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Managing the Magic behind the Movies. ACAMP: The Applicability of Agile Project Management to the Visual Effects Industry

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ACAMP: The Applicability of Agile Project Management to the Visual Effects Industry

Full research paper

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Abstract

Visual effects (VFX) are a cornerstone of modern filmmaking, yet research into their management approaches is still significantly limited. Agile project management (APM) is widely seen as being the most effective project management approach in technology-reliant, and innovative environments, both of which are characteristics commonly found in the VFX industry. We conducted a series of interviews to understand the extent to which APM techniques have been applied in the VFX industry considering the theoretical transferability of APM to such non-software focused, creative teams. The interviews were conducted with a range of VFX professionals who differed in country of origin, seniority, background, gender, and the size of the companies they worked for. We identified an overall alignment of current management practice to core APM axioms, yet there is only a partial adoption of an existing formalised agile methodologies. We also identified a consistent set of adaptive and responsive PM practices across a diverse range of companies. We hypothesise that there exists a previously unidentified incarnation of Agile we have named Adapted Creative Agile Management of Projects (ACAMP).

Keywords: APM, Agile, VFX, Film, ACAMP

Introduction

In this study, we explored the extent to which the phenomenon of agile project management (APM) has been applied across the visual effects industry. APM, developed from Beck et al.'s (2001) agile manifesto, is a management approach that promotes adaptability to internal and external shocks in a business environment while maintaining an organisational structure that facilitates the delivery of project outputs in a timely manner (Cobb 2012, as cited in Seymour & Coyle 2016). We also refer to one of the most common agile implementations, Scrum, and its limited adaptation in the visual effects (VFX) industry. As APM was originally developed for software development, research into the adaptability of APM for other industries has found that APM is most effective in creativity-intensive, technology-reliant, and innovative project-based environments, all of which are characteristics commonly found in the VFX industry (Trier & Treffers 2021).

We specifically considered APM over other management styles in VFX projects due to the theoretical alignment between the VFX industry and APM, alongside the industry-accepted premise that creative workers seek autonomy over their work to support their creativity, which is something that the agile manifesto actively encourages (Hodgson & Briand 2013). Agile approaches emphasise self-organised teams, iterative flexible product design, and flat organisational structures in which individual competence and autonomy are recognised (Wiśniewski & Bukalska 2020). In recent years, the wider creative sector has become increasingly interested in the application of APM due to its potential benefits, particularly regarding productivity and artistic autonomy (Wiśniewski & Bukalska 2020; Hodgson & Briand 2013).

This research embarked upon understanding the management approaches for the processes intertwining people and technology across the VFX industry. As the industry is defined by a reliance on technology, and the importance of the creative inputs from VFX professionals, these contributions are particularly relevant to the Information Systems domain. We conducted a comprehensive literature review to assess the current state of knowledge. After identifying a lack of research in the field, we conducted primary qualitative research by interviewing VFX professionals from diverse backgrounds to create an informative dataset. The findings based on this data revealed a new form of APM we named Adapted Creative Agile Management of Projects (ACAMP).

In this study, we demonstrate the level of understanding of the adoption of agile in VFX in the media and entertainment industry (M&E). We focused on VFX for film and television (hereafter referred to as film), as it is the most prominent area where VFX is utilised, and all the interviewees have experience in VFX for the film industry. This scoping enabled us to consider APM issues in the full range of VFX project sizes, ranging from the largest Hollywood 'tentpole' productions such as *Avatar and The Way of Water* (2022) to independent European cinema features such as *The Champion* (2022).

We conducted and analysed interviews through the lens of the following research question: *To what extent are agile management techniques practically implemented in the VFX industry?*

Literature Review

We adopted the hermeneutic framework proposed by Boell and Cecez-Kecmanovic (2014) to conduct a literature review. The adoption of a cyclically iterative approach in the research allowed us to adjust to newly identified research pathways and thereby broaden the research scope when the original search for sources related to the research area failed to yield a sufficiently large published knowledge base.

APM in VFX

In our first search cycle, we focused on APM in the VFX industry and found only one peer-reviewed paper to directly consider the established criteria. Seymour and Coyle's 2016 paper is an integral part of our research, as they conducted one of the only identified primary research studies with Ukrainian company, Cinnamon VFX. Critically, they identified that whilst Cinnamon VFX had fully adopted several agile practises, the company was uniquely positioned in the industry through having done so. The primary research identified that the company was running series of short sprints, operated by small teams that were managed through daily meetings, and Kanban boards (Seymour 2016). The owners largely attributed the company's rapid growth since 2006 to their Agile management practises, which

allowed them to circumvent the interdependencies that create efficiency bottlenecks commonly found in large projects. Their approach challenges the current industry standards of project management, which is predicated on the assumption of a near-impossible level of predefined client criteria that will not change throughout the duration of the development of the project (Seymour 2016).

