Balfour Beatty, wanted to grow a real partnership in the region that would outcome in one firm with two different brands [14]. To achieve this, he utilized a facilitated process that encompassed shared visioning, aligned change management work and an acquiring effort that would gain senior leaders' agility in both firms.

3.1.7. Servant Leadership – Leading High Performing Teams

Working to empower and serve the individuals one lead is the primary construct behind Servant Leadership. Challenging them to travel beyond, aim higher, innovate and have fun performing it needs leadership skills that are avenue beyond the traditional "Command and Control" style of management. A seldom-utilized but effective leadership style in the right climate, servant leadership aim on creating sure those working under them have their needs fulfilled. This style works best with employees or stakeholders who are well-motivated professionals who cognize their jobs well. The goal of the leader is to ensure sure that all personnel have the resources and the accompaniment required to perform their tasks well. The recommended leadership style for Scrum projects is Servant Leadership. Servant leaders have a deep dedication to development of people within their company. They take on the responsibleness of nurturing the professional, personal, and spiritual development of others [2].

3.2. Agile Software Product Management

This section depicts a technique for applying agile software product management (SPM) in product software companies that work according to ASD practices. The proposed technique is rooted on the default SCRUM process [5], developed initially for the purpose of software development. Section 3.3 offers a short summary of the SCRUM development technique, followed by the adaptations that have been applied to make the method applicable to SPM in Section 3.4.

3.3. SCRUM Development Technique

Scrum can be noticed as a lightweight management framework instead of a full methodology or process. It has wide applicability for controlling and managing iterative and incremental projects of all types. Ken Schwaber, Mike Beedle, Jeff Sutherland and others have contributed substantially to the evolution of Scrum over the last decade.

Over the last several of years in particular, Scrum has garnered gaining popularity in the software development community due to its simplicity, proven productivity, and ability to act as a wrapper for several engineering practices boosted by other agile methodologies. In a nutshell, Scrum in general involves the following [10b]: (a) Optimizing the release plan and updating priorities in collaboration with the customer, based on insights gained by inspecting the release from previous iteration; (b) Optimizing the process itself by having retrospections after each iteration;(c) Splitting the organization into small, cross-functional, self-organizing teams (Scrum does not provide complete, detailed descriptions of how everything is to be done and much is left up to the team itself to decide); (e) Splitting the project (work to be done) into a list called product backlog containing small, concrete

deliverables such as features, bugs, non-functional requirements, etc. The list is sorted by priority and the estimate of relative effort for each item is done; and (f) Splitting the time and forming iterations which are not longer than 1 month. Iterations are called sprints and they end up with working code that can be presented and delivered to the customer. Figure 3.6 depicted Scrum Framework.
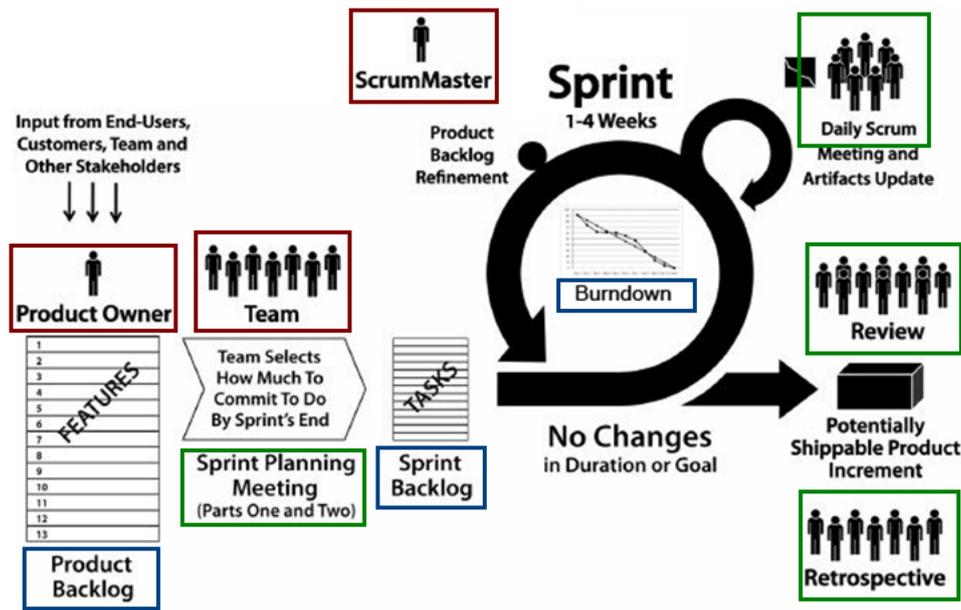

Figure 3.6: Scrum framework.

3.4. Agile Software Product Management (SPM)

When software development teams (SDTs) embrace agile practices, product management is frequently caught off guard by the number of work added to their current workload. Agile calls for new SPM skills and traditional staffing frameworks do not typically fit the new product owner role. Given that most product managers are already overflowing workload, how can they handle these new activities to gain more value from SDT projects and products? Plainly put, agile product managers must alter the avenue they perform to maintain with rapid development cycles and shorter customer feedback loops.

