Weathering the Maelstrom:
The effect of digital workflows on craft identity in independent cinema

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A thesis submitted in partial fulfilment of the
Requirements of the University of Greenwich
for the degree of Doctor of Philosophy

September 2017

DECLARATION

I certify that the work contained in this thesis, or any part of it, has not been accepted in substance for any previous degree awarded to me, and is not concurrently being submitted for any degree other than that of Doctor of Philosophy being studied at the University of Greenwich. I also declare that this work is the result of my own investigations, except where otherwise identified by references and that the contents are not the outcome of any form of research misconduct.

Signed: Dusan Petkovic

Signed: Prof. Gregory Sporton

Date: 27. September 2017

Acknowledgements

First and foremost, I would like to thank all the staff at Archer's Mark and the crew of Notes on Blindness – their generosity in sharing the trials of making this exquisite film has made this possible. Adam, Mike and Steve, Jo-jo, the directors – James and Pete, and especially the talented editor, Jules Quantrill, who I shared a working space with, but also who allowed me to inquire about every single decision he made during this film process. I am endlessly thankful for your help and tolerance.

I would like to thank my supervisors, Gregory Sporton and Christopher Brown, for genuinely being ideal supervisors. For exchanging the roles of the sceptic and enthusiast between each other at the right times; for guiding me into the world of academia and teaching me to appreciate the process of this often-tiresome endeavour; and for all the practical matters related to finalising this dissertation. From the insights I got into how other supervisors handled their students, I became even more appreciative of the responsiveness and engagement you showed. I cannot have asked for better guidance.

Further, I want to thank all the colleagues at the CPDA department at the University of Greenwich: most importantly, a good friend, Fahrudin Salihbegovic, who informed me about the PhD programme in the first place; Andrew Dawson, who had a copy of *Production Cultures* lying on his desk when I entered his office for the first time – that same copy decided the direction of this thesis; Gauti, for saying: "I don't see ANT in your method?"; Stephen Kennedy, for saying "why dilute your PO with other methods?"; a big thank you to Kinnary for being a good friend and a PhD-writing colleague; Andrew, Chris, Janet, Alex, Illaria, Lauren, Remco, and many others. I would also especially like to thank Diana for all her help during the production and with the submission of this thesis.Most importantly, I would like to thank my wife, who, while struggling with her own PhD, had the time and patience to help me with language barriers, to brainstorm with me on every little issue I decided to fuss about, to sacrifice her own learning moments to accommodate my helplessness in this academic context, to take care of our little one, who knows us both as PhD students only. Michelle, you make this meaningful.

Lastly, I dedicate this dissertation to my mother and my son.

Abstract

This thesis asserts a revival of the traditional craft workshop in modern independent film production, as a reaction to tensions introduced by digital technologies, such as unpredictable workflows and shifts in craft authority. Using participant observation, the thesis builds a framework of deep texts grouped around the production of the award-winning independent film *Notes on Blindness* (2016).

Digital tools have transformed filmmaking practice, disrupting processes, increasing output volume, and expanding the expert base. What has changed very little is the prescribed form of organisation in filmmaking. The filmmaking community maintains a traditional perception of film craft whilst new technologies are imposing paradigm-shifting changes onto filmmaking organisation and processes.

This research responds to the need to gain a better understanding of how digital workflows facilitate shifts in the 'locus of control' of craftspersons, and how they mobilise to cope with the effects of these shifts. Independent filmmakers, caught between the opposing trends of high-end industry and the new digital economies, shield their enterprise by committing to in-house production models, best described as craft workshops. This research further draws a parallel between the twenties studio system and today's in-house craft specialist units. Although hugely different in scale, both organisation structures share the same organisational impulses.

By singling out two particular filmmaking roles, this thesis also explains the individual experience in the context of disintegrating craft boundaries. The researcher - a technically versed industry insider - observes the reciprocal influence between craft individuals' and the technologies they operate. While the position of the cinematographer is a typical example in depictions of the authority shifts, this research concentrates on post-production roles. The findings show the editor role exhibiting less authority over the editing process, predict the disappearance of the DIT, and observe a surprising inflexibility in the colourist role.

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Technology marches in seven-league boots from one ruthless, revolutionary conquest to another, tearing down old factories and industries, flinging up new processes with terrifying rapidity.

Charles Beard

Introduction

The 2014 release of *Anchorman 2: the Legend Continues* managed to make its imprint on cinema history. Although few might consider the Will Ferrell screwball comedy culturally significant, this film is notable because it was the last film Paramount Studios shipped to cinemas as a physical film (Verrier 2014). Paramount did not make news of this, as according to some, they did not want to be the first of their peers to mark the point of no return to the medium that enabled the existence of the company. In fairness, this was not news material: Technicolor closed its final film laboratory a short time before that; Fujifilm no longer made film for motion pictures and Kodak, the last remaining producer of film stock for cinema, declared bankruptcy in 2012 (Alexander & Blakely 2014). In the United Kingdom, the Digital Production Partnership (DPP), the organisation overseeing the digital shift and production standardisation in television, announced that broadcasters like "BBC, BT Sport, Channel 4, Channel 5, ITV, Sky and UKTV, will no longer accept delivery on videotape of any programmes commissioned after 1 October 2017" (Digital Production Partnership 2016). The new format for delivery was a digital standard, first introduced in 2015 (O'Halloran 2016). Such a rapid adoption of the new format by the prominent production authority was an exception to the norm, as for the past two decades, the industry as well as film theorists often indulged in mourning over the loss of physical film as data carrier. Film craftspeople seem to be a particularly romantic community and, as will be disclosed later in the thesis, are taking longer than others in coming to terms with the change to digital.

Digital technology has been an integral part of film production processes for more than two decades. Ever since, digital tools have been taking over the filmmaking practice, speeding up the processes, increasing output volume, and expanding the expert base due to plummeting production costs. The twentieth century practices of film creation and distribution have undergone a complete metamorphosis.

Still, as George Lucas put it: "This is the only major industry still using nineteenth-century technology"(Bordwell 2013, p. 22). His statement referred, at the time, to the use of film cameras in the nineties. Nowadays, the cameras have changed, although they are built largely as an imitation of the original analogue invention. What has changed very little is the prescribed form of organisation in filmmaking. The filmmaking community is holding close to the traditional perception of film craft. However, the new technologies

have impressed their mark and are slowly imposing changes onto the filmmaking organisation and processes.

Academic research into the organisation of the film production and technological processes in film is a relatively young discipline in comparison to studying film as text. While sociological and anthropological views of film and the effect thereof are recognised as essential part of any summary of film theory (Andrew 1984; Burch 2014; Elsaesser & Hagener 2015), the same type of inquiry into film production and organisation seemed tangential to the main body of film theory (it is also not included in the previously cited works). This can be explained by noting that the filmmaking process, in gross lines, remained unchanged until the arrival of digital recording (Casetti 2007a). As film theory grew wider and increasingly abstract, along the way it forfeited its connection with the maker – the craftsperson - and the processes of filmmaking (Caldwell 2008; Strandvad 2013; Mayer et al. 2010). This thesis intends to redress this imbalance.

This alienation from the creative individual has stimulated a new interest in rekindling the liaison between film theory and the filmmaker by, among others[1], shifting academic attention to the *processes* in filmmaking practice (Strandvad 2013, p. 1). Although attention to the production process always existed in the works of pioneers such as Powdermaker and Staiger, it was marginal compared to the volume of film analysis as text. And although different people have touched the theme in different guises (Mead 1995; Seldes 1962), the more recent impulses for film production analysis are clearly instigated by the dynamic changes in the filmmaking processes. The effect of the digital technological upheaval on the production culture in filmmaking is considered by academics such as John T Caldwell, Vicky Mayer and Miranda Banks, and is influenced by sociological debates on creative labour led by Richard Sennet, David Hesmondhalgh and Rosalind Gill.

[1] Vastly influential Bordwell, in his and Carrol's seminal work *Post-Theory: Reconstructing Film Studies* (Bordwell & Carroll 2012) calls for rethink of the Grand Theory for the future. The book tackles the culture studies influence over film theory and proposes directions the new film theory should take. And, although Bordwell mentions anthropology pioneers like Powdermaker in other historian works (Bordwell et al. 1985, p. 1957), the cultural studies of the film production process are in all aspects, on the periphery of academic film research.

This thesis contributes to the reconnection of theory and practice in film, looking at technologies and their influence on the below-the-line[2] craftspeople, specifically in postproduction. The digital paradigm is imposing changes in organization and lived experience of these craftsmen and women, increasing anxieties and deteriorating established hierarchies in the production process. The presented case in this thesis will demonstrate coping mechanisms of the filmmaking community, and the way individuals challenge the newfound orders. The disruption caused by the dynamic changes in technology is mitigated by the revival of the craft workshop, albeit in an adjusted form, shaped by new and tight networks of craftspersons.

Aims and scope of the thesis

Throughout the history of film, filmmaking craftsmen and women have engaged with new technologies, bringing innovation to an art form that, in itself, is a result of technological pioneering. However, film art and craft was characterised by one constant until recent years – the carrier of the art was a chemical emulsion resting on a perforated celluloid strip. A gradual disappearance of this corporeal characteristic of film has ushered a new era in film production which is as dynamic and creative as it is paradigm shifting.

Despite this momentous shift and the significant role of digital technologies in the cinematographic creation process, academic discourse on this theme is balkanised and at times contentious. Such discussion extends far beyond the traditional film and broadcast environment, drawing upon ideas from practitioners, freelance pundits, technophiles and independent cineastes (Boddy 2008, p. 144). The events outlined above suggest that digital technologies have fully permeated the world of cinema and that we are entering the end stages of this transformation (Verrier 2014; Bordwell 2013)[3]. However, one can

[2] Terms below- or above-the-line are perfect examples of informality of knowledge in film production. These are widely known terms, and much film history and management literature covers them in width (Cleve 2012; Gaskin 2005). However it is much harder to understand what is the actual 'line' referred to in these terms. The most detailed explanation comes from a blog by De Sousa. The 'line' entailed by these terms is a top sheet line in accounting sheets for film financing. Above the line is the talent that needs to be engaged before the actual production starts (script, director, main actors, producer). Below-the-line refers to all other talent that is engaged in the shoot and thereafter (De Sousa 2014).

[3] Gradually, all processes in pre-production, production and distribution are transformed into a common denominator – the binary code. Even in archiving, the final frontier of a film's life cycle and the final stronghold of the analogue film form, solutions for digital archiving are being seriously contemplated (Academy's Science and Technology Council 2007)

still sense the nostalgic (and highly impractical) tone prevalent in much of the discourse that was so distinctive of the 'transition period' of the last two decades, particularly in film theory. Usai, an archivist, film historian and author of one most controversial texts about film reproduction, *The Death Of Cinema* (Usai & Usai 2001), mourns for the disappearance of silver grain which he calls brush stokes on canvas: "To me digital cinema stands to cinema as a condom stands to sexual intercourse. It is clean and safe and one hardly feels anything." (Usai in Nicola 2005, p. 52).

The digital revolution in film is part of a larger narrative covered in various fields of study, from film and media theory to technology and management. Each specialisation raises different and valuable concerns with regards to the phenomenon. This research, however, will propose a process-oriented approach to film production culture. This requires a thorough understanding of the digital production processes and their on-going transformation, as well as understanding the notion of film production as culture. The combination of both detailed technical workflow knowledge and academic rigour has not been a customary formula for academic research due to the long established rift between the academic film researchers and film practitioners (Caldwell et al. 2009, pp. 214–216). The failure to integrate the two is reflected in assumptions such as Burch's comment on American film criticism, that film theorists are not interested in technology at all and show a level of unawareness on the impact of such dynamics on the creative process and result (Burch 2014, p. 4).

Reflecting on the traditional relationship between academia and film practitioners, Caldwell makes a discouraging claim:

> This scepticism and oversight is mutual – sometimes bordering on contempt. Academic theory has had a historical relationship with contemporary film production and industrial practice that may best be described as problematic (largely impressionistic, disconnected or irrelevant from industry's point of view) (2008, p. 376)

We are in need of new paradigms for understanding the impact of the digital in creating new modes of film production, distribution, exhibition and aesthetics. By looking at wider cultural, process-driven contexts where new technology acts as the new form of social glue, driving and reshaping relationships (and thereby, practices), we can discover more effective and creative ways to appropriate this new situation. As technology is fleeting, and products are short-lived, we will find constancy by orientating towards the workflows and relationships created by these same technologies (Moore 2002).