Seymour and Coyle (2016) theorised that some VFX companies may have developed basic 'agile-like' processes to meet the demands of the industry but emphasised that Cinnamon VFX was likely an outlier in the extent of their implementation of APM practises. The paper clearly identified nine APM characteristics and their applicability to VFX projects, but the authors suggested further study in VFX and other similarly APM-appropriate industries to increase the understanding for APM adoption.

APM in Film

Due to the lack of directly relevant papers, we broadened the scope in the second cycle of the search to include all references to APM in the broader film industry. In the second cycle, we found that despite there being few resources related to APM in creative industries, there was an increasing interest among creative companies to implement APM to access its beneficial aspects (Wiśniewski & Bukalska 2020). Angelouv (2019) found that agile principles are applicable to several creative industries as a means of both efficient management and preservation of the creative process. Trier and Treffers (2021) go further by arguing that APM is necessary for the survival of the industry in the competitive global market. Angelouv (2019) and Trier and Treffers (2021) all agree that the likelihood of adoption success depends on several enablers.

In their literature review, Trier and Treffers (2021) categorised 11 identified enablers into three categories, namely 'Team', 'Project' and 'Culture'. While all these enablers are supported by the literature included in the systematic review, the degree of practical application of these enablers cannot be ascertained without further primary research, which the authors encourage. They further found that the changes in the ways people consume content have caused radical shifts in the creative M&E industries and the management approaches that are effective in the changing environment. With a focus on the European audio-visual creative industries, they argued that a reliance on traditional project management styles will cause creative companies to fall behind their international counterparts, which is a challenge that needs to be considered by companies globally. Trier and Treffers (2021) identified APM as the necessary shift to foster leaner production structures that can adapt to shocks in the creative process. This is supported by Seymour's (2016) findings that Cinnamon VFX found success with APM because the management style allows them to adapt to the continuously changing requirements, thus reducing employee burnout.

Maier and Branzei (2014) do not explicitly mention APM in their paper when considering the management styles required to harness the creativity of film projects. However, in their promotion of flexibility in formal controls to foster creativity in large-scale creative projects, the paper's suggested solution resonates with the agile manifesto (Maier & Branzei 2014 and Beck et al. 2001). Maier and Branzei (2014) concluded that the professional project management practises of software engineers, the industry from which APM originated, would allow companies to better harness creativity within the constraints of a creative project. The desired lean production structure required by APM has further been identified as effective in supporting the critical reallocation of resources, predominantly time and money, for the requirements of film and VFX projects (Maier & Branzei 2014).

Świerczyńska-Kaczor et al. (2019) found that, while it may be difficult, the transition to APM in filmmaking practises in all stages of production is a feasible strategy to address the perceived inefficiencies and wasted resources in the industry. Although predominantly focused on appeasing funding sources through APM, the study is still highly relevant to the overall creativity of VFX artists, as the creative and financial constraints of a project are undeniably related (Maier & Branzei 2014).

A recent systematic literature review by Farina et al. (2022) found links between the software development and film industries that may facilitate agile management adoption and implementation. While their findings for the use of APM in the film industry were positive, their justification of links between processes in the two industries is tenuous. This is due to their flawed research methodology and considerable reliance on sources with no apparent accountability or peer review process (Harris et al. 2014). Nonetheless, the paper provides an insight into the potential parallels and differences that must be understood to assess the theoretical application of practises and processes between the software development and film industries that has remained unrecognised in all other identified research.

APM in Creative Industries

The search for literature on research into the use of APM in the film and VFX industries demonstrated a critical lack of credible studies in this area. All the identified papers recommend further research into the application of APM in the film industry. For the purpose of gaining a better understanding of the entire field of knowledge, we expanded the search scope in the following search cycles to add to the limited number of peer-reviewed sources and include adjacent creative industries, additionally we also considered the perspectives of grey literature sources, notably, working papers.

Trier and Treffers (2021) were identified in the last round of the literature search. It is worth noting that they also studied the effectiveness of APM in music, video games, and mobile content and found that the management style is an important forward step for all these industries. Similarly, Angelouv (2019) found that APM is effective across a range of creative industries and particularly demonstrated its effectiveness in advertising and design-focused industries.