3.4.1. Traditional product management persona

Before the researcher discuss the product manager persona in agile firms, let's recap the role of a traditional product manager. That role is frequently nebular to many in the company, and agile does not create things easier with its new product owner persona. Are you a product manager or are you a product owner? The reality is that not many university programs are dedicated to the SPM profession, so the majority product managers come from diverse backgrounds – from engineering, marketing, pre-sales and post-sales accompaniment or even business development – each bestowing their own angle to the profession. A product manager in one company

may aim on very different things than a product manager in another firm.

A skill product manager would normally be accountable for the following set of tasks: (a) Identify customer needs to solve; (b) Build the business case to get funding; (c) Define a product vision and roadmap; (d) Determine the best market timing to release products; (e) Build the business case to get funding; (f) Determine features to deliver in the next release; (g) Update executives and other stakeholders on release status; (f) Document product requirements; (i) Coach marketing on how to position the product; and (j) Coach professional services on how to facilitate customer adoption [8].

Irrespective of how distinct product managers may be, there is a commonality among all traditional product managers. Not many of them expend much time with their SDT, because the aim in traditional product management has been mainly on strategic activities and writing long requirements documents to maintain development occupy for the next 18 month a traditional software development release would take.

3.4.2. Agile alters the traditional product manager persona

Agile brings a new SPM persona: the *product owner*. The primary persona of the product owner is to groom the product backlog, present stories to SDT members and act as the "customer advocate" for the SDT [2]. Because of the much-accelerated growth cycles in ASDT, the product owner persona offers the critical interface between customers and developers to rapidly gather customer feedback at the end of every sprint, and adapt to altering customer necessities. This is the persona that was clearly missing in traditional software development practices where development could carry on for months with very little customer feedback, leading to the inadequate statistics we all know about the software organizations - rarely on budget, frequently too late, with little value to customers. In effect, the product owner persona is about embedding product management in the development team to prompt software developers that customer value should push their decisions, to prompt product managers that not all features are technically equal, and to proactively respond to the altering necessitates of the market and customers prior to the release goes out [2].

3.5. Agile Software Development Teams (ASDTs)

The question about why the selected ASD project was believed successful was responded in very many distinct avenues [16]. Among the most popular responses were: (a) very good communication in the team; (b) continuous delivery; (c) delivery on time; (d) very few bugs; (e) satisfied customers; (f) no overtime. When asked for the reasons for the success, the following chief facets were noted [16]: (a) all team members were committed; (b) continuous and extensive testing; (c) requirements were very clear; (d) very close communication with and intensive feedback from customers; (f) team workshops for team building. Beside agile Servant Leadership Style is also one of the factors make ASD project success as previously addressed, the following sections (factors) affirmed by many researchers also contributed to ASD project success will be further addressed.

3.5.1. Team Selection

Identifying appropriate stakeholders and choosing proper Scrum Masters(s) is vital to the project success. If flexibility exist in selection the Scrum Master(s), the following are substantial as Selection Criteria: (1) Servant Leadership Style, (2) Good problem-solving skills,(3) Commitment, and Availability. When discovering the stakeholder(s), it significant to realize that stakeholders are sponsors, users, customers often interact with the Scrum Master, Scrum Team an Product Owner to facilitate the creation of the project's products and furnish inputs. These stakeholders help shape the project throughout its lifecycle [2].

3.5.2. Team Structure

In addition to internal factors (e.g., leadership) and workplace factors (e.g. cultural, functional, and organizational differences), hence, organizations ASDTs overall performance also depends on how ASDTs initially structure [4, 13] and alignment. If leaders of ASDTs do not recognize the need to address the differences in how they structure their teams and reward them, they risk ASDT members not having the clarity needed to be account [4].

Johnson et al also affirmed how ASDTs initially structure have consequence to team overall performance [13]. Johnson et al. findings indicated that all teams were at the beginning structurally misaligned and subsequently obtained [13] (a) no feedback, (b) one type of feedback only, or (c) both types of feedback. Johnson et al. study affirmed that structurally misaligned teams illustrated dysfunctional alter by altering process more often than structure, with damaging effects for subsequent team performance. When teams obtained the feedback interventions, however, they were more probably to alter their structure and thereby better their performance.

Hollenbeck et al. recommended that one significant issue in this respect involves team structure: the social architecture of the team that depicts how its task is organized and differentiated [13]. Functionally structured teams show an extremely differentiated division of labor, where each member specializes in a particular part of the team's work. On the contrary, divisionally structured teams represent a low degree of differentiation of labor, where each member is a generalist and can do any part of the team's work. Uniform with structural contingency theory, research has discovered that functionally structured teams do best in predictable task atmospheres, whereas divisionally structured teams do best in unpredictable or quickly altering work [13]. This is because functionally structured teams can leverage the efficiency inherent in their differentiation of personas in predictable situations, but this efficiency breaks down when the work is always altering. Divisionally structured teams can leverage the flexibility inherent in members' ability to do any of the team's works, which is specifically helpful when it is difficult to foretell what will occur next and / or the team needs to respond rapidly.