This PhD thesis proposes a process- and workflow-oriented approach to a discussion of digital film and in doing so, explores the following points in question:

- An understanding of the shifts in decision-making dynamics of image creation in digital film production, in particular the changes in authority of postproduction, and the consequences thereof.
- The need to describe the new type of craft individual in cinema production – the one that multitasks and collaborates – and investigate the relationship between this new breed of professional and the old organisational ideas.
- The need for research on production culture with an expert level of technological literacy and insider knowledge of production culture, noting the paucity of this expertise in traditional film theory

The original contribution to knowledge will be the investigation of perceptions of individual practitioners about the organisation of their labour, the sense of control over their craft and the filmic image, and the changes they perceive in this respect. Accordingly, the aims of the thesis are:

- To understand how particular technological production processes and the concept of workflows facilitate the shift in the 'locus of control' of craft practitioners and
- To analyse in detail particular film production processes and organisational structures at this moment in time through a technical literature review and insider participant observation and to speculate on the future of these same processes.

This thesis posits that a large portion of film theory is experiencing a certain level of detachment from the increasingly technical and diversified film creation process, while focusing solely on the output of the film production. The limitations of this approach will be apparent given how important the filmmaking process is to the result. Admittedly, digital technology in and of itself is not the real culprit to be identified as having a paradigm-altering effect on the final film product. However, as McLuhan suggests, technology is an extension of humanity and its organisation (McLuhan 1994). The organisational changes in film and video production are precursors to larger shifts to come and it is therefore important to understand and explain new workflows and organisational changes in detail. Consequently, an assessment of the impact of digital technology on contemporary film has to differentiate clearly between the main branches

of its industrial anatomy. Production, post-production and distribution must be treated separately and the influences of the digital in each of these domain economies analysed in a way that recognises both their autonomy and their inter-dependence (Taylor 2004). In reverse, equal attention should be given to the practice of multitasking and an individual's capability to redefine the craft borders through the appropriation of digital technologies, as this is clearly the type of filmmaker that has been fashioned by the socio-economic condition of the consumerist world (Ritzer & Jurgenson 2010; Mayer et al. 2010; Jenkins 2003).

Digital technology has permitted a plurality of practice that has created turmoil in how we relate to the cinematographic product. There is, therefore, an acute need to examine how some of these processes evolved from their humble beginnings to the fully-fledged digital age. Distribution in particular – the seat of power in nearly all types of cinema – deserves specific attention, given its enormous role in determining the films we see, whether a filmmaker is part of an elite high-cost studio model or an amateur 'self-shooter.' This defining part of film production sets the stage for the seminal shifts in cinema production that are happening at the moment. The multitude of output platforms is the stimulus for the wide variety of workflows we see today. Although this thesis recognises the scope of influence distribution has in the contemporary digital ecology and the need for its thorough examination in future research, this study will only address the effect of the multiple output options on the cinema production workflows.

The aim of this investigation is to map the impact these new technologies contribute to the organic occurrence of new organisational structures in filmmaking, new workflows, and the repositioning of the decision-making discourse.

The case study in this research is making an example of a remarkably successful production of *Notes on Blindness,* a film deemed to be a highly innovative experiment in film narrative (Petkovic 2016; Chen 2016). This film was created by a film company in the United Kingdom with mainly public money and without affiliation to any major studio. The research findings are therefore primarily applicable to understanding the independent cinema sector but have wider resonance and implications for all aspects of the industry with regard to the shifts and organisational pressures of film production. The film has won numerous awards (BIFA, Sheffield, Tribeca, and 3 BAFTA nominations), was screened on many A-list festivals and was made available on Netflix.

❖

The thesis is organised into four chapters. The first chapter navigates existing literature in various disciplines, looking for touching points in order to demarcate the gaps in knowledge. The literature review elucidates further on the works on which this thesis is built, like contemporary production culture and the sociology of craft, framing the existing works into the researched case.

The second chapter outlines the research methods for the project. In so doing, the chapter discusses the use of participant observation and anthropological inquiry as the principal methods of research. It further supports the argument for "wearing both hats" – being a part of the highly specialised crew as well as a participant observer. This chapter will also provide a detailed overview of the case study: the production company, the film, as well as the researcher, in order to voice possible existing biases.

The results of the research will be presented in Chapters 3 and 4. The first part will describe the general workflow, and the organisational specificities of this particular case. The case in question propagated a specific version of an in-house production – a system of production that will be clarified in detail in Chapter 3. Chapter 4, on the other hand, addresses the individual experiences of two specific roles in this workflow – the role of the editor and the role of the DIT (digital imaging technician). By inquiring into the anxieties and coping mechanisms of these individuals, this thesis provides insights into the inner motivations of certain shifts in authority and decision-making within the production of a film. Each set of observations, respectively on workflow in Chapter 3, and on the editor and the DIT in Chapter 4, will be followed by a discussion that draws together the disclosed observation texts in a theoretical context. The final chapter will offer several conclusions as to the future of the described in-house workflows as the modern crafts workshop and its up-scaling possibilities.

Chapter 1: Literature Review

In order to position the central argument and contribution of the thesis within existing debates, this chapter will review and outline the gap in knowledge by navigating different disciplines concerned with film and the arrival of digital technology in film. The chronology of the themes in this literature review is as follows.

1. **Digital technology in cinema**

   The literature review will offer a short historical account of the penetration of digital technologies into the filmmaking process, followed by an examination of the specific nature of digital technology in film. The researcher will open a discussion on whether the digital revolution can be understood as a disruptive or as an evolutionary change. For the sake of argument, a parallel will be drawn with a similarly volatile time in film history: the birth of cinema.

2. **Digital technology and critical film theory**

   Continuing the theme of 'disruption', the next section will take a closer look at how film and media theory have acknowledged and dealt with the digital phenomenon in cinema.

3. **Film in convergence culture**

   Digital technologies can be seen as a catalyst for media convergence. As media collide in unexpected forms, analysing film only as a cultural text can overlook the changes in human interactions and processes that form those interactions. Consequently, this chapter argues for the advantages of looking at film as a practice – a space of interaction between humans and technology tied together by specific cultural norms.

4. **Tools and craft interactions in production culture (*and organising technologies)***

   What is the production culture? This section considers how tools and interactions shape a specialised network, and looks at the role of standards as a communication interface between practitioners and technology, but also as a means of maintaining the status quo.

5. **Workflow, making sense of a non-linear practice**
   In contrast to the past, digital film productions can differ greatly between each other due to the plethora of technological solutions available. The concept of workflow is described in this section, as a means of organising, managing and making sense in the modern film production culture.

6. **Individual experience and anxieties in contemporary film production**
   Workflow and labour tensions in digital film production will be discussed, including the problem of blurred craft boundaries and the issues practitioners are facing vis-à-vis artistic authority over production stages.

After covering this wide range of vantage points on the topic of digital technologies within the filmmaking process, a final argument will be presented to validate this research, identify the gap in the knowledge and federate the disparate observations. The last section of this literature review chapter will also serve as a fitting introduction for the chapter on research methods.

The literature review will sketch a picture of a medium in transition. As a consequence of digitisation, film is still looking to firmly articulate its new identity and position for the future. Finally, such transition suggests a medium looking to revitalise the bond between academia and practice.

Digital Technology in Cinema

Film is a definitive case of art passing through technologies. It has known many technological breakthroughs and is seen in itself as a disruptive technology (Christensen 2013; Lucas 2011, p. 106). As Bordwell points out, digital technology entered film relatively late in comparison with other creative media: "Cinema was the last medium in popular culture to go fully digital. By 2000, most entertainment industries had let computers make their work easier and more efficient" (2013, p. 24). Non-film media companies had discovered that software could go beyond accounting and it could boost the production, distribution, and consumption of their products. Word-processing programs, CDs and video games are all examples of various media adapting a digital carrier. The famous film editor Walter Murch describes his surprise with the slow movement of innovation in film:

> We found ourselves in the mid 1990's, stuck in a lingering electro-mechanical transition phase – one that lasted longer than I would have guessed when I was so dazzled by the CMX back in the 1968. After all, 2001 was only a few years away, the 33 1/3 LP was history, word processors had universally replaced electric typewriters, and here we were still listening to the clattering of the Moviola's Maltese Cross, with scratched film all over the floor and splicers, tape, trim bins and grease pencils filling the editing room. (Murch 2001, p. 91)

Still, the notion expounded by Bordwell (2013) that the digitisation of film came later than other creative media can be mitigated by the fact that film, being a hybrid of existing creative forms, will naturally take longer to entirely transform. It can be suggested that the separate aspects of film production/delivery did digitise reasonably in sync with other disciplines, but connecting these separate aspects was an obstacle for the full digitisation.[4] As a consequence, the filmstrip remained the final carrier for most films deep into the digital shift. The following section offers a condensed chronology of the digitisation of different aspects of film production.

Chronology of the digital in film – a short overview

Computers have worked their way into different points of the film production process at an uneven pace. Special/visual effects, an incredibly vibrant and active branch of film craft repeatedly overlooked by academia, were the first to take computers on board (FilmmakerIQ 2013). As early as 1968, early computers were used to track camera motion in order to repeat camera movements in *2001: a Space Odyssey* (Kubrick 1968). By the mid 1980s, Sony was producing its first consumer CCD (Charge Coupled Device) camcorders. Although targeted for amateur use, independent cinema recognized the technical flexibility of video and started experimenting with it, taking its crude and inferior 'look' as a part of its aesthetics (Kenneally 2012). Some historically crucial, visually magnificent pieces of cinema were created at the hand of ultra-light, low quality cameras – such as *Festen* (Vinterberg 1998), *The Idiots* (Von Trier 1998), *Mifune* (Kragh-Jacobsen 1999) – which all used early digital cameras and embraced its visual aesthetics. More importantly, this sparked an ambition among manufacturers to compete with the (at that time, unachievable) quality of 35mm film.

[4] This need for a "glue" can be seen as the reason the concept of workflow entered the field of filmmaking as a fitting organisational model (Fleming 2013)

In postproduction, the revolutionary parting with the filmstrip as data carrier was specifically electronic rather than digital. In television production, the process called *telecine* was the act of scanning film onto a digestible medium for non-linear editing. At that time, the befitting format was the analogue videotape. The real novelty here was the non-linearity of the edit and not the videotape. Linear, tape-to-tape editing was being used in television when analogue video cameras were used to record the footage. The first non-linear edit suites gave an illusion of random access to the material through a system of numerous linked player/recorders (Swartz 2004, pp. 16–35). The first of these non-linear devices were the EditDroid, the Ediflex, and the Montage Picture Processor.

> Although imperfect and often cumbersome and clunky (the Montage had 18 Betamax VCRs and the Ediflex had 12 VHS VTRs, which noisily clattered as they switched from tape to tape to give the illusion of seamless play), these early devices pointed to a new way to edit film. The ability to attempt edit without having to worry about losing frames at a splice point was both liberating and maddening, as the endless variations of potential edit points could lead editors and directors in circles. (Silverman 2005, pp. 35–36)

The EditDroid editing system, first released in 1984 by George Lucas, was sold, digitally re-worked and re-branded in the early nineties as AVID and together with a competing system, Lightworks, soon became the standard replacing most film-cutting desks by the late nineties. The non-linear editing trend expanded dramatically after Apple released Final Cut Pro in 1999, making editing possible on a consumer laptop (Bordwell 2013, p. 26).

In post-production, it was sound that made the shift to digital first, and this is mainly due to the flexibility of sound as data and its relatively small size, which suited the digital storage limitations of that time (Swartz 2004). The first digital end-to-end system was introduced in 1989, followed by the digital audiotape and MIDI audio format, allowing music and effects to be altered or created from scratch. The AVID equivalent software for sound, ProTools, was embraced as the sound editing standard in the mid-nineties (Bordwell 2013, p. 25).