Of the adjacent audio-visual creative industries, the relevance of video game development to the VFX industry is particularly notable due to the parallels of technological reliance, creativity requirements, and project-based work. However, there are distinct differences between the film and video game industries. For example, video game development deadlines are more flexible, and version iterations and updates of the same product are expected, unlike in film. Nevertheless, video game development still presents potential for valuable insights due to the parallels. This is especially helpful because the applications of APM to video game development have been considered in greater depth by researchers than for VFX. However, the results of these papers vary.

Keith (2020) argued for the use of APM in video game development to manage rising costs, the growth of the industry, increasing complexities, and the pressure on studios to find more efficient management practises. Agile management practises implemented into video game development have been found to provide solutions to these issues over the last decade and are hailed by Keith (2020) as the way forward to prevent project overruns of both time and budget. However, in direct contrast, Hodgson and Briand (2013) found that the implementation of APM in a video game development project was met with significant resistance to change by the artists, despite the promised increased artistic autonomy. Over the six-month period of the study, researchers and managers observed artists becoming increasingly reticent about APM practises. The study found through interviews and observational data that the potential increase in artist autonomy offered by APM was not valued by the studied developers. Artists rejecting potential control imposed on their creative freedoms aligns with the findings of Maier and Branzei (2014), who identified this as a common project management issue. However, Hodgson and Briand's (2013) study was significantly limited by the broader company not adopting agile practises, thereby preventing the complete implementation of APM due to the need to still meet the expectations of management external to the team. This could represent evidence for a key enabler identified by Seymour and Coyle (2016), Świerczyńska-Kaczor et al. (2019), and Trier and Treffers (2021), namely that the need for broader team culture support is a critical factor for APM adoption success.

APM Outside of Software Development

The final, fourth search cycle focused on the general applicability of APM well beyond the software development industry to understand the advantages and enablers regarding APM that can be extrapolated into the VFX industry.

Our research focused on how agility could enhance creativity in projects. Aldave et al.'s (2019) systematic review found that agile methodologies provided opportunities to foster creativity within professional project requirements in the software development and design industries. Several key benefits of the employment of APM were identified in the systematic review, including improving stakeholder engagement, and meeting business needs better. However, to achieve these benefits (Aldave et al. 2019), users had to be open-minded and willing to collaborate in alignment with APM practices, a known issue according to the work of Hodgson and Briand (2013) and Maier and Branzei (2014).

Willingness and open-mindedness for the application of APM to other industries was expanded upon by Ciriello et al. (2022), as they considered the impact of customer's willingness to adopt agility in their practises. While a customer may continually change their demands for a VFX project, this does not mean that they are willing to consistently remain involved in the requirements of agile. This agility is only

achievable when the client and the VFX company have mutual trust and willingness to adopt agile and the flexible collaborative environment it promotes. To facilitate these environments, both the client and the VFX company need to expect the mutual benefits of adopting APM (Ciriello et al. 2022).

A major paper by Conforto et al. (2014) is valuable to researchers seeking to apply agile to other industries. Cited by Trier and Treffers (2021), Noteboom et al. (2021), Seymour and Coyle (2016), and Ozkan and Gok (2022) among others, the paper delves into the applicability of APM beyond the software development industry. The researchers found that APM is applicable to industries whose requirements for dynamic product development resemble the requirements of software development (Highsmith 2004 and Chin 2004, cited in Conforto et al. 2014). The authors introduced a conceptual framework through which six practises and 41 enablers for APM in other industries could be identified. In what was seemingly an inspiration for Trier and Treffers' 2021 paper, the enablers were divided into four broad categories: organisation, process, project team, and project type, which can be used to determine the likelihood of success in APM implementation across industries. The authors studied limited application of APM in 19 small to medium enterprises in a range of industries. They noted that the adoption of agile-like practises may be occurring unintentionally, but also found favourable results for the enablers that support the potential adoption of APM. The exploratory study hypothesised that APM can be adapted to other industries, especially those that demand flexible management such as VFX. Conforto et al. (2014) highlighted the lack of research into the applicability of APM to any industry beyond software development despite its potential adaptability, which presents a significantly overlooked research area.

Recently, Noteboom et al. (2021) also conducted a literature review on APM applications in a broad range of industries through 32 papers. They identified key enablers such as team collaboration and management buy-in, which have been specifically identified for creative and film industry APM researchers and support the findings of creative industry-focused papers.