3.5.3. Team Member's Competencies

ASDT member's competencies also have effect on team overall performance [17]. It is imperative for organizational managers to work with HR personnel when interviewing new candidates and / or selecting candidates or members' with appropriate competencies for the job. Not every candidate is well qualified or has the competencies or the skills required to perform the vacancy is being advertised. Hence, when leaders are

building and managing high performance ASDTs they need to put in place appropriate procedure in order to choose the appropriate candidate for the job. This process is also applicable when selecting ASDT leaders as well.

3.5.4. Team Goals

Leaders serve the bridge between ASDT members and connect them with a common goal or vision [32]. Each of new project ASDT members are being work on, it is imperative for leaders to drive and work with members' goals as well as put strategies in place to help them achieve their assigned goals this in term will help improve team overall performance. Leaders need to help team member set goals and align team overall goals as well as strategy in place to work on and achieve assigned work on time as specified is also critical for team overall success. Goal alignment needs to be managed with due to divergent culturally endorsed aspirations, and an ASDT atmosphere in which goal conflicts are not squarely detectible [32]. According to Earley and Mosakowski, effective teams are those that have a firm team culture (a sense of purpose and goals) and shared expectations [32]. Define clear objectives and prepare detailed plans, but have steady checkpoints and communication to create essential changes. Bell and Kozlowski also add that clear goals should be set both for the ASDT as an integral and for each member. Clarity permits ASDTs to monitor their own advance and to be more motivated to accomplish the goal [3].

The most usual theme when analyzing the information in this category is the challenge of multitasking [24]. Leaders noted that they are encountered with the importance of distributing tasks distinctly based on capability. This lends itself to the importance of getting to know your employees. Multitasking during team meetings appears to be a significant issue as well. Communication is very significant in ASDTs; thus, having team members who are not fully aimed on a meeting might be unproductive for the team as an integral. Team overall performance success depends on how well each team members are able to achieved their assigned tasks and goals to accomplish them [17]. If ASDT members lack of goals in order to help achieve their assigned tasks could lead to hinder team performances.

3.5.4.1. Goal alignment

The ASDT leader should initiate a discussion on particular project objectives and how they link to overall organizational goals [32]. This is significant in the multinational setting because the purpose of the overall organization may be interpreted in distinct avenues, and while in traditional teams tacit knowledge about goals often evolves it is often missing in ASDTs. We know that interpretations of objectives are frequently assumed to be shared, but in ASDTs we cannot assume that these expectations are inevitably aligned. Leaders can promote discussions on objectives and purpose in order for all to be part of the process of building a team's reality. This assists to align culturally diverse renditions of objectives, creates common savvy and trust, and beyond that also a shared vocabulary that afterward leads to a sense of ownership and shape significant for commitment and motivation.

3.5.5. Team Commitment and Trust

ASDT members' tasks commitment as well as trust is also vital to team overall performance success. In Joshi et al. study, teams that were more geographically scattered had greater perceptions about leadership, dedication to the team and team trust [32]. Thus, ASDT members' work commitment and trust play a significant role with team overall performance success. Nguyen [19] conducted a qualitative study titled "Workplace Factors That Shape Information Technology Project Success," interviewed twenty ASDT managers. Question. "What is your lived experience on how effective team trust could heighten the likelihood of IT project success?"

The outcomes themes linked with this question were "an effective way to manage team members and trust is essential to project success; team dedication to user stories and task completion must be maintained; key role in effective information sharing and positive impact on knowledge sharing; bridge the psychological space between team members; effective communication and honesty is key and trust must understood; full trust in each other is significant to project success; significant to establish trust when first forming a team; and priority issues should address in timely manner and measure what to do today, tomorrow and roadblocks" [19] .

3.5.5.1. Building trust

A related factor in the successful performance of software testing teams is the formation of trust. In an ASDT environment it can be hard to develop and uphold trust between distant ASDT members. Many factors come into play, which include the deficiency of opportunities for the growth of human relationships between distant ASDT members. These can be compounded by cultural, fear, linguistic and motivation linked issues. Through communication, ASDTs must secure the trust of their distributed members before they can be recognized as being performing members of the team [19, 31]. Furthermore, gaining the trust of team members will hopefully prevent ASDT members from freeloading and other deceptive behaviors, thereby increasing the productivity and effectiveness of the integral team.

A component critical to success in all teams is the ability to build trust among ASDT members. In ASDTs, "trust is argued to be rooted in perceptions of teammates' ability, benevolence, and integrity" [31]. The ASDT's persona transcends co-located team fixed functional personas, requiring ASDT members to be prepared to adapt to an altering diversity of assignments and workloads during the life of any specific team. All of these factors impact the workplace in which the individual members of ASDTs must acquire to work. ASDTs, because they possess the potential to significantly shrink the amount of travel needed of team members, can dramatically gain the productive capacity of individual members. ASDT membership will be considerably more dynamic than co-located teams, and ASDTs will be more probably to include members from workplaces that would not traditionally have operated together. This dynamism requires ASDT members to be especially adaptable to operating with a wide diverse of potential co-workers.