It is important to note that the initial digital revolution in post-production was a distinctly a television-oriented revolution. The film industry took longer to appropriate the new digital editing tools, simply because the quality of the digitized video image was low to the point that it was impossible to see whether the sound dialogue was in sync or not. Further, due to the aforementioned storage issues and the impossibility of storing multiple film reels on one system, the digital editing systems had yet to reach their relative maturity and could only be used for shorter projects such as commercials (Silverman 2005, p. 38)

The most radical shift in the established filmmaking workflow was undoubtedly the development of the digital intermediate (DI) process (Prince 2004, pp. 26–29; Lucas 2011), which instead of enhancing or adding to the film process, made 35mm film obsolete in part of the production. The DI process evolved as a combination of different techniques used in film and television video settings that had digital colour correction and mastering in common, after which the finished product would be scanned back to film for various reasons[5]. The name is derived from its relationship to film – 'a digital intermediate solution'. In its simplest form, the process entails scanning the edited celluloid film to high resolution digital tapes, performing colour manipulation and adding visual effects while the film is in digital form, and once that is done, scanning the finished product back to film for distribution (Silverman 2005, p. 28). This process was neither fast nor cheap, but it offered unrivalled possibilities for colour and visual effect manipulation. Soon it became clear that in order to curb costs, film should 'stay digital longer'. This meant including editing in the DI process, so the actual scanning of film to tapes happened before the editing and not after (this was done in television already). Colour timing, the analogue manipulation of colour after film editing is finished, could now be done digitally and the colour-corrected data could then be scanned back to film prints ready for distribution. Thus through DI, celluloid film lost its processual continuity (Standke 2002; Belton 2008; Lucas 2011).

[5] The foremost reason was cinema distribution, as most theatres projected on film. However scanning DI back to film was also utilized in film archiving as well as film restoration. (Lucas 2011, pp. 126–129)

To film audiences, the more apparent changes were Computer Generated Images (CGI), digital animation and digital compositing. These technologies created new resources for visual/special effects. George Lucas did not limit himself to the technological development in film production only; he has had a significant role in the development of CGI and 3D animation. His company, Industrial Light and Magic, became one of the first specialists in CGI. The division of Lucas Film that would later become Pixar developed the RenderMan CGI software that allowed filmmakers to give animated creatures realistic surface texture and illumination. In 1989, the software acquired its famous name and began to be licensed to CG visual effects and animation companies. (Raghavachary 2006). CGI progressed rapidly with pioneers such as Lucas and James Cameron, leading the increasingly visual-effects-heavy Hollywood film industry. This thesis does not intend to analyse the role of computer generated imagery in detail, but it is important to acknowledge the prevalence of CGI in all contemporary films, including the case study discussed in Chapters 3 and 4. Further research into the organisational aspects of the CGI industry would benefit both academia as well as film practitioners.

Distribution and exhibition, a pillar of power in cinematographic industries, was the last to succumb to the advent of the digital. This event deserves special attention as it marks the final hurdle of the digitisation cycle (Vaz 1996; Bordwell 2013); however as this step effectively happens after the film product is finalised, it will be left out of further analysis in this research.

Disruptive Technology

Digital technology has saturated film in a more or less traditional manner; its diffusion is analogous to the bell curve[6] described in Everett Rogers' classic work on the adoption of new technologies (Rogers 2010). However, as the brief history above indicated, it is hard to see the digitisation of cinema as one homogenous burst of innovative vision. Rather, it was a bundle of endeavours towards different economic or creative solutions, enabled by

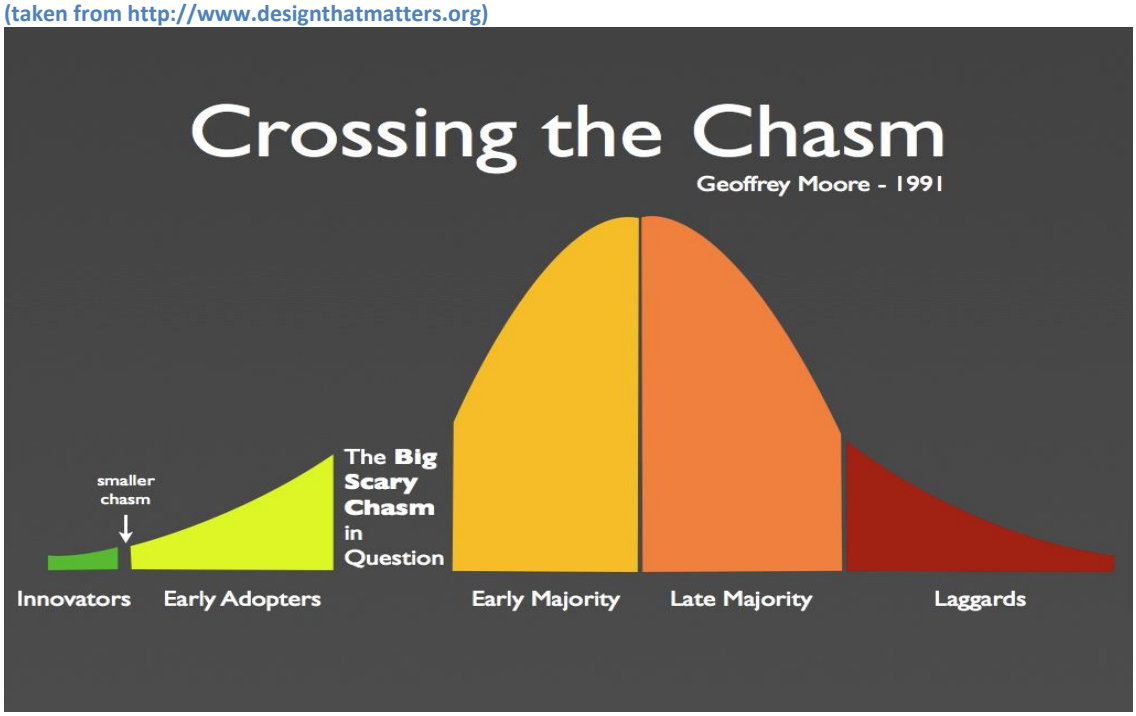
[6] The innovation adoption curve is a model that divides adopters of innovations in categories varying by their numbers and the time they adopt an innovation, suggesting that some groups are more prone to adopt a technological innovation than others. It also describes steps and hurdles that occur in crossing from one group to another. The model is referred to as Multi-Step Flow Theory or Diffusion of Innovation Theory.

the maturity of the technological era. This needs to be emphasised, given the potential pitfall of comparing the diffusion of the digital with other, more singular innovations in film history. An example of this deficient approach is Belton comparing the appearance of sound in cinema with the advent of digital technologies (2006). Moreover, failing to isolate specific events in the digital shift can give us a sense that the shift has been happening unwillingly, fitting nicely in the technological determinism hypothesis[7], and could therefore not be characterised at all as ground-breaking (Belton 2006; Le Grice 2001).

The introduction of the digital (even if seen as a singular, slow event) can nevertheless trace the same curve outlined by disruptive technologies in other areas of human activity. The uptake of technology by a population has the same traditional players denoted by Rogers – i.e. its innovators, visionaries or early adopters, early and late majority, as well as its stubborn laggards (2010, p. 56). For example, recent studies (Nye 2007) described the connection between the 'diffusion theory' and non-linear editing systems in the United Stated television. The extended bell curve introduced by Moore (2002) in *Crossing the Chasm* can also easily be observed in the case of digital cinema. Moore expands on Rogers' classic innovation diffusion curve, most notably by adding a large gap in the previously smooth curve, between the early adopters and the early majority, the so-called 'chasm'. He characterises this chasm as the 'make or break' point for each uptake of innovation – the hardest market segment transition to bridge, and one that distinguishes between a successful or failed innovation. In his research on D-cinema projection *"Michael Karagosian recognized the chasm situation in diffusion of D-cinema and published it in September 2007"*. (Perkis 2009, p. 154)

[7] Technological determinism as a theory presumes that a society's technology drives the development of its social structure and cultural values. It is generally criticised for its inclination towards a one-directional influence of technology and its perception of inertia of the public (Winston 1998).

Figure 1 – Geoffrey Moore's adjusted bell curve of innovation diffusion
(taken from http://www.designthatmatters.org)



These separate enquiries demonstrate that the digital in cinema follows the path of what is traditionally seen as disruptive innovation: where innovation is such that its influence challenges and breaks old habits (Christensen 2013; Bordwell 2013); its diffusion is determined by complex factors of economic imperatives, flexibility of practitioners, and the manner in which the new technology 're-codes' the old medium (Manovich 2001); and there is an idealistic and political impulse for change (Bazin 1967; Winston 1998).

The technological maelstrom of innovation happening at present can be compared with the advent of film itself (Manovich 1999; Gunning 1986). Heavily conditioned by disruptive technologies, it is difficult to find another time when technology played such a determining role in shaping the film process as *before* the institutionalisation of the narrative film and the studio system[8]. Both Gunning (1986) and Manovich (1999) point to comparable characteristics between the emergence of cinema and the emergence of the digital in cinema.

[8] The 'studio system' refers to the time of emergence and hegemony of a small number of major Hollywood studios between the late 1920s and the 1960s. In true oligopolistic style, the major studios developed a production system that accounted for 95% of Hollywood's output (Dixon & Foster 2008).

What Gunning called the 'cinema of attractions' where non-narrative form, reliance on trickery and magic was most valued, Manovich recognises in today's heavy reliance on special and visual effects in mainstream industries.

> Manual construction and animation of images gave birth to cinema and slipped into the margins…only to re-appear as the foundation of digital cinema. The history of the moving image thus makes a full circle. Born from animation, cinema pushed animation to its boundary, only to become one particular case of animation in the end. (Manovich 1999, p. 8)

Other than favouring technological innovation, the birth of film and the birth of digital film have more unifying patterns. There is a certain openness of competition: key players struggle to cope with monetising the new medium, the field is open for a larger number of innovators and participants of varying sizes to compete in setting trends. In doing so they can claim a slice of pie larger than would be allocated to independents in a non-transitory time (Tryon 2009). Digital technologies were the catalyst for the latest wave of globalisation, which only enlarged the potential profits and intensified the struggle for market shares (Wang 2003; Jonson 2008).

For this reason, rather than drawing from (equally valid) comparisons with, for example, the introduction of sound or mobile cameras in film, looking back at the birth of the cinematographic medium can offer insight in the modernist ruptures with established processes, and can illustrate the coping processes that were unstructured, improvised and varied.

> The digital reinvention of the cinema is every bit as revolutionary as the dawn of cinema itself, and it comes with an entirely new set of rules and expectations. (Dixon 2007, p. 6)

Before moving pictures acquired a silver-bromide emulsion as a reactant and before recording and projection reached the modern standards enabled by the celluloid strip, a whole range of technical apparatuses competed for the viewers' gaze. This was a time comparably volatile with today[9]. The following section offers a brief account of the competition between cinema-like apparatuses at the end of the nineteenth and beginning of the twentieth century.

[9] It may be no coincidence that the emergence of moving pictures and digital technologies coincided with respectively the first and third wave of global internationalisation (Jonson 2008).

Early film, new technologies and uncertainty

Historical accounts of early film paint a picture of many disparate technological innovations in different parts of the world, all with a more or less similar motivation: presenting a succession of images to create a notion of movement (Fielding 1967). This was one of the five preconditions for the invention of cinema according to Bordwell, Thompson and Ashton (1997, p. 5). These disparate efforts converged over a lengthy period of time to offer more sophisticated solutions for recording and projecting film, only symbolically culminating in few handpicked moments that are now described as, for the sake of simplification, the "birth of cinema"[10]. This first period was characterised by a large number of apparatuses and formats, all competing for technological distinction and market dominance. It started with camera precursors like Phenakistoscope and Zoetrope, both able to simulate fluid motion with a succession of drawings. After the technological landslide of fast photographic exposure, a scramble started for the best photographic sequence machines, best formats and best film transport methods (Nowell-Smith 1996). An often-combative patent fight ignited in the United States, which gave European countries space to get ahead of the race for a short period. This volatile situation gave birth to the marvels of engineering such as the Skladanowsky brothers' Bioscop and the Lumière Cinématographe along with the Edison's Kinetoscope. Each of these innovations brought cinema a step closer to what it became in the twentieth century.

This period of innovation races, plurality of formats, fierce patent competition and uncertainty over the future of the medium (Nowell-Smith 1996, p. 18) has parallels to contemporary transitions in film in the digital era. The historical comparison offered above demonstrates the conundrum cinema makers and cinema theorists alike are facing: the new medium represents a whole new set of challenges and imposes its own procedures that both groups need to assert ownership of.