The motivations of team members for the adoption of APM should be considered by change managers and other advocates for a transition to APM. Interview data found that developers with high motivation for agile projects experienced greater work satisfaction, leading to better performance and creative outputs, while periods of low motivation led to a loss of autonomy and greater inefficiencies that hindered progress (Jansson 2015). Therefore, Jansson (2015) concluded that the development team's ability to maintain high motivation is a critical enabler of a successful adoption of APM and the resulting autonomy that VFX developers desire. The paper notes that further research into APM in other industries will be important steppingstones in knowledge, arguing that there is still much to be understood regarding agile (Jansson 2015).

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Following the hermeneutic framework, the literature review search cycles were concluded when the found content achieved saturation (Boell & Cecez-Kecmanovic 2014). Saturation was reached after four cycles with 16 papers, as repetitive themes were becoming increasingly common.

The above literature review demonstrates a clear understanding among researchers of the theoretical application of APM in a range of industries. Several key enablers for APM that largely overlap have been identified through studies and literature reviews. However, primary research into APM in creative industries remains limited to only two identified studies: Hodgson and Briand (2013), and Seymour and Coyle (2016). This presents an important potential direction for primary research into APM in the VFX industry, which this study fills. The theoretical applicability of APM to VFX is apparent, based on the limited research in this and adjacent industries. The most recent research into the extent of the application of APM in VFX is now seven years old. Significant shifts in companies' approaches to work have occurred since then, in no small part due to the COVID-19 pandemic. Therefore, we sought to understand the practical applicability of APM as well as to determine whether the use of APM has expanded throughout the industry since the last formal research was conducted.

Research Method

To generate an informative data set to analyse the extent to which agile management approaches are practically applicable to VFX companies, we conducted a series of semi-structured interviews with employees of VFX companies, following the principles set out by DiCicco-Bloom and Crabtree (2006). It is important to note that standard industry practises in VFX companies mean that projects are managed by producers, and the title 'Project Manager' or the agile-specific title of 'Product Owner' are

rarely, if ever, used in VFX companies. We therefore focused on VFX producers, due to the importance of their role in managing teams, budgets, and clients. We were unable to focus on only peer-reviewed literature, because of the lack of research in this area.

We interviewed producers at four companies: Wētā FX, Magnopus, Union VFX, and Engima2. These companies vary considerably in size, from a start-up with 25 people to an industry-leading large company with 1,500 employees. Based in New Zealand, the USA, the UK, and Australia, respectively, the companies were sampled from the broader VFX industry. We interviewed a total of six individuals who are VFX producers of varying seniority or managing directors and executive producers in their respective companies. The selected interviewees represent a diverse selection of expertise and talent across the industry. The interviewees also represented an element of gender balance, with a 2:4 female to male ratio (industry female to male ratio is 3:7; Pozniak 2021).

Experience with APM varied among the interviewees, from Grossmann, who is an officially certified Scrum Master and Product Owner, and Cooper, who has worked in a major UK software development company that utilised Scrum, to others with only a passing formal familiarity with agile or any of its major formalised methods. An element that might have yielded more diverse interviewees would have been to include companies from non-Western nations, as different work approaches can be culturally aligned. However, Grossman has managed VFX work globally, including with employees from China and Eastern Europe, which may have provided some experience regarding the potential differences in cultural-based management practises.

To generate a rich data set from our interviewees, we conducted individual semi-structured interviews to produce answers to a wider range of research questions based on the overarching research question (DiCicco-Bloom & Crabtree 2006). Interview questions were based upon the axioms of APM and largely informed through the literature review of research into agile management applications beyond the software industry.

The six interviewees combined had over 100 years of experience in the VFX industry. The interviewees' qualifications include the following (in alphabetical order):