The challenges detailed here have the potential to make a radically distinct workplace for the ASDT participant, both because of the change from F2F to some level of virtual interaction and because the ASDT is expected to operate in a distinct form of organization and take new organizational roles [31]. ASDT members will be required to have superior team participation skills. Because team membership will be somewhat fluid, effective teams will require members who can quickly assimilate into the team. ASDT members will have to become

proficient with a diverse of ICTs. In numerous organizations, ASDT membership will cross national boundaries, and a diverse of cultural backgrounds will be introduced on the team. This will rarify communications and workload interactions and will need additional team member growth in the areas of communication and cultural diversity.

To tap the advantages of the new workplace fully, ASDT members will require fundamental teamwork training and development and will also necessitate training to enhance their facility with the new ICTs [31]. ASDTs require organizational re-structuring and the introduction of new work technologies. One of the greatest challenges in the introduction of ASDTs is the successful internalization of valuable technophobic staff into the ASDT environment. Organizations must be thrifty not to overextend ASDT members and burden them with degrees of responsibility that they cannot moderately satisfy. One important supervisory persona will be to ensure that ASDT members have sufficient private time to finish their individual tasks and get ready for their team participation.

3.5.6. Team Collaboration

3.5.6.1. Cooperation

Teamwork is a collaborative activity and without collaboration teams cannot work effectively [19, 24]. Like so numerous other factors which are necessary for ASDTs, distance adversely impacts on the degree of cooperation that occurs between distant team colleagues. The reality is that ASDT members must be motivated to build effective cooperation with their distant members. Numerous issues directly palliate against the formation of collaboration in the ASDT environment. In these circumstances from the PM view collaboration between team locations has to be developed, built and effectively managed. Even though progressions in ICT significantly alleviate ASDT collaboration and finally heighten team operation, it is significant for ASDT members to derive firm interpersonal dynamics and support technical facets, as even the most progressed ITs simply partially conduce to the success of these teams [6].

3.5.6.2. Flexible schedule

Flexible time schedule is a benefit for members of distant teams that may be in distinct time zones and have family or other commitments [19]. Flexible work schedule also work best for local ASDT members other commitments as mentioned previously. Common times need to be built for routine catch ups to discuss progress. Thus, flexible schedule benefits ASDT leaders and members as well as cross-functional teams.

3.5.6.3. Get the team together

One of the great benefits for project managers to establish virtual team is cost reduction such as traveling cost. If it's a long and ongoing project, it's also significant to at least attempt and get the team together F2F at least once if not multiple times throughout the project [19]. This assists everyone get a sense for who they are operating with and establish firmer work relationships. Is it absolutely essential to get together? However, for those times you do interact with the other ASDT members in F2F, it transforms the working relationship and

truly benefits the project. It can be a very challenging task when bring all team members together for F2F interactions especial when members from multinational countries. Thus, F2F was never practical due to the significant cost to create it happen [19]. An alternative solution is to use collaboration and communication such as video and teleconferences to minimize or simplifies F2F meetings or interactions traveling cost constraints [19]. We recommend this alternative solution is another avenue for to team members to collaborate and interact.

3.5.6.4. Knowledge transfer

Knowledge transfer needs to be managed due to culturally based divergence in communication and trust, and the ASDT environment's deficiency of a rich communication medium [32]. Effective knowledge transfer is a core activity when forming and working an ASDT. Effective knowledge transfer helps leverage team members performance as well as expertise. Project manager should always promote knowledge transfer for team sustainable development [19]. For instance, a team member with the most expertise in certain functional area, he or she transfers his knowledge to junior team members. In this avenue, if he decided to leave his team a for better job opportunity, the team won't suffer. Sufficient training measures and techniques necessitated to be carried out to assure this activity is sufficiently supported and executed. A procedure to evaluate the effectiveness of knowledge transfer activities should be made available rooted on the outcomes accomplished the provision of further training and support should be put in place, if and when needed.

3.5.6.5. Knowledge sharing

In virtual teamwork, due to lack of F2F interaction knowledge sharing is important and imperative team members to understand the business. Communication and knowledge sharing can be viewed as a natural bi-product of communication. Such knowledge sharing can be both intentional and serendipitous; for either to take place team members have to build trust, resolve distinct views, and make mutual savvy across the cognitive boundaries of cultural, linguistic and functional divergences amplified by distance [32]. In addition, knowledge sharing also has positive interaction effects with task programming and communication because it offers a common knowledge root that can create communication more effective and the use of task programming mechanisms better tailored to the needs of the task [9]. Knowledge sharing also helps booster team performance and trust among team members [19]. In ASDTs environment this is very important due lack of F2F interaction and time zone differences. Uphold a shared ASDT calendar using ICT. Shared calendars take the guesswork out of time conversions and create clear everyone's availability in case a fire needs to be put out.