The following section will demonstrate that themes like 'transition', 'rethink', and 'reinvent' echo throughout film theory in relation to the paradigm shift in cinema production. The digitisation of film has intensified the on-going discussions film theory has been wrestling with for decades. Film theory continues to be self-reflexive and under

[10] In popular culture, the moments most frequently referred to as symbolic 'big bangs' in cinema are the Lumière brothers' first projection of films to a paying audience in 1895 and Edison's patented invention of the Kinetoscope.

constant pressure to reposition itself vis-à-vis changes in film's physical characteristics. It is useful to review and navigate specific topics of film theory that confront the digital changes in order to assess the impact of digital technologies on film theory. The following section will also contribute to demonstrating the rupture between film theory and film practice, which strengthens the argument for the proposed research and its methods.

Digital technology and film theory

The historical transition period from analogue to digital production in film has forced film theory to come to terms with a momentous change – the disappearance of the filmstrip from what is still called film, despite its absence. Studying film, to put it simplistically, invokes "in its very name a medium, an industry, and a specific set of material referents that make the field's life seemingly dependent on the duration of those entities" (Cartwright 2002). As a consequence, the tone of cinephile theory when addressing the advent of the digital oscillates between antipathy (Belton 2006) and – in the more optimistic case – a call for the reinvention/redefinition of its core values (Friedberg 2010; Casetti 2007; Kittler 1999[11]).

> Every change in film history implies a change in its address to the spectator, and each period constructs its spectator in a new way. (Gunning 1986, p.70)

It is appropriate to start with an aspect that was simply 'deleted' by digital recording techniques. The indexicality of a film image, a film's casual ability – as Andre Bazin and Roland Barthes would put it – to spatially and temporally represent the originating event and preserve it on physical material, is seriously jeopardised (Hadjioannou 2008). The digital seems to have further complicated (if not closed) the ontological argument that film, through its chemical nature, is a representational rather than a presentational medium. The representational, indexical quality of the film strip was assured through the notion of its 'transparency', in contrast with painting for example, since to see a photograph of X was to see X, while to see a painting of X was not (Walton 1984; Scruton 1981). The process of digitisation through a light-sensitive chip[12] and the translation of that image to a binary code have severed film's causal relationship with reality, so passionately maintained by above mentioned classic film theorists.

[11] Kittler takes a broader look across different creative media, including film (Kittler 1987)
[12] CCD (charge-coupled device) and CMOS (complementary metal–oxide–semiconductor); both types of light-sensitive chips will be covered in later chapters.

On the other hand, the notion of 'photoreality' is the subject of debate, in that most of the digital cinematographic creation is in one way or another attempting to emulate the same ideal they shook off by going digital – staying 'realistic' (Cook 2004). To this end

> Rodowick points to the numerous ways in which the 'perceptual realism' of classical cinema persists in digital images through the latter's attempts to incorporate both the language of classic cinema (Rodowick's reading of the Matrix is exemplary in this regard) and the defining elements of the analogue image itself (even at the expense of those new possibilities opened up by the realm of the digital). (Stubblefield 2008, p. 102)

Furthermore, while modern film (based on digital technologies) has significant ontological similarities with animation (Rodowick 2009; Manovich 1999; Gaut 2010), in that every single pixel consists of algorithmic values that can be manipulated, McGregor notes that "even the most cursory examination of the philosophy, theory, and criticism of film reveals an overwhelming bias in favour of photorealistic – as opposed to animated – films" (2013, p. 271). Gaut states that the "philosophy of film has concentrated almost exclusively on traditional photographic images" (2010, p. 19). The indecision on what defines cinema is not new, although it might be exacerbated in the digital era. This dichotomy between the photoreality bias and manipulability of the filmic medium persists throughout film theory, and is representative of the identity of this discipline in digital environments.

Rodowick notices that "there has never been a general consensus concerning the answer to the question, "What is cinema?"" (2009, p. 11). Questioning the identity of cinema seems to lie in the very nature of film theory; however in discussions of representation it remains difficult for cinema to ideologically separate from its physical carrier [13]. Nevertheless, a call for reinvention is heard across the board. For example, after discussing reality perception and representation issues in film theory discourse, Stephen Prince concludes: "Digital imaging represents not only the new domain of cinema experiences, but a new threshold for theory as well" (Prince 1996, p. 36). Similarly, Anne Friedberg, in her influential article addressing film history as a discipline, closes her argument with the following:

[13] Or, at least both theory and the popular culture sustain this relationship.

> Not only does our concept of 'film history' need to be reconceptualised in light of these changes in technology, but our assumptions about 'spectatorship' have lost their theoretical pinions as screens have changed, as have our relations to them. (2010, p. 450)

Conversely, certain critics are attempting to negotiate a valuable space for the analogue, material film, claiming that this transition should not be seen from a future-centric aspect only (Knowles 2011). In her critique of the prevalent theorising by the likes of Manovich and Rodowick, Knowles states that rather than seeing material film's relationship with the digital as a mere melancholic death-birth relationship, material film deserves a creative place alongside and not in reaction to the digital. In her argument however, she relies on examples that conceptualise the artistic capacity of material film in binary terms of a positive/negative relationship with the digital, as she argues:

> Contemporary materialist film can be seen, in part, as a reflection on the ontological differences between analogue and digital media – if we buried a hard drive in the ground for days on end there would be little chance of rebirth in any creative form! (Knowles 2011, p. 10)

Ultimately, Knowles claims not to engage in "a rehearsing of the reductive celluloid versus digital debate" but sustains romantic attachment to celluloid in grand statement like the one above.

Another obfuscating feature in the traditional film discussion is the *de facto* nature of cinema as a form of artistic expression. Film represents an atypical art form. While it classically aligns itself with traditional visual media (like painting and photography) placing its self-identity in the creation of visual images, more often than not it ignores the hybridity of its aesthetic product.

As Rodowick puts it:

> Yet the great paradox of cinema with respect to the conceptual categories of eighteenth- and nineteenth-century aesthetics is that it is a temporal and 'immaterial' as well as spatial medium. The hybrid nature of cinematic expression that combines moving photographic images, sounds, and music as well as speech and writing has inspired equally cinema's defenders and detractors. (2009, p. 13)

It is exactly this hybridity that generates wider debate. To some, film has always been seen as an ugly crossbreed, struggling with its identity and right to co-exist with other

arts. On the opposite end, others worship it as an apogee of arts, a Hegelian[14] culmination of all its forms (Roche 1998). Film is the preservation of various creative acts in front of and behind the camera, before and after the recording stage. The digital aspect just further complicates an already convoluted definition of this medium. Film theory never shied away from raising grand questions[15], but recent discussions mentioned above suggest that digital has brought a new sense of urgency to the interaction, a sense of crisis. Casetti (2007b) situates this crisis as a response to the 'disappearance' of film as a distinctive medium, to its inherently hybrid character, while Sinnerbrink points out that *"the very complexity and hybridity of film has meant that attempts to secure its ontological identity as a medium have always been fraught with ambiguity and doubt".* (2012, p.70)

This hybridity of cinema lies at the base of another important and challenging aspect of film. As an amalgamation of various art forms, it implicates teamwork in its creation process, which according to Walter Benjamin divorces it from any claims on authorship (Benjamin 2008).

The introduction of cinema at the beginning of the twentieth century has highlighted the problem of art reproduction and authenticity. This has challenged classic convictions about art and the icons of its aesthetic authority. In the seminal paper *The Work of Art in the Age of Mechanical Reproduction*, Walter Benjamin makes a strong 'end of history' statement for the classic definitions of art and authenticity in the age of reproduction. He uses mainly film[16] as an example to make a point about the effect of reproduction on our relationship with art. For Benjamin, film has a revolutionary potential as a form of mechanical reproduction in its ability to wrestle itself free from its author, making every viewer a critic rather than a participant in an 'art ritual'. This 'politicisation' of the art spectator is seen by Benjamin as revolutionary but also potentially dangerous. Benjamin's article ends on a sombre note and warning against the introduction of aesthetics into politics which will lead to Fascism (Benjamin 2008, pp. 241–242). Susan Buck-Morss

[14] The Hegelian dialectic is used as a metaphor in this sentence rather than precise description of direct outcome of two squarely opposing worldviews. The figurative speech is reinforced with the fact the triad of dialectic approach is not Hegelian thought at all (Kaufmann 1966, pp. 154–155), but a simplified observation of his writings by Johann Fichte (Fichte 1993)

[15] What is cinema? How do we define its medium? What is the relation between ontological and aesthetic aspects of the moving image? What is the future of film/cinema in light of the technological revolution? (Sinnerbrink 2012)

[16] Although he points to photography as well, most of the article revolves around film.

elucidates on Benjamin's vision of art, stating that art must "restore the instinctual power of the human bodily senses for the sake of humanity's self-preservation, and to do this, not by avoiding the new technologies, but by passing through them" (Buck-Morss 1992). This view, although unmindful of the artifice of art, treats technology not as a damning factor but as a transporter, an emissary of artistic impulse. Inversely, in an article very mindful of the artifice of art, Rancière treats technology in the same confident manner as Benjamin, but without grand warnings about the politicisation of the viewer leading to doom scenarios:

> Renewed confidence in the political capacity of images assumes a critique of this strategic schema. The images of art do not supply weapons for battles. They help sketch new configurations of what can be seen, what can be said and what can be thought and, consequently, a new land-scape of the possible. But they do so on condition that their meaning or effect is not anticipated. (Rancière & Elliott 2009)

Finally, one of the most contentious questions arising while contemplating the future forms of film is the future of film theory itself. Considering the aforementioned disappearance of its carrier that granted it exclusivity from a theoretical point of view, how do we treat film theory now that film has become a more integral part of visual media with a common foundation of digital data? Questions like these bring forward the issue of media convergence in the digital age.

Film in convergence culture

> And yet it is more than apparent that with the speed of such rapid and radical transformation, our technological environments cannot be conclusively theorised. (Friedberg 2010, p. 450)

What most pioneers did not foresee until very recently is the extent to which the digital would saturate our lives. Telephony, photography, sound, computing, games, as well as film and television are all part of the digital realm. Cinema practice keeps transforming and theory is struggling to keep pace with such changes. However, whether it is seen as a revolution (Lucas, Ohanian and Phillips 2000, Ganz 2004), an evolution (Le Grice 2001) or just an economic replacement for film (Wheeler 2002), digital technology underpins all our visual activities. The digital realm has a common ontological denominator today, which is the binary code. This simple fact makes the borders between different media and the delineation between practices blurred. A single media franchise can be distributed through, and have an impact on, a range of media delivery methods (Jenkins 2006). Lower cost technologies and continuous innovation have opened creative

possibilities for consumers to participate in media creation and consumption in ways previously unimaginable. Jenkins calls this 'media convergence' – a new space where new and old media collide.

Rodowick points out that the disregard for the complete reshuffle on the production side of the moving image prevents us from realising its full potential as "the autonomous voice of a medium with distinct properties and possibilities" (2009, p. 48). The distinct possibilities of digital and computer-generated imagery was recognised in the very early years of the digital, and the need was highlighted to aestheticize this new technology outside of pre-existing production paradigms.

> Aesthetic application of technology is the only means of achieving new consciousness to match our new environment. (Youngblood & Fuller 1970, p. 189)

Gene Youngblood, one of the leading video pioneers/activists of his time, played with the ideal of *closed circle* video production, exhibition and distribution, and the effects thereof in his popular work, *Extended Cinema*. Similarly, mainstream film practice had its own share of early pushes to appropriate disruptive technologies in film. Frances Ford Coppola championed an effort called 'electronic cinema', prophesising the fall of the studio monopoly and a communal approach to filmmaking since the seventies (Boddy 2008).

These enthusing attempts to part more radically from analogue film proved particularly difficult; after all, film has existed since the late nineteenth century.