Name	Role	Company (Size, country)	Years in VFX	Notable Works/Awards*
Lucy Cooper	Managing Director	Union (Medium – 130 people, UK)	16 years	Banshees of Inisherin, Yesterday, The Crown (s3), Mamma Mia! Here we go again.
Matthew Graham	VFX Producer	Enigma2 (Start-up – 25 people, Australia)	20 years	The Champion, Patriots Day, Gabriel (*nominated* AFI Award for Best Visual Effects), Red Dwarf.
Ben Grossmann	Co-founder	Magnopus (Medium – 180 people, USA)	15+ years (traditional VFX) + 10 years (next generation VFX)	Hugo (Academy Award for Best Visual Effects), The Triangle (Emmy for Outstanding Special Visual Effects), The Lion King. (VES Award: Outstanding Virtual Cinematography).
Jeremy Hollis	Associate VFX Producer	Wētā FX (Large – 1,500 people, New Zealand)	9 years	The Batman (*nominated* Academy Award for Best Visual Effects), Guardians of the Galaxy Vol 2 (*nominated* Academy Award for Best Visual Effects), Game of Thrones (s8).
Rebekah Ross	Production Manager	Wētā FX (Large – 1,500 people, New Zealand)	16 years	Avatar: The Way of Water (Academy Award for Best Visual Effects), The Hobbit: The Battle of the Five Armies, War for the Planet of the Apes.

Richard Thwaites	VFX Producer	Wētā FX (Large – 1,500 people, New Zealand)	20 years	Shang-Chi and the Legend of the Ten Rings (*nominated* Academy Award for Best Achievement in Visual Effects), Missing Link, Obi-Wan Kenobi.

Table 1. Interviewees' roles and experience.

*Award is listed where the interviewee worked VFX on a project as an employee of the company awarded, even if the interviewee's name was not on the award. This is a common industry practise given the collaborative nature of film projects, which often have thousands of crew and contributors.

To analyse the data, we transcribed the more than 6 hours of audio recordings from the interviews before coding them through NVivo. By using NVivo to code themes and relationships, we were better able to contribute to our analyses and findings in an organised manner. In addition, by finding the common themes, we were able to clearly identify the existing conditions in the VFX industry that need to be addressed to support the implementation of APM, thus unlocking the societal benefits of our study.

To code the transcripts, we adopted Glaser and Strauss' 1999 grounded theory. Grounded theory is an inductive coding approach that derives theories from data, in contrast to deductive coding which encourages researchers to seek preconceived codes in research. As this study was exploratory, there was no research or literature available to pre-design codes, nor would it have been helpful to exploring the research area. We conducted three rounds of open coding until we reached saturation from the 6 interviews. In accordance with grounded theory, we recognised a theoretical saturation for the research scope of establishing a foundational understanding of the VFX industry's APM application amongst the interviews through the coding process (Vasileiou et al. 2018). By the coding of the fifth and sixth interviews, no new codes were being identified indicative of emerging themes. Instead, interviewees were adding richness to already discovered concepts of previous interviews.

To analyse the collected data, we examined the responses through the lens of the original four core axioms or value statements of APM (Beck et.al 2001):

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

We searched for evidence in the interviews that either support or disprove the existence of practical applications of APM to answer our primary research question and to understand whether the companies are adopting agile, even if it is with different names and practises.

Findings

Formal agile project management is not fully deployed across the VFX industry. No teams associated with the interviewees has completely adopted a formal agile PM methodology, such as, for example, Scrum, for the management of projects, despite the apparent transferability of the management practise. This can be attributed to a range of reasons, including industry-specific conditions, a lack of familiarity with formal agile tools, and concerns over inefficiencies of known vs unknown processes. In almost all cases, the interviewees followed the core value statements of APM. Though not primarily applying a formal agile approach such as Scrum, they are applying some of Scrum's specific tools alongside integrating waterfall approaches into a hybrid management style.

When asked about exposure to APM in the broader VFX industry, Graham stated that 'generally, in the creative industries, you have to be agile because things are constantly changing', yet this agility does not translate to a formal application of APM methodologies. Some respondents indicated that they would borrow agile terminology to name the existing management practises as a means of simplifying communication. The application of these agile practises has evolved organically and is not part of a comprehensive adoption of a formal methodology. Others indicated that specialist teams, either in tool development or what was termed 'special projects', used agile methodologies, but this was at the fringes of the company and not in the primary business.

Only Grossmann at Magnopus indicated that he intentionally applies agile practises in his operations and is training the entire Magnopus team to be officially certified. Grossmann argued that agile is inefficient for known and well-understood repetitive processes, and, therefore, the application of agile is not company wide. Some projects are better suited to a hybrid or waterfall approach because the process to a final output is a known, repeatable process; hence, formal teams are encouraged to adjust their management style in accordance with what is best-suited. This indicates that, even in companies that intentionally practise APM, company-wide buy-in is not guaranteed, and it is project dependent.