Standardize communication and documentation processes (e.g., having a form for each kind of data to be exchanged), but leave open the possibility of adjusting them. This is especially significant when teams are crossing organizational boundaries, so everyone has the correct setting and data is going to the correct places. With effective documentation and knowledge sharing mechanism in place so that every team member is able to access at any time help boost team performance as well as trust. Lack of effective knowledge sharing creates mistrust and fear among other team members this in turn degrades team performance.

Nguyen [19] study on knowledge sharing identified themes linked with knowledge sharing were "use

Sharepoint and we create team folders on the sites and obtain high quality decision; positively affect team performance and associated with decision and improve team operation; create knowledge transfer and transparency; effective knowledge sharing is effective through conference calls / phones, training, and online; and members guard knowledge and leaves adversely affect team performance".

3.5.6.6. Knowledge management

According to Anantatmula, knowledge management is a systematic method to using information systems, business processes, best praxis, and culture to design and share knowledge within a firm. Innovation and transfer of knowledge are two facets of knowledge management [19]. Knowledge innovation and transfer can occur only when more than one individual is involved. With regard to innovation, knowledge management includes two activities: (a) preserving and employing existing knowledge and (b) producing new knowledge for effective use. Existing knowledge is comprised of both tacit and explicit knowledge. Producing new knowledge involves the interaction of stakeholders within the organization.

Nguyen [19] study on knowledge management identified themes linked with knowledge management were "use Sharepoint and to create team folders on the sites; vital to remain competitive and improve team performance; assist teams in handling with dynamic and complex situation; knowledge should be shared with all the team members; maintained a detailed project plan; and member know how to access proper persons, resources, and knowledge".

3.6.7. People Factors

The success of an ASD project is often linked to people factors. Human resources factors are also hypothesized as significant factors for the success ASD projects. Some of the ASD project success factors will be addressed below could equally be classified as people factors. Additionally, Cao [7] study found success people factors comprised of: (a) Team members with high competence and expertise; (b) Team members with great motivation; (c) Managers knowledgeable in agile process; (d) Managers who have light-touch or adaptive; (e) Management style; (f) Coherent, self-organizing teamwork; and (g) Good customer relationship (p. 963). However, rather than getting bogged down into the not significant issue of which class they belong to, the researcher simply will further addressed them.

3.6.7.1. Competency

Competency implies whether an individual has real-world experience in the technology domain, has developed similar systems in the past, and has good communication and interpersonal skills [19]. Competency also means that one acquired the necessary skills and abilities to perform the job well overtime for the similar systems. Using the skills requirement matrix as a competency model, organizations can access any skill gaps in ASDT members and distinguish the members who will require further training in a particular competency [2]. These team members competencies concur with Nguyen [19] study findings.

3.6.7.2. Personal characteristics

People factor plays a central persona in the success of ASD methods. Alistair Cockburn, asserted that Good people are primal to success with big teams. Ken Auer considers that having high quality people does not inevitably implies having the appropriate experienced ones. ASD members may not be inevitably highly experienced skilled people consisted of having collaborative attitude, honesty, sense of responsibility, eagerness to learn, and willingness work with others are believed equally significant, if not more [10].

3.6.8. Organizational Factors

The Organization has a great outcome on the success of the project. The culture can shape many things in the ASD project. Various researchers shown that organizational factors are also significant success factors in order for agile project to be successful. These factors will be further addressed consist of customer commitment, decision time, team distribution, corporate culture, planning and control, and business/safety criticality. Cao [7] research found that success organization factors as follow: (a) Strong executive support; (b) Committed sponsor or manager; (c) Cooperative organizational culture instead of hierarchal; (d) Oral culture placing high value on face-to-face; (e) Communication; (f) Organizations where agile methodology is universally accepted; (g) Collocation of the whole team; (h) Facility with proper agile-style work environment; and (i) Reward system appropriate for agile (p. 963)

3.6.8.1. Customer commitment

The Agile Manifesto preaches customer collaboration as one of the significant requirements for successful ASD [11]. One of the principles of ASD is bringing highest priority to attaining customer satisfaction through early and continuous extradite of valuable software [11]. This necessitates that the customers are not just available on site with the ASDT, but also highly active, motivated, and view themselves responsible components in the ASD project. Customer commitment is, thus, a signification success factor.

3.6.8.2.Team Distribution

One of the factors that is potentially to positively shape the success of an ASD project is the centralized establishment of the ASDTs. Ken Schwaber [10] asserted that collocated teams are one of the substantial vehicles for successful communication, which is, in turn, distinguished by Scott Ambler [10] as one of the significant success factors of ASD. Organization engaged in distributed offshore projects will be impacted by the cultural, and political places in those regions.

3.6.8.3. Corporate Culture

Lindvallet al. [17] argued that "to be agile is a culture thing", hence if organization culture is not right then the company can't be agile. Having the correct corporate culture is virtually unanimously perceived by agile experts to be an essential factor ascertaining the creation of agile methodologies [10,17]. Since carrying out agile methodologies demand taking control of individual's own fortune to the uttermost possible extent, the nature of firms people work in is significant. For example, agile is does not suit well in bureaucratic firms [10]. A dynamic, and fast altering firm will discover agile methods extremely suitable for it [3].