> A medium's content may shift, its audience may change and its social status may rise or fall, but once a medium establishes itself it continues to be part of the media ecosystem. (Jenkins 2003, p. 14)

Bar a few aforementioned outliers, the century of filmmaking did leave the bulk of the processes unchanged. This persistence of the film craft from the celluloid era left an indelible legacy, not only in film production and aesthetics, but we can also see that the *film* culture and aesthetics has infused the new digital forms of media such as video games and computing with its own code, its own paradigm. The introduction of the digital in cinema processes has brought back to our attention an additional complicating factor – the legacy of film medium – which is very transparent in all new digital media (Manovich 2001). The 'new' in media introduced by digital technologies, while replacing some consolidated practices in film, did show some striking structural similarities with cinema:

> A hundred years after cinema's birth, cinematic ways of seeing the world, of structuring time, of narrating a story, of linking one experience to the next, have become basic means by which computer users access and interact with all cultural data. In this respect, the computer fulfils the promise of cinema as a visual Esperanto. (Manovich 2001, p.87)

We can see this moment in time as a collision of influences. While film is being distorted by new technologies, in return it has ingrained its framework into the new media. The two-way stream of influence is creating a new space mediated by digital technology, which is transforming the production and delivery processes to such an extent that basic notions of things such as reality, acting, authorship and economic authority are being questioned and reshaped. This space is defined by new relationships, workflows and a multiplicity of players:

> Convergence of the media raises important issues for those of us in film studies. We find the defining object of our field – film – disintegrating into, or integrating with, other media. (Cartwright 2002, p.8)

> The depiction of media change as a zero-sum battle between old powerbrokers and insurgents distracts us from the real changes occurring in our media ecology. Rather than displacing old media, what I call convergence culture is shaped by increased contact and collaboration between established and emerging media institutions, expansion of the number of players producing and circulating media and the flow of content across multiple platforms and networks. (Jenkins 2006, p. 274)

'Convergence culture', as coined by Henry Jenkins, is a fitting description for the current situation in media, but more importantly it is descriptive of where we have to search to come to terms with these changes. Film research in this new post-network[17] age (Lotz 2007) requires tackling film as a *culture* practice - a negotiated space of interaction, difficult to delineate due to the diversity of individuals and practices in the modern age, but defined by a sense of belonging (Gupta & Ferguson 1992). Thus, this thesis will situate itself exactly in this new, dynamic space, probing the new networks and processes, and especially looking into the individual perceptions in the new craft spaces.

[17] The post-network era, defined by Amanda D. Lotz, describes the transition of television's network expansion in the US from the dominance of three big networks (ABC, CBS and NBC) to more networks, including more channels, a wider diversity of programming, and less constraints in terms of the viewer's viewing medium, location and viewing time. Although it is a term specifically designed to describe the situation in television, it is often used to emphasise the erosion of hierarchies in the visual media world.

One of the most prominent works dealing with the culture aspect in relation to digital technologies and film is *Production Culture: Industrial Reflexivity and Critical Practice in Film and Television* by John Caldwell. Drawing on a mix of methods, mainly anthropological, Caldwell describes how film professionals make sense of a transformed, post-network industry, registering their responses to changes including media convergence, new production technologies, corporate conglomeration, and the proliferation of user-generated content. The industry's ability to self-reflect about the technological shocks it endures is covered in detail in this work, as well as individual sentiment about specific technological changes (Caldwell 2008). This research will draw from Caldwell's methodological approach and further this research tradition.

Film Production Culture: technology, tools and black boxes

What is new in film-based research is the foregrounding of the production culture of film. "While the world does not necessarily need another field of study, one has indeed emerged." (Perren 2009, p. 2)

The above quote indirectly indicates a begrudging acknowledgment of a new approach – media production studies – that has taken the spotlight in recent times. Although Perren and Holt later recognize a broad scope of research that haws already contributed to this field, they maintain that the recent surge in Media and Production Culture research (of which this study is a part) is a new phenomenon. Wasko and Meehan (2013) claim that the "new" approach is ignorant of a rich tradition of inquiry into media production by political economists. They further question whether the new approach should exist at all. The ire of political economists of the media is problematic for two reasons. First, the works that drew their indignation all consider political economy a valuable addition to understanding the overall state of media production. The sole critique, is that political economy of the media often looks at macro level changes and effects on larger groups (writers of this assessment then go to further argue the need for the lived experience and human account of the organizational shifts) (Havens et al. 2009; Mayer et al. 2010, p. 27). Wasco and Meehan further this argument by pointing at a number of articles that, according to them, prove:

> Clearly, the claim that political economic research has remained at the "meta" level cannot be based on a thorough literature search. (Wasko & Meehan 2013, p. 3)

A thorough review of the literature presented to substantiate their point, shows it is dubious as to whether Wasko and Meehan understand the level of detail intended by the researchers they criticise.

Second, the surge in research on production culture coincides neatly with the surge in digital technologies (Wasko & Meehan 2013, p. 150). Digital technologies did usher in new dynamics in production, described by many as tumultuous and chaotic (Bordwell 2013; Ganz & Khatib 2006; Spaargaren 2011). This maelstrom of novelty and discord introduces a palpable sense of anxiety and ambiguity within the ranks of the media-creating individuals, which in turn, requires a specific ethnographic examination—one that is best achieved with a toolbox of researchers in culture studies (Caldwell 2008, pp. 1–37; Mayer et al. 2010, pp. 1–35). Ignoring these individual mind-sets means falling into a determinist top-to-bottom trap and disregarding the upward powers humans and their individual networks have on the larger-scale occurrences.

The contribution of this research is aimed at unpacking these exact issues in film production. Coping mechanisms by filmmaking individuals at the points of anxiety are also points of Hegelian conflicts where resistance to a domineering influence of technologies and to the organisational trends create new forms of organisation and tools appropriation. To appreciate this, one needs to familiarise with the changes in filmmaking processes.

❖

The traditional feature film production process consists of five steps: financing, scripting, pre-production, principal photography, and post-production (Bordwell et al. 1997). Financing, mainly a realm of executive producers and studios, will not be addressed further in this research but is referred to in decision-making and the construction of rationale for creative and functional decisions. Scripting and pre-production, often named jointly as the 'development' stage, describe all combined activities that eventually culminate in the start of the 'shoot' (principal photography). The activities of the development stage entail script research and writing, location scouting, set building, pre-visualisation (storyboards and decoupage diagrams), hiring talent and crew and allocating technology. The principal photography or 'shooting' is the stage of recording all the elements suggested by the script. During post-production all the recorded images are assembled together into a narrative, sound and visual effects are added and the image

is finally graded. If we disregard financing[18], we get a crude three-step production system – pre-production, production, and post-production.

This three step system has remained remarkably unchanged since the establishment of the Hollywood studio system in the late 1920s (Bordwell et al. 1985). The divisions of labour and authority still practiced in most high-end film productions are the same divisions of labour motivated by technologies that are now more than hundred years old. It is peculiar that even after the introduction of modern digital tools, the industry practice lingers by making the new tools perform the similar tasks done by a century-old technology. This exercise of confining the raw potential of new technology into old paradigms, is referred to as *black-boxing* (Lagesen 2012; Cockburn et al. 1992). Cockburn refers to *black-boxing* in the context of a relationship between gender and technology, describing *black-boxing* as an action of closing controversies, settling artefacts, which occurs when people ally together to close certain concepts and forbear to reopen them (Cockburn et al. 1992, p. 34).

However, the steady invasion of cinematographic processes by digital technologies has ignited a structural shift in the chronology and emphasis of these processes, and has, in addition, created numerous production sub-steps. At present, the digital has permeated every facet of filmmaking, and we can easily conclude that delineation and order between processes have never been more flexible (Manovich 1999). The new technologies propose new paradigms that are hard to contain within the old concepts; this creates anxieties, which in turn, move the individual practitioners to slowly reopen these 'black boxes'.

Such volatile technological shifts and perceptions about production tools are breaking the *Instrumental Theory* mould of technology being defined as merely a means to an end. *Instrumental Theory* assumes neutrality of technology, where technology is a tool, the purpose of which is defined by its user through its use (Feenberg 1991, p. 6). In this view, a social context can confine the technology but it cannot be changed by it. This thesis will adopt an opposing stance with roots in *Substantive Theories* of Heidegger and Ellul (Ellul et al. 1964; Heidegger & Lovitt 1977), but without the undertone of human downfall at the hand of machines. When not describing doomsday scenarios, *substantive theory*

[18] Financing is a part of pre-production but the financing model of a film has an effect on the production processes. The particular financing model of the case study in this thesis will be described in Chapter 2.

reminds us of the *Instrumental Theory's* blindness toward the cultural implications of technologies, and its agency to exert cultural influence in and of itself (Feenberg 1991, p.9). Technological tools in hands of filmmakers, instead of solely being apparatuses used to create meaning, are also capable of imposing a meaning. As Caldwell would put it, we should not ask ourselves anymore "how do machines make meaning" but "how do machines mean" (2008, p. 150).

This *substantialist* notion is in contrast with the dominant theories in the golden age of cinema. The aforementioned "auteur theory", a brainchild of the *Cahiers Du Cinema* cohort (Truffaut 1954; Bazin 1967), as well as the "post-auteur" texts and the "Apparatus Theory" (Baudry & Williams 1974; Metz & Meltzer 1977), had a tendency to overlook technology's ability to impose its own meaning and shape dynamics in people's relationships, for a preferred model of locating the director as the locus of the creative process.

Another legacy of the 'auteur theory' is the disproportionate recognition of the vision of the auteur and the innovator for advancements in film production, disregarding the authority of other users of these film technologies, like the cinematographers and editors. In this view, a camera is "a cold, rent-seeking camera obscura" – largely disregarding the multitude of human eyes firmly pressed against its viewfinder (Lucas 2011, p. 42). In this research, the primary subjects of inquiry are the below-the-line craftspersons in post-production and cinematography, 'the significant others' of the above-the-line proponents, who are usually out of the spotlight.

Workflow - making sense in a non-linear practice

When it comes to cinematography and post-production, the unprecedented speed of innovation in production technology has created a reflexive craft culture, where process successes, failures, experiments and *ad hoc* solutions are openly shared in order for a specific craft to maintain its authority over designated parts of the production process. The reason for this openness – aside from the love of the craft – is an anxiety over the future of the craft during this time of intense reconceptualization of practice within film production.

There are no dominant process standards as yet in digital production and post-production (although some have the capacity to become generally accepted; ACES[19] being a good example). Innovation in digital video production has permitted a plurality of practice, a vast array of options that created turmoil in how we relate to cinematographic tradition. This results in the appearance of a whole array of new low- and mid-level 'below the line' production roles with a strong emphasis on technology and project management. 'Efficiency' defines the highly competitive world of visual output productions (Turok 2003). The amount of visual stimulus fighting for our attention is higher than ever, and in such a competitive paradigm, business methods and jargon are permeating the production set. This is where the concept of workflow is relevant to film production.

Since the introduction of the digital intermediate process, the concept of workflow has become an approach through which filmmakers come to terms with new options in production. It is remarkable that the introduction of these new methods, especially in the case of the digital intermediate, did not simplify but, on the contrary, made the production process more complex. Nevertheless, the notion of increased flexibility, lower costs and the promise of increased input from other creative disciplines like design (other than through cinematography), proved too tempting for visual content producers.

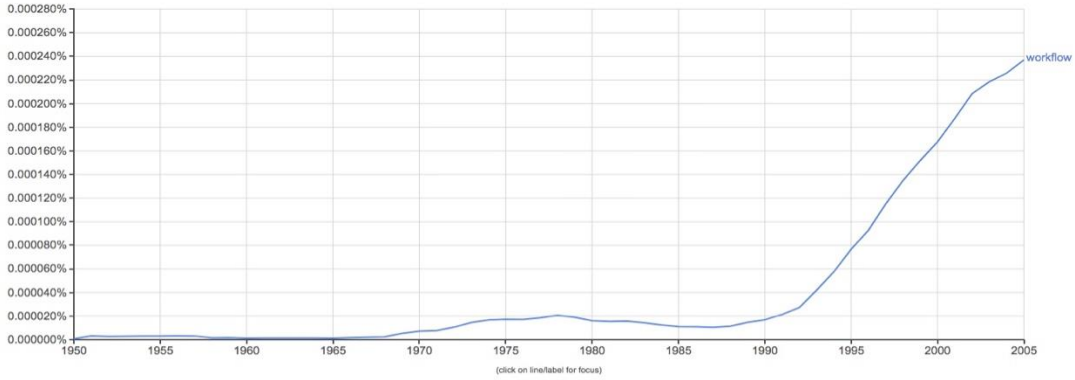
Workflow, almost synonymous with visual content production in 2017, has emerged as a powerful tool in production discourse in the last twenty years. The term originates from business management and production automation, and is synonymous to what in economics is called 'value chain theory' (Porter 2008). It is not surprising that filmmakers borrow from other areas, especially management and automation, since – as shown previously – the digital was incorporated in those production ecosystems much earlier than in film. In this regard, film is a latecomer. Historically, one can trace the concept of

[19] Academy Color Encoding System (ACES) is a set of colour management guidelines that attempts to tackle the current lack of standards and control over the colour output in film and television. It is a relatively complex set of tools, digital file containers and programming protocols, which enables one to have more control over interchange issues between manufacturers, codecs and formats. At the moment, it is still mainly adopted by the high-end film industry, but the promise stands that it is meant for all production levels and outputs, from cinema screen to YouTube. ACES is a free, device-independent open-source system that (Academy of Motion Pictures Arts and Sciences 2017; Maher 2017). However, outside of high-end industry, ACES is yet to be adopted and it is uncertain whether this will become a tool only affordable to big productions, due to its technical complexity.

workflow back to manufacture organisation innovators like Frederick Winslow Taylor, most known for his time and motion studies, and for breaking work down into individual, measurable tasks, enabling easier analysis and improvement on the process (All things workflow 2012). Henry Gantt, one of his disciples, popularised the Gantt chart, still extensively used in project management today, including film workflow management (Chartfield & Vangermeersch 2014). Although the understanding of workflow was defined by Taylor, the term seems to not have been used in their lifetime. Possibly earliest usages of 'work flow' was in railway engineering journal of 1921 (Saunders & Blundstone 1921).

