Factors Determining The hybrid Approach: A Preliminary Study

Emergent Research Forum (ERF) Papers

Mason Brown
Griffith University, Nathan QLD
Mason.c.brown@griffith.edu.au

Sharmistha Dey
Griffith University, Nathan QLD
s.dey@griffith.edu.au

Gervase Tuxworth
Griffith University, Nathan QLD
g.tuxworth@griffith.edu.au

Abstract

The choice of methodology for information system development (ISD) is a significant question faced by information systems (IS) professionals. A sizable body of research details the agile and traditional approaches independently. The choice of approach holds no universal agreement. A hybrid approach combines agile and traditional techniques, implementing multiple methods within one approach. The contextual analysis identified that the hybrid approach is attaining popularity. The investigation of factors ensure an informed, and justified approach can be selected. Prior research debates company culture, individual choice, and natural evolution as selection factors. Researchers have identified the need to find additional factors. This study proposes a design to identify the factors influencing the selection of hybrid. This research will be the first within the field to examine these factors in an Australian context. A matrix in progress aids the purposeful selection of the hybrid approach.

Keywords

Hybrid, Factors, Agile, Traditional, Scrum, Waterfall, Selection, Australia.

Introduction

Commonly, studies investigate the agile and the traditional approach independently (Alqudah et al. 2019). Balaji and Murugaiyan (2012) state that agile approaches "evolve through collaboration between self-organising, cross-functional teams" (p. 26). Ziolkowski and Deregowksi identify the traditional incremental approach as a “formal, detailed process” (p. 64). Hybrid approaches are implemented by combining agile and traditional approaches (West et al. 2011). Prior literature has identified hybrid methods (Kuhrmann et al. 2018). The growth of hybrid is evident by an increase in post-agile methods (Fernandez and Fernandez 2008). Kuhrmann et al. (2017) resolved that hybrid selection is not linked with company culture, individual selection or natural evolution. Vijayasarathy and Butler (2015) state, "researchers need to examine the role of other factors" (p. 94). Castilla (2014) found a literature gap in the application and research of hybrid selection. Sohal and Fitzpatrick (2002) found that the Australian industry considers hybrid governance but has not completed a hybrid ISD investigation. Australia has been selected as the location as there has been no complete research on the hybrid approach in Australia. A focus of hybrid factors within literature has not been correlated, warranting the need for a cumulative literature review to identify theoretical factors determining selection.

Research Questions

To conduct this study, the following broad research questions have been identified:

- Is there an increasing trend to use a hybrid approach when choosing an ISD methodology?
- What are the factors determining the implementation of a hybrid approach?
Factors Determining The hybrid Approach: A Preliminary Study

Literature Review

The origin of the traditional approach is traced to the need for business to collect requirements (Theocharis et al. 2015). Clarke and O’Connor (2012) discuss Winston Royce’s 1970’s introduction of the traditional waterfall method. The v-model is an additional example of a traditional method. West et al. (2011) state “Waterfall evolved in response to the business growing demand for IT to deliver more and more processes automation” (p. 13). Vijayasarathy and Butler (2015) reported that 32% of projects are still implementing waterfall. Before agile, methods maintained characteristics including; phased development, equipped procedure and applied philosophy (Aviison and Fitzgerald 1995; Wynekoop and Russo 1997; Carroll 2003). The Agile Manifesto, published in 2001 and the Declaration of Interdependence introduced in 2005, are recognised as the origin of agile (Beck et al. 2001; Fernandez and Fernandez 2008). Teams embrace the manifesto through methods such as scrum (Vijayasarathy and Butler 2015). Clarke and O’Connor (2012) acknowledge that parishioners often support one approach “each arguing that their particular approach is best” (p. 434). Fernandez and Fernandez (2008) attempt to examine the traditional and agile approach independently, identifying a mixture of two approaches in practice. The hybrid approach can be defined as any combination of methods, techniques or practices that fall under the agile and traditional approach in context to individual methodologies, programs and practices. The terms “approach” and “methodology” are defined through “The right Degree of Agility in Rich Processes” (Diebold and Zehler 2016; Kuhrmann et al. 2018). Fernandez and Fernandez (2008) state that a traditional approach should be accompanied by an “organic and adaptive view” (p. 16). The hybrid approach often appears as a single traditional methodology linked with multiple agile methods (Vijayasarathy and Butler 2015). Alqudah et al. (2019) expand the definition to include combining numerous agile methods in practice.