To consider the interviewees' consideration of agile principles, we discuss the responses according to the four key axioms or values of the original Agile Manifesto (Beck et.al 2001), which allows us to consider the potential practical applications of APM in alignment with the research question. Each interviewee was presented with the four value statements of APM and asked which phrase they prioritised in relation to their own specific management approach. All the interviewees stated that they either prioritised the agile value statement or held two alternative options to be of equal weight.

Individuals and interactions over processes and tools

Five of the six interviewees considered individuals and interactions to be more important than processes and tools to achieve the best output, and one interviewee considered the two aspects of the value statement to have equal weighting. The clear preferences were only made apparent when the interviewees were directly asked about the two phrases in relation to their own management styles.

The importance of prioritising people in their management approaches to achieve superior outcomes was succinctly referred to by Hollis: 'People are more important than processes and tools', or, as he stated in te reo Maori, 'He aha te mea nui tea o? He tangata, he tangata, he tangata! What is the most important thing in the world? It's people. It is people; it is people. So, when I learned about Agile, I was like, yep, I'm in'.

Processes and tools are largely considered to be important aspects of producing quality outputs; however, a clear theme among the responses was that the output should not be constrained by the current processes and tools. Thwaites stated that 'we should never be limited by a process or tool set', a statement indicative of the innovative nature of an industry that seeks to constantly develop new techniques to improve the viewing experience of audiences.

Grossmann stated that 'processes, in my experience, have been created not to create exceptional outcomes, but to prevent mediocre deliverables... if you follow a process, you won't create anything great'. His statement highlights the significant fact that the industry is dependent on innovation and creativity to solve the everchanging requirements, and, as per Graham, no two projects are ever the same in VFX. Therefore, processes cannot be standardised to fit the diverse projects the VFX industry tackles. Grossmann expanded the notion that the prioritisation of processes established to create the same or similar deliverables over the individuals and interactions capable of innovating in response to evolving project requirements only dooms an output to mediocrity right from the outset. This provides further evidence of how apt the APM value statement is for the current practises in the VFX industry.

Furthermore, the interviewees noted the importance of balancing the workloads of their employees to ensure job fulfilment, thus preventing burnout. The importance of staff motivation and involvement was consistently discussed by the interviewees, which demonstrates the importance and contribution of individuals and interactions on the final outputs in VFX.

The respondents noted that communication between teams when cross-functional work is required is a key challenge. Preventing individuals from becoming overly siloed with their own tasks despite their specialities allows for a cohesive final product that channels the creative vision of the studio. Key stakeholders for VFX producers are their downstream in-house colleagues, who will continue the work in accordance with their skill sets. Therefore, interactions and strong communication are essential to ultimately create the best possible final product.

Working software over comprehensive documentation

'Working software over comprehensive documentation' was the only agile value statement that was unanimously preferred by the interviewees. Grossmann noted a trend in game development where an

overemphasis on comprehensive documentation and project specifications prior to development often results in a subpar product because it restricts the ability of the company to create a superior product. Because of the similarities between game development and VFX industries, identified in the literature review, an overemphasis on predetermined documentation would likely cause the same issues in the VFX industry. Comprehensive documentation, while recognised as important, is consistently 'sacrificed at the cost of making sure everything is running' according to Graham, a common sentiment expressed by the interviewees.

Each interviewee recognised that comprehensive documentation is not the final desired output, despite potential pressure from the studio. Documentation often restricts the iterative design process that is commonly used as a creative approach and has a negligible effect on the final output. Over-emphasis on documentation can lead to over-engineering of outputs that do not align with the final creative vision. The interviewees consistently referred to the need to adapt to changes in the creative vision or requirements from the studios. However, an overemphasis on preliminary requirements recorded in documentation prevents future willingness to adapt and improve because of the written plan.

Customer collaboration over contract negotiation

Five of the six interviewees considered that customer collaboration is more important than contract negotiation, and the sixth interviewee considered them to have equal weight.

Cooper stated that 'our industry is very much still based on personal relationships', and, in an industry where long-term client relationships are critical to company success, productive collaboration with the customer is an essential aspect of developing VFX projects. VFX companies' bids for work on films are often decided by the personal relationships and trust built between key stakeholders of a film and a VFX company. This is especially relevant due to the dynamic nature of film creation. Creative directions frequently shift in accordance with a studio's requirements, test audiences' responses, etc. Strong collaboration is an essential ongoing process in the film industry to promote superior outputs from studios and VFX companies.