Once the film production broke with the linearity of its process through introduction of digital technologies, the plurality of practice options enabled for the concept of workflow to be fully embraced. However, it is not exactly clear how the term embedded itself in film culture, but if we trace the term through Google n-gram viewer, we can see that the exponential increase in the usage of the term corresponds with the timings of the digital revolution.

Figure 2 - Frequency of "workflow" use in all English language books scanned by google between 1950 - 2005



From a business management point of view, a workflow is "an orchestrated and repeatable pattern of business activity enabled by the systematic organization of resources into processes that transform materials, provide services, or process data" (Ko et al. 2009, p. 4). Simply put, workflows are put in place to maximise efficiency, to avoid 'dead-end activities' and keep the flow of work smooth and streamlined.

Since the linearity of the traditional process fell apart, the unrestricted innovation and lack of standardisation resulted in confusion over the responsibilities of different craftsmen and women in the completion of the final film product. Colour management is one of the best and one of the few comprehensively discussed examples of this.

A short explanation of the complexities of film colour management is useful to this discussion. In the era of celluloid film, the colour of an image was considered the sacred realm of the director of photography[20] (DP) (Misek 2010, p. 405; Lucas 2011). It was a standardised process, based on a mechanical timing system, and almost always took place in the same location as all chemical procedures (it was very rare that a production would change labs in the middle of a shoot). The process was very easy to supervise by one person – the same person who considered the light on the set, the choice of lenses, etc. This gave the DP an enormous level of power and a magician-like aura as s/he was the only person that could claim to know how a negative will look the next day (and therefore had the final say in most visual choices) (Lucas 2011, p. 45).

However, since the introduction of the digital intermediate process, colour manipulation has lost the DP as its dominant figure. Due to digital monitoring systems combined with digital cameras, the director and others can question the choices of the DP immediately on the set: with a digital camera, the video assist system on set will show the image as it will be seen throughout the post-production. Hence there is no need to wait for the film to be developed. However, the issue of colour manipulations becomes more problematic in post-production. The digitisation process is quite anonymous, occurring in the late hours in a post-production facility or on set by a DIT[21] team (depending on the size of a production). A lower echelon employee will be the first to see the 'raw' footage, and might easily interfere in the colour scheme just because it is possible to do so, disregarding that these settings may have been chosen for a reason (Caldwell 2008). The possibility to interfere in colour management, due to the increased mouldability of an image, has created confusion about where these decisions should be taken. Currently, one can

[20] The authorship over colour is one of many film craft-identity misconceptions. Choice of colour in classic cinema was a deliberation between the director and the production designer. The DP might be consulted, but in reality his/her role is the management of colour, rather than authorship. (Lucas 2011, p. 130)

[21] The digital imaging technician (DIT) is a new occurrence in film production hierarchy and will be extensively covered later in this research. It is well summed up as follows:
"During the evolution of the modern film, the crew has become an engine: an efficient, purpose-driven entity.... With the convergence of digital acquisition and post-production on set, there are numerous challenges to overcome. Digital imaging technical is a key player between camera manufacturers, rental houses, editorial and post-production facility, making sure the designed workflow is properly executed. Because the DIT crosses boundaries between the camera department, editorial and sometimes sound, there have been disputes and disagreements among the unions over which group can best represent the DIT." (Arundale & Trieu 2014, pp. 79–80)

change colour on a camera, during ingest or dailies creation, editing, visual effects (VFX), but also before the shoot, where the VFX coordinator (another 'management-heavy' role created by the versatility of options with the digital) can propose colour presets for the DPs camera. All this involvement will eventually influence the director and producer, and finally the final colour correction.

> Workflow has become an increasingly important discursive resource for cinematographers as the production process based on 35mm film (the technological foundation of the industry and of their craft authority) was replaced by complex, hybrid workflows of film, video, and digital media. As a concept and object of study, I think workflow offers a new way to link technologies, institutions, aesthetics, style, and craftwork in the study of production cultures—analogous to, but distinct from, mode of production. (Lucas 2011, p. 23)

Academic interest for workflow in a film context is mainly from an engineer's perspective. Papers that examine technical interoperability issues between technologies are good examples (De Geyter & Overmeire 2011; Levy et al. 2016; Diaz et al. 2016). The Society of Motion Picture & Television Engineers (SMPTE) journals are the most valued publications in this highly technical field, and this academic branch works closely with the industry in search of increased efficiency and higher quality output of the technical tools in filmmaking. Conversely, research on the social, human or managerial context in filmmaking workflows is much harder to come by. As Caldwell indicates in *Production Cultures*; the reason for this could be the mutual mistrust between academia and production (Caldwell 2008), or the general lack of interest in technology on the side of the academics (Burch 2014). This absence of the academic literature on workflows in film and video forces the researcher to look into more than peer-reviewed theoretical documentation. Therefore the information about workflow for this thesis will be derived from multiple resources, including trade publications, mainstream press sources, in-depth third party interviews with craft practitioners and relevant ethnographic research. Studying the workflow and its effectiveness as an organizational model within the ever-changing film industry is valuable for both academia, searching to reconnect with the realities of the filmmaking practice, as well as film practitioners in their attempts to locate the optimum organizational models where space is created for both efficiency and creativity. This research will attempt to contribute to this discourse.

In addition to the concept of workflows, another noteworthy development that is closely connected to the issues described above will be investigated in more depth. Affected by the disappearance of boundaries between crafts in film, a practicing individual is faced with a challenge, i.e. whether to specialise or diversify. The question seems to have been answered, as exemplified by the generation of 'multi-taskers' that is emerging and challenging elite ranks of film production by competing for their piece of the pie on the same stage. Making a choice to diversify, however, has a number of trade-offs.

Blurred lines in crafts, blurred lines in technologies

The multitasking trend mentioned in the previous section is not only the result of a freelance filmmaking workforce trying to gain a comparative advantage in the absence of an over-arching, boundaries-setting, craft authority – it is also part of a wider capitalist push towards 'prosumer' behaviour, where increased agency is expected from the consumer as well as the production worker (Ritzer & Jurgenson 2010). For example, being a video editor and having only a passive interest in editing sound will be tolerated only of highly established craftspeople that are happy with what they are doing. Everyone else, on the other hand, will feel inclined to extend his or her services. However even practitioner icons such as Walter Murch acknowledge the opportunity of on-going integration of previously rigid post-production phases:

> By contrast, digital techniques naturally tend to integrate with each other because of their mathematical commonality; thus they come under easier control by a single person. I can see this already happening in the sound-mixing work that I do, where the borders between sound editing and mixing have begun to blur. And it is about to happen in the further integration of film editing and visual effects. (Murch 1999, p. 30)

The 'mathematical commonality' Murch is talking about has covered the whole of the filmmaking process. Binary code makes crossing borders both easier and wide reaching, so it is extended beyond post-production, enabling many versions of the same film. This destabilises a once consolidated process.

The traditional studio system can be viewed as film's answer to the mass production needs of the industrial age, with a traditional push for standardisation and very clear vertical craft divisions. This in turn gave craft positions a strong bargaining power through union and inter-union negotiations (Staiger 2004). Scholars who researched labour in these now traditional creative industries note that the studio system was *change-averse* when it came to the introduction of new technologies (Christopherson &

Storper 1989). The profit, technology and innovation-driven twentieth century saw a strong shift in labour force management and organisation that has been conflicting with the film industry labour standards long before the introduction of the digital. The so-called 'flexible specialisation' notion, which refers to the tendency of film craft individuals to specialise in their technology and use it in various settings, has been their strategy to cope with the steady decrease in wages and increase in working hours, while maintaining their price and value at a reasonable level (Bernstein 1987; Storper 1989; Christopherson & Storper 1989).

It is debateable whether the 'flexible specialisation' thesis is sufficient in explaining the organisational issues of media production, especially in the United Kingdom. The industrial/post-industrial dynamic does not apply well to film production models in the United Kingdom (Atkinson & Randle 2014). Furthermore, it is hard to consider flexible specialisation as an adequate description of contemporary labour patterns, as a vast majority of the visual production workforce has no affiliation with a union (Oakley 2013); when it has an increasing variety of outputs to think about (distribution disintegration means the cinema screen is just one of them); and has a variety of formats to choose from when making a visual product (Dwyer 2015, pp.998–1003).

The craft identities and the controlling jurisdictions associated with them (whether state- or union-regulated) are giving way to more amorphous job titles and roles. In an effort to cope with these events, and evermore-depleted budgets and tighter deadlines, the creative industries are witnessing the emergence of hybrid jobs. The coping is at the cost of accepting a market without regulation and structure (McKinlay & Smith 2009). This acceptance of risk and the rejection of old production-tool skill-based labour has been characteristic of working in media for a long time (although the trend has sharply increased in the last two decades). However, there is limited research on how these new roles and trends are perceived by practitioners themselves (Hesmondhalgh & Baker 2011; McKinlay & Smith 2009). The dilemma of specialisation will be tackled in the results chapters, as attention will be given to individual anxieties of the craft practitioners. The understanding of the individual's lived experience is beneficial for general understanding of less quantifiable pressures that occur with implementation of new digital workflows and processes.

For this research it is specifically interesting to consider one more term introduced by Henry Jenkins - a noteworthy hypothesis coined the 'Black Box fallacy', which should not be confused with the notion of 'black boxing' covered above. Jenkins conceived this concept to reflect specifically on media delivery systems, which in cinema terms would mean distribution and exhibition. This research, however, is interested in the occurrence of the same black box fallacy in the actual craft of media production, noting both its metaphorical and literal application.

> Much contemporary discourse about convergence starts and ends with what I call the Black Box Fallacy. Sooner or later, the argument goes, all media content is going to flow through a single black box into our living rooms (or, in the mobile scenario, through black boxes we carry around with us everywhere we go). If the folks at the New Orleans Media Experience could just figure out which black box will reign supreme, then everyone can make reasonable investments for the future. Part of what makes the black box concept a fallacy is that it reduces media change to technological change and strips aside the cultural levels we are considering here. (Jenkins 2006, p. 22)

Jenkins alludes here to an intuitive tendency to assume some kind of 'final' delivery solution for all media, a 'black box' where all media converges. This is also a way of looking at media convergence that is falling out of fashion, however convenient this fantasy may be. It also reflects the techno naiveté of the technologically untrained.

> The old idea of convergence was that all devices would converge into one central device that did everything for you (à la the universal remote). What we are now seeing is the hardware diverging while the content converges. (Cheskin Research 2002, pp.8–9)

The two-way pressure between the convergence and divergence realities is a constant feature of film production. While the amount of new technologies multiplies and the craftsmen and women are struggling with issues like compatibility and diverging output options; those who manufacture post-production tools play into the new multitasker roles by creating tools that cater to convergence of filmmaking disciplines. Both Adobe[22] and Blackmagic[23], for example, have their versions of 'black boxes' aimed at a multitasking

[22] Adobe has a history of bundling production tools into a streamlined package. This tradition resulted in Creative Cloud, a cloud based service offering all their products on one desktop account. The software components are well integrated into each other and the package is pitched as a tool for collaboration (Lord & Velez 2013).