The popularity of agile could be overshadowing hybrid studies, with recent work showing hybrid is increasing in popularity (Vijayasarathy and Butler 2015; Cram and Brohman 2013; West et al. 2010). Results suggest that hybrid solutions are being used within the industry yet labelled as agile. West et al. (2011) identified the hybrid method, Water-Scrum-Fall Fall, and this new method was further investigated by Theocharis et al. (2015). Fernandez and Fernandez (2008) address marketing bias influencing the rise of agile popularity. Identification of literature bias is associated as a determinant for the surge of Post-agile. Post-agile is a term moderately interchangeable with hybrid and Post-Scrum. Vijayasarathy and Butler (2015) review the state of agile and hybrid from 2003 through 2010, supporting literature bias as a factor. Nazare (2019) examines the 2018 12th Annual State of agile Report by Collabnet VersionOne. Concerning approaches in use, the hybrid (multiple methodologies) category is identified by 14% of respondents. An additional two-hybrid methods are outlined by respondents, namely Scrum/XP selected by 6% and ScrumBan identified by 8% (CollabNet 2018). According to Nazare (2019), XP is linked with Scrum to improve quality. Consequently, according to the Collabnet VersionOne report, 28% of approaches in use are hybrid (2018). The 13th Annual State of agile Report reports similar results concerning hybrid use. Scrum and Scrum/XP hybrid (64%) continue to be the most common agile methodologies used by respondents’ organizations” (CollabNet 2019).

The Hybrid approach appears within the Trough of Disillusionment on the Gartner Hype Cycle for Project Portfolio Management 2019. According to the report, it will be less than two years before the technology reaches the Plateau of Productivity. According to Gartner, “Gartner Hype Cycles provide a graphic representation of the maturity and adoption of technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities. Gartner Hype Cycle methodology gives a view of how a technology or application will evolve, providing a sound source of insight to manage its deployment within the context of the specific business goals. Henderson (2019) states, "Within the Trough of Disillusionment phase, interest wanes as experiments and implementations fail to deliver. Producers of the technology shake out or fail. Investments continue only if the surviving providers improve their products to the satisfaction of early adopters". The hybrid approach will either reach the Plateau of Productivity in the next two years or fail to deliver.

Negating the disadvantages of each independent approach is possible through a hybrid combination. Organisations with multiple teams display an increased use of the hybrid approach—the required structure from the traditional approach aids project managers. Theocharis et al. (2015) identify that company norms ensure these traditional approaches maintain continued use due to the reluctance to change. Theocharis et al. (2015) report "we assume managers prefer the structured planning-oriented way of working" (p. 11). Agile methods are tailored towards all, yet favoured by development teams (Ziółkowski and Deregowski 2014). Castilla (2014) describes this factor as "combining the strengths and mitigating the weaknesses of two or more approaches, a better software development process can be achieved" (p. 9). Overcoming strength and weakness through combination is labelled as the win-win factor (Vijayasarathy and Butler 2015). The win-win factor has been reidentified as a dual limitation within the search matrix (Table 1).