Customer collaboration is the value statement that was the most frequently referenced by interviewees, even when questions did not refer to it directly. Several of the interviewees identified poor customer collaboration as a reason for inefficiencies. This includes issues such as creating false project constraints regarding scheduling or budgeting that led to lower-quality outputs. These are often set under the guise of allowing the studio a longer pre-release buffer.

Communication between the VFX company and the studio was highlighted as a key potential inefficiency. Vague client notes or unnecessary changes to already developed shots lead to a strained relationship and can cause significant inefficiencies and staff burnout.

All interviewees stated throughout the interviews that the film studio, as the client, is the priority in all VFX work. Their creative vision is final, and the work is directly contracted with the studio. As such, a strong collaborative culture between the companies is essential to delivering superior quality outputs.

Grossmann argued that contract negotiation only becomes relevant when customer collaboration has broken down, and 'everyone has failed and there is no recovering'. Simply put, reliance on contracts limits the potential quality of outputs and prevents the collaborative customer environment critical for the iterative design adopted on a consistent basis by several of our interviewees. In his experience, Grossman has found that a 'contract is only used to threaten people', a means to force them to comply with whatever the stakeholder wants. Despite the negative outcomes associated with relying on a contract during the creative process, the creation and negotiation of contracts in a constructive manner is dependent on a 'good personal relationship with the client', according to Cooper. A poor pre-existing relationship simply leads to a negative experience from the outset and difficulties in negotiating a fallback contract.

In alignment with Grossmann's statement, when customer collaboration is prioritised and supported, the need to rely on contract negotiation is rendered obsolete, as neither party needs to revert to the contracts agreed on at the outset. Close customer collaboration leads to superior outcomes for all stakeholders in the VFX industry in a way that contract negotiation is not designed to do.

Responding to change over following a plan

The 'change over following a plan' value statement underscores what it means to be agile to changing specifications, and it is central to being flexible when there are inevitable changes to a film's script, direction, editing, or constraints. Five of the six interviewees resolutely preferred to respond to changes in their approach to projects over following the predetermined plan. Thwaites stated that 'my preference for production [is] let's move fast, fail quick, change quicker'.

Interestingly, Cooper, who previously worked for an APM-compliant software company, stated that it should be situation-dependent. While she agreed responding to change when necessary, she considered it important to consider the problem in depth because 'we'll always take the time to really think about what's the spanner [in the works], because often the spanner is not what you think it is'. As such, she investigates if there is a deeper, situationally dependent issue before deciding to change the plan.

Grossmann, as a certified Scrum Master, found that, throughout the media and entertainment industries, willingness to respond to change, even under the guise of agile, is often difficult to achieve. Individuals may agree that changes are acceptable during a sprint retrospective, but often, by the time a retrospective is done, the required change is out of date and no longer aligned with what needs to be done going forward. This reticence towards flexibility makes it more challenging for VFX professionals to consistently respond to change as required.

Overarchingly, it appears that, while the VFX professionals interviewed are willing to respond to change, boundaries exist across the wider media and entertainment industries that can prevent them from being as agile as they are willing and capable of being. Because the VFX industry is dependent on the creative vision of the film studios, their ability to remain flexible is consistently restricted, not just by internal forces but by external stakeholders within the broader film industry.

Discussion

VFX producers who are responsible for steering the direction of projects follow the four value statements of APM in practise. However, the companies are not actively practising formal agile methodologies on a widespread scale, which reveals an interesting disconnect between the apparent theoretical and practical suitability of APM across the industry and in actual industry practise. Ross stated in her interview that agile is 'not something that's spoken about in a traditional sense', yet she found that the adoption of agile is 'definitely a need that's growing in terms of the nature of the industry as it's changing'. The hybrid adoption of agile and adaptation of its terminology to name existing practises is evidence that the industry is modifying agile to meet its needs.

Based on these findings, we determined that a new form of agile that we named Adapted Creative Agile Management of Projects (ACAMP) is emerging throughout the industry as companies apply the agile value statements to their everyday practise without consistent adoption of established formalised agile methodologies such as Scrum. We are confident that our sample size represented a reasonable diversity in experience, company size, and seniority, and, thus, we surmise that this reticence to use formal agile practises, despite a managerial alignment to APM principles, is common throughout the industry. Set deadlines and the inability to continue iterating a project after the release date of a film prevents the complete flexibility that other agile methodologies, such as DevOps, support, where projects are ongoing and iterative after release. Furthermore, despite the different technologies and techniques required to innovate in VFX, the overall desired outcome is the same across the film industry, despite creative differences between the VFX companies and the broader film industry. We theorise that ACAMP will provide the VFX industry with the flexibility to adhere to the agile core value statements without being constrained by methodologies that do not support the best outcomes for VFX projects. We also theorise that, due to its flexibility, ACAMP may potentially be applicable to adjacent M&E industries.