[23] One only needs to visit the front page of the latest version of its editing and grading software DaVinci Resolve to see the convergence and workflow "black box" paradigm. Blackmagic Design is an established manufacturer of post-production hardware, but has recently expanded its presence across the whole production workflow, with cameras, editing and VFX software etc.

user base. This research deals with these specific real-time issues of coping with convergence/divergence in production tools.

It should be noted that concepts of convergence and divergence in technology and media are relatively inexplicit terms, as they are appended onto a variety of hypotheses (Appelgren 2004). This research will specifically focus on the Jenkins definitions quoted above and place them into the production culture context. Dealing with the convergence technologies in the context of individual practitioners and filmmaking groups inevitably raises questions as to how the new convergence of technologies, combined with pressures to multitask, are shaping the base of the crafts involved in filmmaking. As mentioned in the introduction, the contribution of British sociologists looking into the modern craft culture is a highly valuable resource when researching the experience of crafts practitioners.

Craft Identity shifts

This chapter had thus far demonstrated how the production culture – the networks, experiences and appropriation of spaces and technologies – is dictated by a two-way stream of influences. To understand the concepts shaped by the new digital technologies, it is imperative to take into account the subjective experience of filmmaking practitioners. It is this experience that can enrich our understanding of uptake and alterations of new technologies.

The descriptions of the experience of the filmmaking practice relate to the descriptions of the experiences in modern craftsmanship in general. A wave of these descriptions came from a group of British sociologists of art, craft and creative labour (Vonderau & Szczepanik 2013). Such sociologists are interested mainly in the social aspect of art and craft production, with its emblematic representative Richard Sennett (Tweedie 2013). In the early nineties, Caldwell started the interdisciplinary dialogue between studies of production cultures and the sociology of craft; since then, the two disciplines have established an active platform for exchange of ideas (Vonderau & Szczepanik 2013, p. 3).

https://www.blackmagicdesign.com/uk/products/davinciresolve/

Sennett's study of the effect of new technologies on the craft identity of the craftsmen and women shows a bleak picture of deskilled and demotivated individuals powerless to regain the sense of pride and ownership over their work (Sennett 2011). He uses a bakery to depict the transition from manual to machine-driven work. What he discovers are workers with only interchangeable skills, not able to make bread, but only able to operate the simple software of the machine that makes bread (Sennett 2011, p. 66). It can be noted that the common denominator, the binary code, also acts as the common equaliser in craft description. We all operate some kind of software that turns our ideas into more binary code. Sporton is further exasperated by the fact that:

> For the creative sector, being regularly exhorted to join the digital revolution is becoming more than tiresome. We have found our concepts colonised and our professional expertise trivialised by the idea that through technology everyone is now 'creative'. (Sporton 2015, p. 116)

Anxiety is the key effect of the experience of craft identity deterioration and the expansion of the competition. Anxiety, insecurity and stress in modern craft is covered throughout the production culture, digital creativity and sociology literature (Sennett 2011; Hesmondhalgh & Baker 2010; Gill 2013; Sporton 2015). Caldwell covers in detail what he calls "stress aesthetics" in Hollywood work culture (Caldwell 2013). The previously described account of the deterioration of traditional colour authority and workflow shifts between the DP and the colourist are an example of the type of craft anxiety created in time of workflow transformations.

The context of anxiety is also heavily influenced by the cited sociologists and their research on disappearance of long term security in jobs (Sennett 2011; Giddens 2013; Gill 2013). The view of this branch of sociology is characterised by a doomsday 'end of work' stance and is heavily criticised for not being in line with the reality of contemporary creative labour situations (Doogan 2005; Doogan 2009; Fevre 2007). Doogan and Fevre claim that Sennet and others have no grounds at all for the end-of-work stance, as the situation with job insecurity has not changed as much as the sociologists claim. In fact, the figures in their accounts show it has not changed. Therefore, they conclude that by fabricating job insecurity, the prominent sociologists are accomplices in the creation of anxieties that should not be there.

However, others point out that sociologists like Sennett are looking into perceptions of insecurity and anxiety and those are definitely present, regardless of whether the labour situation has changed from a legal point of view (Tweedie 2013). The perceptions of insecurity that result in individual anxiety are the result of degradation of craftwork through the introduction of new technologies. This experience of alienation from work is crucial if we are interested in speculating on the organisational and technological future of the filmmaking craft. It is clear from much academic and non-academic literature that the craft identity in filmmaking is fragile and unclear at the moment. However, champions of these disheartening views do not lament over the lost glory of a non-digital world, nor do they call for any unrealistic backtracking towards the time before the digital. They rather analyse these dynamics to suggest potential resolution for the inevitable restructuring of the craft focus and de-skilling in the traditional craft framework (Sporton 2015).

This thesis will contribute to the ideas Caldwell developed in his chapter *Trade Machines and Manufactured Identities* (Caldwell 2008, pp. 150–196), where he lists examples of degeneration of craft identity and workflow stability, and the increase in anxiety of the below-the-line worker in the filmmaking process. Caldwell assigns agency to machines (see the Production Cultures section), rendering them capable of affecting human hierarchies and structures. This thesis will characterize the all-pervading anxiety in the workplace as a catalyst of new agency in creative craftspeople who adjust to new situations and push back to reshape the spaces, networks, and technologies to alleviate their anxieties. It is this push-and-pull effect between technology and the craftspeople where one can see glimpses of the potential of the newfound structures instigated by the new technologies. The thesis case study and participant observation are suitable examples for presenting the possible settings where the struggle between the technological promise of creativity and craft anxieties is playing out.

Chapter 2
Method

> The anthropological approach to diffusion of innovation has proven fruitful in examining the consequences in other areas of industrial innovation (Rogers 2010, p. 48)

This study uses qualitative research methods, typified in David Silverman's depiction as an attempt to *"use first-hand familiarity with different settings to induce hypotheses"* (Silverman 1998, p. 37). An inquiry of this nature has an intrinsic ethnographic element. Examining a group of individuals, connected by specific professional and cultural norms, necessitates an 'insider view' in order to determine the innermost workings and practices of the production mechanism. It is worth noting how difficult it is to define ethnography, or rather distinguish it from other terms intimately related to the ethnographic tradition, such as 'participant observation' and 'fieldwork'. Although these terms fall into the realm of qualitative research, academics often use them interchangeably to describe a specific research method where the researcher spends longer periods of time with people, observing and interacting, in order to interpret their attitudes and visions of the world that surrounds them (Delamont 2004, p. 206). 'Fieldwork' relates to the space and time when the researcher is continuously present at the study site, away from their research institution, employing various research methodologies (not necessarily ethnographic in nature) such as interviews, questionnaires or focus groups (Gobo 2008, p. 13; Delamont 2004, p. 206). 'Participant observation' is a key tool in the ethnographers' toolbox and will be central to this research as well. As an elemental activity of an anthropologist, and a regular appearance in an ever-increasing number of other social science disciplines, participant observation has been extensively reflected upon and its advantages and hazards are well documented (Atkinson & Hammersley 1994; Spradley 2016; Bourdieu 2003; Preissle & Grant 2004; DeWalt & DeWalt 2010). The particular strengths and weaknesses of participant observation relevant to this research are identified in this chapter.

The chapter is structured as follows. First, it starts with a section that explains and reflects on the methodological choice of participant observation and the role of the researcher. In the case of this research, the most distinctive characteristic of the participant observation is the researcher's earlier background in media anthropology, as well as his extensive experience in film production and expert technical proficiency in filmmaking

workflow technologies, especially in post-production. Therefore, in addition to the rationale behind the choice of participant observation, the role of the researcher as an active industry practitioner will require further discussion. This section will then go on to address the prominence of technology in this specific cultural setting, with added attention to the interaction between humans and the technology.

Second, the chapter will reflect on the theoretical underpinnings of the method, followed by a detailed overview of the research design and ethical considerations of the chosen approach. Although participant observation is the most prominent method in this research, additional methodologies were used to complement the dataset, such as semi-structured interviews. Therefore, the third section discusses the integration and balance between research methods, to ensure their suitability within the research. Lastly, the scouting period and the final choice of the institutions and individuals participating in the research will be presented. This chapter is followed by a separate chapter that describes the selected research setting, the film project and the backgrounds of the individuals involved. A separate chapter was required to describe the case study, namely to ensure methodological transparency, as well as to set the stage for a detailed contextualisation of the results.

Participant Observation

Engaging in participant observation within the film industry calls for a reflexive approach to knowledge construction, which in turn, requires some expertise in the researched subject, familiarity with jargon and general awareness of how the particular researched culture operates (Denscombe 2010). Such requirements highlight the intrinsic paradox of traditional participant observation. The contradiction between detached observation and technical involvement has been characterised as challenging.

> Society and people are so organised that the goals of scientific and emphatic understanding (access of meanings) are competitive in principle. It may not be possible to be a participant and a scientist simultaneously. (Schwartz & Jacobs 1979: p. 49)

In contrast, Gobo points out that philosophically participation and observation are not two contradictory attitudes; rather they are two distinct aspect of social life. "*They do not contradict each other as they do not overlap"* (Gobo 2008: p.7).

However, the realities of fully participating and observing are complex, and the effects of balancing the two differ from case to case. As participant observation in this study will be conducted by a researcher active as a film professional, some light needs to be shed on the matter of "wearing two hats"- i.e. making a study of the industry in which one is professionally active. In the article *Both Sides of the Fence* (Caldwell et al. 2009), one of the leading researchers of cinema culture exposes the advantages and potential conflicts of doing research as a technically-versed industry professional. Caldwell highlights classic approaches to ethnographic research, derived from the positivist physical sciences, where a certain form of detachment is highly valued. Early anthropologists tapped this school of thought, making the detachment from 'subjects' a fundamental concern (Caldwell 2008, p. 228). Structuralist and feminist theorists turn these notions on their head and have turned ethnography into a 'textual practice' (Clifford & Marcus 1986; Okely & Callaway 1992; Moore 1987) where, mainly due to ethical and legitimating reasons, reflexivity towards the complicated relationship between informant and researcher is paramount. This opens the door to practices of shared ethnographies, informants as co-authors and participatory research, which greatly enriches and reinvigorates anthropology as a discipline.

This thesis builds on the branch of anthropology that focuses on the participant observation of visual media production cultures, where the researcher is an observing industry participant, rather than an isolated participant observer. In the arena of creative arts, it is more customary to articulate knowledge from the practitioner's perspective (Newbury 2010, p. 372); however, in the case of film, the sheer size and power of the industry section of the medium has created clashes from the onset between practitioners and academia. The tradition of examining the motion picture industry was started by seminal work of Hortense Powdermaker (1950). Powdermaker spent considerable time examining the influence of Hollywood production culture on its film narrative, although not as an industry insider. Her work was met with ferocious disapproval from the industry; whose members characterised her work as "naïve musings of an outsider" (Caldwell 2008, p.9). This excessively negative reaction to outside analysis was one of the most important effects of Powdermaker's work – unveiling the industry's reluctance to take outside questioning as legitimate, rationalising it as an academic's lack of understanding of the practice of filmmaking. It also revealed the strong capacity of the film industry to produce its own reflexive narrative, something Hollywood effectively used to deter outside investigations (Caldwell 2008, p. 10).

Due to the unsympathetic stance of the motion picture industry towards academia (also covered in Chapter 1), there is a need for a type of academic research capable of engaging with the technical and bureaucratic intricacies of film production. This is not necessarily to raise legitimacy of academia in industry circles, but more as an attempt to reconcile two disciplines that have been growing apart for considerable time. There is increasing research of production culture conducted by individuals active in both academic and industry practice (Henderson 2009; Hill 2011).

For this research it is useful to isolate a few examples of varying effect of "wearing both hats", in order to make the reader aware of possible participant observation outcomes. The work of Barry Dornfield, who acted as an ethnographer and a production assistant in the production of the PBS series *Childhood* (Dornfeld 1998), produced a work of valuable methodological legitimacy[24] (Caldwell 2008, p. 201). From a practical point of view, having an intimate working knowledge of production processes:

> ...pushes them (researchers) beyond the sometime rudimentary questions that scholars with little direct knowledge of film/television raise. Yet "straddling the fence" also forces them to regularly negotiate both their access and their critical distance from those granting access. (Caldwell 2009, p. 214)

Indeed, as this research's primary goal is to investigate the impact of technical workflows and processes in film, a detailed knowledge of the same is essential, not only for the depth of the research, but knowing where to strike the balance between observation and practice.