Natural evolution is considered with varying levels of justification. Kuhrmann et al. (2018) examine the hybrid approach within organisations with formal standards. The findings show that the approach is present regardless of company regulations or standards. Kuhrmann et al. (2018) consider natural evolution due to 83.9% of respondents' acknowledging experience. These results could suggest that natural evolution is the prime factor. Kuhrmann et al. (2018) qualitatively rule out company size and industry as factors. Kuhrmann et al. (2018) contradict Theocharis et al. (2015) consideration of organisational size as a factor. A series of smaller studies would disagree regarding these influences being ruled out (Matos and Lopes 2013; Vijayasarathy and Butler 2015; Jadhav and Sonar 2011). West et al. (2011) addressed that practitioner lead hybrid implementation often relates to internal change. Areas such as release management and positions accustomed to business analysis generally maintain some traditional processes (West et al. 2011). These full business process and documentation can be challenging to remove (Cram and Brohman 2010). The business factor is similar to the finding from Ziolkowski and Deregowski (2014) that shows the application of agile is lead from development teams.

Vijayasarathy and Butler (2015) conclude that organisational, team and project characteristics are factors influencing hybrid selection. West et al. (2011) summarise that agile adoption from a traditional approach requires a change in company culture, norms and processes. Migration is identified as a trigger for the hybrid approach. Castilla (2014) resolves that hybrid implementation adds value to projects. This factor is based on the experience seen through case studies. Selection is dependent on the team experience, knowledge, and familiarity of approach. Špundak (2014) suggests that adopting one approach using methods from both agile and traditional could be the best way to address all characteristics of a specific project. Theocharis et al. (2015) concluded that the hybrid approach was the favoured solution.

**Research Design**

The research will include two phases: a contextual and periodic analysis. Each phase will be investigated separately but considered holistically. Initial research attempted to identify articles of the hybrid approach in the Australian context. One article was identified; therefore "Australia" was removed from the search criteria. The search query developed as: "hybrid approach", "hybrid methodologies", "Mixed-mode software development" in conjunction with any of the following keywords: "Software", "Water-srum-Fall" , "traditional", "waterfall", "agile", "lean", "factor" , "trigger", "reason", "Australia", "cause", and "justification". A contextual analysis is displayed as a cumulative literature review (Templier and Pare 2015). Text content analysis was used to develop this approach (Krippendorff 2018). Contextual analysis followed the subsequent process: 1. An initial investigation of studies from 1980-2019 conducted through Google Scholar utilising the search query (51 articles identified) 2. Development of a matrix identifying factors linked with hybrid selection (16 articles included), 3. Identification of hybrid selections factors from 2011-2019 publications within the following conference databases: AMCIS, ECIS, ICIS, ACIS and PACIS and, 4. The matrix will be updated to include the AIS conference articles (Table 1).
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Table 1. Matrix of factors determining the selection of the hybrid approach

Discussion

Due to the complexity of software development methodologies, further analysis is required. Justifications identified through partial contextual analysis indicate what factors are expected from further ES-analysis. Two factors are consistently recognised by literature: dual limitation and project operation. The dual limitation is recognised by joining two approaches to reduced limitations of each approach. These two factors have been identified individually across ten separate articles. Client involvement and team influence are identified as factors, eight and seven times, respectively. Further investigation is needed to confirm the factors identified in the literature. A hypothesis is generated as the need for flexibility between approaches in combination with a need for increased flexibility and client reduced engagement is leading toward hybrid selection.

Conclusion and Future Research

There is no universal agreement on the factor influencing the choice of the hybrid approach. The growing popularity of the hybrid is evident from the trend presented. This research presents the foundational design for an in-depth hybrid investigation aiming to confirm the findings presented in prior research. The initial literature review comprised of sixteen (16) primary articles presented, shows the factors that have been identified by the researcher so far. Future research will contain an integrated literature review containing periodic analysis. An investigation of Google trends will conduct periodic analysis. It will evaluate claims of hybrid popularity increase, specifically within Australia. An empirical study will confirm theoretical data through observation of industry experience. The study will follow four steps: 1. Interviews will be conducted with leading IS experts in Australia, 2. A survey instrument will be developed, 3. The instrument will be reviewed and refined based on feedback from the pilot study, and, 4. Statistical analyses will be conducted to identify patterns.

REFERENCES