ACAMP offers a management approach that is neither entirely agile nor entirely waterfall. As demonstrated in Figure 1, there is a clear overlap between some practises of Scrum and ACAMP, and the majority of ACAMP is rooted in the agile core principles/value statements. However, the industry has also implemented elements of traditional waterfall approaches to improve efficiency where there are known outputs and/or processes. The VFX industry employs APM in practice when innovation over processes and/or outputs is required, where processes and/or outputs are known, then Agile practises are reduced in favour of waterfall. This hybrid approach is adopted to varying extents between teams

based upon the extent of intentional application of APM in companies. However, the principles of the hybrid approach's application in different scenarios remains consistent throughout the industry.

Through a better understanding of ACAMP, VFX companies will be able to adopt a formalised approach that will benefit the industry. This would have the undeniable flow-on effect of benefiting society at large as the quality of M&E produced through the iterative, flexible management approach improves.
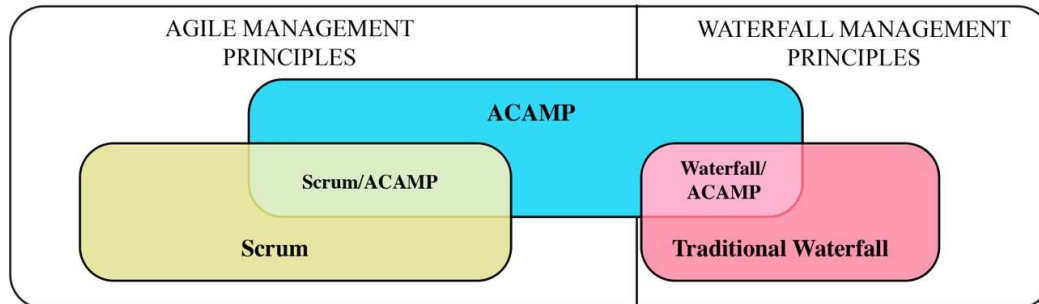

Figure 1. ACAMP Context in Management Approaches

Limitations

The focus of this study was designed to understand the potential practical applicability of APM to the VFX industry. Future research is necessary to assess whether our ACAMP theory is applicable across a wider sample of visual effects projects. This future research is especially essential to understand the potential adaptability throughout the wider M&E industry. Recurring themes were found in the interviews, which indicate that the selected interviewees discussed several of the most relevant concerns and experiences of VFX professionals. This research area has not been explored, so, therefore, we recognise that there is a clear need for further research into several future directions to achieve saturation in this research area.

Conclusion

This paper was motivated by a desire to investigate the adaptability of APM to the VFX industry. Creative industries have been significantly neglected in academic research pertaining to efficiency and management styles despite previous research having found that creative industries increase employment opportunities and economic output (Pearson 2017; Foord 2008). Increasing efficiency in creative industries will have the flow-on effect for economies they operate within (Foord 2008).

VFX professionals who are from varying backgrounds, different sized companies, and different seniority follow core APM value statements in everyday practise. Despite this, formal, wide-scale adoption of agile is non-existent in all the companies the interviewees represented. Intentional application of certain agile practises is on an ad hoc basis, and agile terminology is sometimes used to name an existing practise. However, industry-wide formal application of APM appears to remain limited despite its apparent alignment with current management approaches. In consideration of our findings, we theorise that the industry has adopted an adapted version of agile, which we have termed ACAMP. The findings of this study represent initial research into this area. We strongly encourage further research into the applicability of the ACAMP management style, considering its apparent theoretical and practical applications in VFX. A significantly larger knowledge base would be required to explore and define the nature of ACAMP in more detail not just in VFX, but a broad range of creative industries.

By embarking on landmark research into the adaptability of the APM management style to VFX, we have opened an avenue for future researchers to explore to better understand how to enhance management practises in creative industries, particularly those in the M&E industry. Practically, formalisation in research into management approaches and tools successfully adopted by other companies will benefit industry professionals in their execution of creative projects. Further research is undeniably still required to explore whether ACAMP can be applied beyond our interviewees, but our research provides a rich foundational understanding based on the literature and primary research that may form a base for future exploration.

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