3.6.8.4. Planning and Control

One of the significant facets that characterize the implementation of ASD methodologies is the nature of management, organizational, and project planning and control. For example, documented plans, accompanied by quantitative performance measures are believed primal to the success of firms applying plan-driven methodologies. On the other hand, internalized plans, and qualitative control are believed to succeed firms adopting agile practices [3b].

3.6.9. Technical Factors

Technical factors are factors that have an affect on how a project functions and are linked to the software, hardware, or technology employed within the project development process. Various researchers affirmed that technical factors are also central key role in order for ASD projects to be successfully. These technical factors consisted of requirements, development, and testing will be further addressed. Cao [7] study found that technical success factors consisted of: (a) Well-defined coding standards up front; (b) Pursuing simple design; (c) Rigorous refactoring activities; (f) Right amount of documentation; (g) Regular delivery of software, (6) Delivering most important features first; (h) Correct integration testing; and (i)Appropriate technical training to team (p. 963).

3.6.9.1. Requirements

ASD processes espouse altering requirements, even later in the development stage [11]. On the contrary to plan-driven practices, which are most useful in surroundings where there is low rate of alter, ASD practices have been successful in both low and high alter environments. Whereas plan driven practices function best with formalized ASD project requirements, requirements capability, interface, quality, and predictable requirements, ASD practices are successful even in surroundings where requirements undergo unpredictable changes.

3.6.9.2. Development

The success of ASD methodologies are believed to be successful in development atmosphere characterizing short increments, simple design, and inexpensive refactoring [3b]. On the contrary to the success of plan-driven development practices is characterized by longer increments in development and extensive design. Refactoring, in which the internal structure of the existing code is altered without altering the external behavior of the system, is believed expensive in plan-driven practices.

3.6.9.3. Testing

Whereas documented test plans, and procedures characterize the success of plan-driven practices, executable test cases determine the success of requirements and testing in ASD [3b]. Testing should identify management commitment in organization and effect of ASD process in quality.

3.6.10. Process Factors

Process factors are those linked to the tasks functions or process of the project itself (e.g. reporting of the project status , testing and reviewing the code of the software, and risk management). Cao [7] study found process factors also signification in ASD project success. These success factors consisted: (a) Following agile-oriented requirement management process; (b) Following agile-oriented project management process ; (c) Following agile-oriented configuration management process; (d) Strong communication focus with daily face-to-face meetings; (e) Honoring regular working schedule – no overtime; (f) Strong customer commitment and presence; and (h) Customer having full authority (p. 963). Whereas the SBOK™ Guide [2] break process factors into five different ASD cycle phase comprised of: (a) Initiate; (b) Plan and Estimate; (c) Implement; (d) Review and Restrospect; and (e) Release [2] as shown in Figure 3.7.

Chapter	Phase	Processes
8	Initiate	1. Create Project Vision 2. Identify Scrum Master and Stakeholder(s) 3. Form Scrum Team 4. Develop Epic(s) 5. Create Prioritized Product Backlog 6. Conduct Release Planning
9	Plan and Estimate	7. Create User Stories 8. Approve, Estimate, and Commit User Stories 9. Create Tasks 10. Estimate Tasks 11. Create Sprint Backlog
10	Implement	12. Create Deliverables 13. Conduct Daily Standup 14. Groom Prioritized Product Backlog
11	Review and Retrospect	15. Convene Scrum of Scrums 16. Demonstrate and Validate Sprint 17. Retrospect Sprint
12	Release	18. Ship Deliverables 19. Retrospect Project

Figure 3.7: Scrum Processes. [2]

The five phases above depicted each process in detail comprising their linked inputs, tools, and outputs. In each process, some inputs, tools, and outputs can required or optional. Whether to employ the optional inputs, tools, and/or outputs depend on particular project, industry or company [2].

3.6.11. Technologies and Development Tools

ASDT overall project success or team performance outcomes also depends on how and what technologies and development tools are being use to help team members daily development activities or tasks assigned [19].

Thus, it is imperative for organizational managers to consider what technologies (e.g., ICTs) and development tools are needed when establishing ASDT s and how these technologies and development tools will be utilized by ASDT members to perform their daily work. Additionally, Sharifi states that if company desires to bring forth the agile capacity it must employ suitable technology and tools [29]. In 12 principles of agile declaration it posits that we should invariably pay attention to matching of excellent design and technology, so that we can better software the prompt response capability [34].

Technology is at the key of ASDTs [19]. Without email, internet, audio bridges and video conference, ASDTs can't even exist. The competitive collaborative atmosphere support and ascertain ASDT high speed to function and extradite solutions; these characteristics are made rooted on new ICT and Internet technologies by offering progressively richer collaboration tools (advancing from the fax machine and the telephone and to specialized "software tools, video conferencing and virtual workspaces platforms" [1]. Technologies offer some mechanisms for collaborating when people are co-located but are the medium for collaboration when they operate virtually, separated by distance or time. Technologies (e.g., email, conferencing, scheduling tools, and knowledge management tools) can permit teams to function towards a mutual purpose by conveying information and aligning across distinct time workplaces, zones, organizational contexts and cultural backgrounds[19].

3.6.12. Education and Training

Martin Fowler said "Whatever you select some technology, it's not easy to make it clear how the specific implementation. Agile methods are particular, because it will need you to change the mind! Many people just focus on specific practices rather than the philosophy behind them. Is it possible that you ignore the philosophy of the system and look forward to good results?" [17,6b]. Wan and Wang [33] empirical study found that education and training play a positive persona in encouraging successful implementation of ASD project.

3.6.13. Workplace Factors

Espinosa et al., Reed and Knight, Remus and Wiener, and Sharma et al. argued that workplace factors that may impact IT project success such as cultural, functional, and organizational differences between teams have not been explored thoroughly compared to internal factors of leadership and project management [19].

3.6.13.1. Cultural Differences

Dispersed work groups in which members are located in distinct countries encounter unique cultural differences that can impact the overall success of the group's performance. Numerous of the organizations experience difficulties caused by cultural differences between ASDT members, affecting their ability to interact and communicate. Cultural differences that bestow to communication issues lean to attest themselves in three major categories: the functional disciplines of the members of the team, the organizational construction of the firm and, the nationalities of the team members and/or the nation in which the teams exist. Additionally, language barriers in divergences in cultural understandings and expectations can have a heavy impact on the team's overall performance. Nguyen [19] study findings on culture differences the identified themes linked with culture

differences were "to appreciate other cultures, to create a more trusted working environment, and allow time for each member to speak; concurrent engineering reduce time to market; leverage diverse knowledge and skills; level of proficiency can affect project success; and ICTs use (teleconferencing and videoconferencing) extensively".

3.6.13.2. Functional Differences

Functional differences, for instance, can guide to ASDT members with distinct cognition bases, motivations, reasoning abilities, and like-minded thinking approaches. Engineers, for instance, reason distinctly, react distinctly, and are motivated distinctly than marketers. Any inherent divergences have been strengthened over time through training and exposure to other like-minded individuals. Nguyen [19] study findings on functional differences the identified themes linked with functional differences were "to boost team overall performance and outcome; right expertise or people at the table is critical to project success; diverse skills so knowledge can be shared; multiple functional expertise control whole project and other members have limited input; gain conflict among team members and lower team commitment; less attraction and trust of peers and less frequent communication; and difficult to establish trust and assess teammates' trustworthiness".

3.6.13.3. Organizational Differences

Organizational differences attest themselves as acquired behaviors within organization cultures. Each organization has its own unique style. Apple and IBM, for instance, might develop similar computers, but their employees have developed quite distinct behaviors and values. An IBM employee would likely be uncomfortable at Apple, and vice versa. Nguyen [19] study findings on organizational differences the identified themes linked with organizational differences were "reduce project risks, gain and diversify skill sets; create competition that leads to improve project performance; vendors' processes or tools are uniform, alignment, and thoroughly tested; hidden agenda and remind them main goals; invite vendors to teleconference meetings; and minimum affect when leaders and team members remotely work well together".

3.10.14. Workplace Factors Summary Discussion

Numerous researchers there more advantages with functional and organizational differences compared to disadvantages (e.g., [9]). But the advantages out weight the disadvantages. For instance, where ASDT with more than one functional expertise within the team, it can help leverage other team members' technical skills as well as boost team overall performance [19]. Thus it is recommended when establishing ASDTs, organizational leaders and HR personnel work together to institute cultural training programs in place. These cultural training programs can be used to train new ASDT members to be aware and learn other cultural ways of doing business as well as the way other cultural celebrate holidays. The more ASDT members cognizance and understand other members culture avenue of doing business [19]. The more they appreciate, trust, and work well with other team members different cultural.

4. Conclusion

This paper is significant for both researchers and practitioners because it has the possible to shed light on SFs as critical in building and managing high performance ASDTs. It also contributes more commonly to the evolving savvy of SFs in the specific and non-traditional mode of project management, used in ASDTs [11]. The research is important for project supervisors and for national project coordinators and their project teams in that its findings, if integrated into training programs, may direct to better understanding and use of SFs. If the supervision of ASDTs projects does in fact improve project success, then there is a lack of knowledge on SFs and their linkage to project success.

In this paper the researcher performed extensive literature review, determined, synthesized, and presented the success factors in building and managing high performance ASDTs. This paper is significant for both researchers and practitioners because it has the potential to shed light on SFs as vital in building and managing high performance ASDTs. It also conduces more generally to the evolving savvy of SFs in the specific and non-traditional mode of project management, used in ASDTs [11]. The research is important for project supervisors and for national project coordinators and their project teams in that its findings, if incorporated into training programs, may lead to better understanding and use of SFs. If the supervision of ASDTs projects does in fact improve project success, then there is a deficiency of knowledge on SFs and their linkage to project success.

These findings offer a significant step in studying how success factors as vital in building and managing high performance ASDTs. Organizational managers and practitioners from various industries who are managing ASDTs could be of benefits with our study outcomes by implementing or developing strategies or processes that could improve ASDT performance for long term sustainable development. High performances ASDT outcomes include improve team overall performance, time to the market, project success rate, and a better safer and healthier organizations or society.

4.1. Limitations of the Study

There exist a limitation to this study. The study was aim to address the success factors in managing and leading agile software development teams. Thus, the outcomes might not transferrable to other agile development teams. Guba [12] noted that transferring findings into positions outside of the study setting might be challenging for inquirers because of minimal resemblance between the two settings.

4.2. Recommendations for Actions

In order for IT organizations to stay competitive advantage, software quality, employee satisfaction, safer and healthier organization as well as to help reduce the current project cancellation and failure rates; project managers need to proactively implementing new ASDT practices. To help accomplish this, the following recommendations or strategies for organizational managers and HR personnel work together to build an effective virtual project team: (a) Establish cultural awareness and training programs in place to help train new team members; (b) Select new candidates with good communication skills as well as prior or current experience virtual team practices; (c) Institute continuous training programs to encourage team members to improve their

technical skills as well as communication skills; (d) Routinely conduct risk assessment on current project and its team members technical skills; (e) Closely monitor and track current project; (f) Select new manager with appropriate leadership style and technical skill for the job; (f) Create an effective domain knowledge transfer and sharing, and knowledge management repository that can be accessible to all team members at any time; (h) Select vendors that have good reputation and trusted as well as common development processes with your organization; (i) Embrace and appreciate other team members' culture relate to work; (j) Establish strong trust with other team members at the beginning of a new project inception; (k) Encourage team members to work with Sr. engineers and learn from their expertise; (l) Promote team members to do cross-functional training or learning; (m) identify potential threats and put secure design in place to countermeasure these threats; (n) Use open source software to leverage new development time; (o) Invite key stakeholders to attend meetings right at the beginning of project inception; (p) Encourage team members to utilize communication tools; (q) Sr. managers need to provide realistic expectations for all team members to achieve; (r) Establish clear definition of roles and responsibilities; (s) Ensure code sharing and knowledge sharing and requires that all parties empathize and uphold to their contractual agreements relating to IP, while keeping the overall business objectives; (t) Encourage team members responsibility and accountability for their actions; (u) Manager needs to facilitate, plan, implement and monitor global communication, alignment and related activities with effective procedures and policies; (v) Effective partitioning and allocation of work across the ASDT must be addressed. This can be accomplished by implementing one or more distinct approaches for task allocation. Partitioning can be lifecycle based or component based [24]; (w) Manager must build an effective cooperation procedure within the global to reduce or countermeasure threats to the project; (x) Managers must acknowledge and empathize the cultural needs of the global software team; (y) Manager needs to be cognizant of how the project is progressing. Without designing formal reporting structures, there is a risk that the distant team members may not report properly, due to misunderstandings and cultural differences. The linked threat here is that ASDT members may accept tasks which they are badly equipped to perform; and (z) Risk management should be integrated into all well planned ASDT software projects. ASDT projects bring additional exposure to risks which are linked with dealing a culturally diverse global team [19].

4.3. *Recommendation for Future Research Direction*

IT organizational ASDT managers are endlessly searching for the root causes of project failure. The findings from the research study provide the ground for future studies to explore the affect of success factors in building and leading high performance ASDTs. The following factors, if included, may increase the opportunity of achieving a positive and generalized result. Failure to conceive and leverage the findings may outcome in ASDT project failure. The factors to be considered are: (a) employ a larger sample size, (b) employ quantitative methodologies to corroborate the outcomes obtained from the current study, (c) encompass IT professionals from various firms and ASDT workplaces, and (d) conduct a mixed research study on the affect of success factors in building and leading high performance ASDTs.

There are several recommendations to future studies. The first recommendation is with the same sample size and method, further studies should encompass: (a) participants work location based in China or other country, (b) participants consist of ASDT leaders instead of managers, (c) participants consist of ASDT members instead

of managers, and (d) participants consist of ASDT members work for IT industry. The second recommendation is with a larger sample size and same method; further studies should encompass participants as mentioned in (a) to (d) above. The third recommendation is with a very large sample size and quantitative, further studies should encompass participants as indicated in (a) to (d) above.

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Dedication

 First, the researcher would like to dedicate this research study to God who saved me three times from drowning at sea; and another time while he was on a kayak fishing at lake in Texas. Secondly, the researcher would also like to dedicate this research study to my blood parents Do Nguyen and Tai Thi Dang; and my American parents Raymond L. Schilling and Lucille M. Schilling who raised and influenced me since seventh grade and throughout high school and my sponsors (Ms. Alinda, Ms. Hildegarde, and Ms. Renata Weiss). Third, the researcher would like to dedicate this research to my wife, Hồng Nhung Trương, and my sons (Bill Lê and Jacob Schilling). Finally, this research study would not have been possible and successful without those American soldiers (58,226) and South Vietnamese soldiers (1,250,000) who fought and died for the war.

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