Although technology plays a central role in this thesis and demands careful consideration when determining the choice of research methods, there is no need to discuss technological determinism. Academic research has developed an understanding that technology is not a sole motivator for social change, and can be socially shaped as well (Cockburn et al. 1992, p. 32; Winston 1996). Nevertheless, it is imperative to define how the machines will be regarded during the fieldwork part of the research. Participant observation will draw on a theoretical framework that treats objects as equal part of social networks. The actor-network theory (ANT) employs concepts useful for this study. The ANT is an approach to social theory and research, originating in the field of science

[24] Unfortunately some of his claims about his research being path-breaking were marked as limited and uninformed by critics (Curtin 2000, p. 201).

studies, which treats objects as part of social networks. Although it is best known for its insistence on the capacity of nonhumans to act or participate in systems as well as humans, ANT is also associated with forceful critiques of conventional sociology. Developed by Michel Callon, Bruno Latour, and sociologist John Law, among others, it can be described in more technical terms as a "material-semiotic" method. It also values the sense of space as a networked entity rather than a fixed hierarchical concept (Couldry 2008). The simplest way to describe the material-semiotic method is as a method that maps relations that are simultaneously material (between things) and semiotic (between concepts) (Law 1992).

Since film production culture is a highly technical and craft-oriented world, where the space of activity is more or less equally mediated by human and non-human determinants (in this case technological tools), a theoretical framework that recognises both types of actors is of value when shaping questions and inquiring about mutual reliance of the actors. As demonstrated above, there is a dynamic relationship between technological tools and their human users; the tools or techniques in themselves often determine the potential and actions of humans at a number of levels. Furthermore, the ANT "ties together and considers the differing moments, times and spaces of a specific production in a single study as a networked whole" (Mould 2009, p. 211). As Mould further posits, ANT has such a strong affinity for 'project-based' work activities, it is a valuable methodological language for researching the film industry. Latour's emphasis on the use of many types of ethnographies simultaneously, and unapologetic request for research to "tell a story" through empirical description and ethnographic research, creates a sense of awareness of the "messiness" and complexities of film practitioners' networked spaces (Law 1992).

Although criticised by many and practically abandoned by Latour himself (Law & Hassard 1999, p. 16), ANT did leave important marks on social research: it established a space where a relationship is formed between actants - to use an accepted term - thus creating a network that can also act as a 'macro actant' and create new networks. The term 'actant' alludes to "that which accomplishes or undergoes an act" (Greimas et al. 1982). It plainly is a preferred term for acknowledging more equal agency between humans, objects or concepts intertwined in a researched network. According to Czarniawska, "this semiological term is highly suitable for social science analysis, as it allows same entity to

be a subject or an object of an act." (2004, p. 10). This research will therefore turn to these methodological strengths of ANT.

Furthermore:

> [T]here are important reasons why ANT should be an important part of the media theorist's toolkit...since ANT remains an important antidote to functionalist versions of media theory and an inspiration towards developing better versions of a materialist approach to understanding what media are and their consequences for the social world and social space. (Couldry 2008, p. 107)

Although ANT cannot provide a total framework for this research project, due to its inflexible distancing from the social aspect of networks and technologies, (Latour 1990, p. 110), it provides the much needed scepticism towards the social sciences where a functionalist view of media is prevalent. The dated functionalist view in this context means assuming an all-pervading and all-defining place for media in a social context. Cauldry offers a good example of Real's statements:

> Media serve as the central nervous system of modern society. The search to understand these media draws us into a search for the centre of all that is life in the 20th century. Our media, ourselves. (Real 1989, p. 13 in Couldry 2008, p. 97)

In practical terms, and essential for this research, are questions that can arise from treating the agency between human and non-human actors as reciprocal. In this regard, the transition from emulsion to digital in film production "networks" is exactly the type of change that will induce craft-specific questions that reflect the agency of these technologies (Lucas 2011; p. 17). As stated above, this research will identify how the aspects of digital technology engender new dynamics in film post-production processes by looking at post-production culture practices, the emergence of new technical positions, and a shift in cinematographic leverage towards post-production.

Given the researcher is also an industry practitioner, participant observation should adopt the ethnographic tradition where the reflexivity of the researcher is central and the research is contingent on this. The self-aware analysis of the dynamics between the researcher and the participant is crucial for fruitful data collection, as the researcher will need to be explicit and transparent about when 'observing' and 'participation' takes place. Considering reflexivity in participant observation, DeWalt noted, "making explicit the process of participant observation allows the reader to better understand the information presented by the ethnographer" (DeWalt & DeWalt 2010, p. 289). DeWalt further asserts that although self-observation and uncovering researcher bias is essential to gathering

valid and valuable data, the reflexivity should not become an end in itself. It is accepted that we are not objective measuring devices; therefore the reflexivity should not overwhelm the actual research.

Practical details of the research design, note-taking style, and analysis methodology will be discussed in the Research Design section, however the leading principle underpinning this ethnographic research is driven by work of Clifford Geertz on interpretative anthropology and 'thick description'.

Interpretative anthropology and deep text

The academic work of Geertz is based on his fieldwork in mainly Indonesia and Morocco. It is this fieldwork that has shaped his theoretic considerations about conducting anthropological research. In broad terms, Geertz posits that researching culture needs to step away from positivist investigation where actions are decontextualized from their intent and added meaning. Instead he proposes an interpretive, semiotics-based observation, where the researcher interprets the cultural meaning of actions by describing the context and motivations for the actions. This description he calls 'thick description'.

> The concept of culture I espouse, and whose utility the essays below attempt to demonstrate, is essentially a semiotic one. Believing, with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning. (Geertz 1994, p. 4)

When it comes to approaching a culture, Caldwell (2008, p. 5) ascribes to view of Geertz best described by following:

> The culture of people is an ensemble of texts, themselves ensembles, which anthropologist strains to read over the shoulder of those to whom they properly belong. (Geertz 2005; p.86)

Caldwell further elucidates on his leaning towards Geertz' approach to fieldwork:

> Following the philosopher Paul Ricouer, Geertz argues that the ethnographic problem is not about 'social mechanics' but about 'social semantics', which for him meant systematically treating 'cultural forms…[as] texts, as imaginative work built out of social materials'. (Caldwell 2008, p. 5)

The theory of symbolic and interpretative anthropology, the development of which Geertz has been instrumental, has endured a great amount of criticism, which is no surprise, regarding its ambition and impact.

> Attacked by the positivists for being too interpretive, by the critical studies scholars as being too politically and ethically neutral, and finally by the interpretivists (themselves products of the Geertzian revolution) as being too invested in a certain concept of culture, Geertz has quite literally gotten it from all sides. (Ortner 1997, p. 1)

However, although Geertz led the push of the humanities away from positivism, he did have a robust materialist, evolutionary grounding of his theory of culture. In his work "The Growth of Culture and the Evolution of Mind" (Geertz 1973, pp. 56–84) he elaborates on this. His early work on evolution and cognition is best summarised by Shore:

> Geertz looked to the implications of hominid evolution to provide a biological basis for the importance of culture in human life. For Geertz the human capacity rests on the extensive symbolic mediation of behaviour. He stresses the human need for symbolic models and reality. (Shore 1998, p. 32)

The by now classic 'interpretational anthropology' stance based on Geertz is a fertile basis for the fieldwork of this research. First, because this position is preferred by leading proponents of ethnographic research in production cultures, such as authors Caldwell and Powdermaker and second, because it offers space for the subjects' own self-interpretation. Geertzian concepts of 'thick description' and 'deep play' make enough space for industry practitioners to make sense of their own culture and juxtapose them against the researcher's interpretation. This will prove particularly interesting in a case like this, where the researcher is an industry participant. Making transparent the tussle between academic interpretation and the mix of industry self-assessment and flack should make for informative insight in the way the individuals deal with anxieties brought by constantly changing technologies and workflows. Finally, when it comes to participant observation, this research will subscribe to one more particularity: starting with a slightly more open and flexible analytical framework. On that note, it is vital to recognise the inductive[25] aspects of the beginning this inquiry, meaning:

[25] Grossly simplified, inductive reasoning derives a theory from research data, in contrast with deductive reasoning where a theory is formed first and then tested in through research (traditional positivist method).
Grounded theory, a valuable methodological framework that lends itself excellently to ethnographic enquiry (Spradley & Baker 1980, p. 15), is based on this inductive approach and will be considered in the analysis of the fieldwork.

> Rather than starting with theories and concepts that are to be tested or examined, such research favours an approach in which they are developed in tandem with data collection in order to produce and justify new generalisations and thus create new knowledge and understanding. (Gibbs 2008, p.xi)

Although this research starts with a fixed hypothesis, in the initial stages of participant observation, a level of leeway should be permitted, especially when specificities of the research setting are clearer to the researcher. Most of this information will hopefully help refine and sharpen the research goals and not entirely deracinate them. For example, when talking about new digital workflows in post-productions, the researcher will abstain from the exact description of technology in question until he can witness the specific integration of the technology in the chosen setting. Only after understanding the exact integration of the technology in question can the research questions be adjusted, if needed. What lies behind this is the non-linearity of anthropological research; there is no specific time for data review, analysis or interview. The research mechanisms are intertwined into a process that is "dialectic, not linear" (Agar 1996, p.9).

> [T]he work of formulating a research question is part of the process of researching, not something which takes place prior to research. This is particularly true of qualitative forms of inquiry. (Newbury 2010, p. 370)

Therefore, excess information and conceptualisation prior to the research can have a blinding effect on the particular site dynamics encountered in the field.

Additional research methods
(and their distinction in the context of production culture)

Participant observation is the primary research method applied in this work. However, the term *participation* also alludes to presence in the field where the researcher combines a number of methods, all of which are incorporated in the performance of participant observation. One such method is interview.

Typically for fieldwork, this research will differentiate between three styles of interviewing. *Informal interviewing* is what happens at the beginning stages of participant observation almost all the time, when the researcher is still searching for common themes and interests, and when establishing rapport (Bernard 2011, p. 211). It is characterised by a lack of structure or control, which makes it data- and labour-intensive, as it can go on for hours. It also requires a rate of deception as the researcher disguises the interview as a casual conversation, while still very focused on data extraction. The *unstructured interview* is by no means informal or deceptive. It is based on a clear plan but the

researcher still gives up control over people's responses, making it still possible to divert from the theme if the respondent gives an interesting clue. This type of interview is typical for longitudinal ethnographic research (Bernard 2011, p. 211-212). The *semi-structured interview* follows a written interview guide but relies on open-ended questions, therefore still allowing some deviation from the theme. This type of interview technique is generally used when conversing with people in leadership functions, who value more efficient use of their time.

When working in the below-the-line sector, one should note that although the interest might lie within the direct practitioners, the actual gatekeepers of 'background information' could be the producers and heads of companies. Therefore, a separate line of action should be developed methodologically when tackling interviews with individuals who are active *above-the-line* in this case (and especially if they are not the primary concern of the research but the carriers of specific vital information). Bruun points to the need to recognise that such an informant is not only an elite e.g. a person in position of power or reverence, but more accurately is an 'exclusive informant' – a gatekeeper of crucial information very probably not known to many in the same milieu (Bruun 2015, p. 6). An exclusive informant holds knowledge that is irreplaceable, in contrast to expert informants who are greater in numbers and have identifiable schools of thought to which they belong. Improved understanding of the nuances and exclusivity of information certain informants carry will "contribute to strengthen theoretical coherence, methodological transparency, and secure the validity of the research contributions." (Bruun 2015, p. 20)

The interviews are conducted to test attitudes, and compare data extracted from fieldwork or from secondary data analysis. This type of methodological triangulation is meant to affirm or test the convergence points found in attitudes or actions observed during the participant observation.

Quantitative secondary data will be used to validate informant and setting choices made in the research. Secondary data such as statistics from the BFI yearbook and findings from Creative England's yearly reports (BFI 2014; Creative England 2016b) will be used to test attitudes of informants towards trends and to examine for ingrained fallacies in the opinions of the informants.

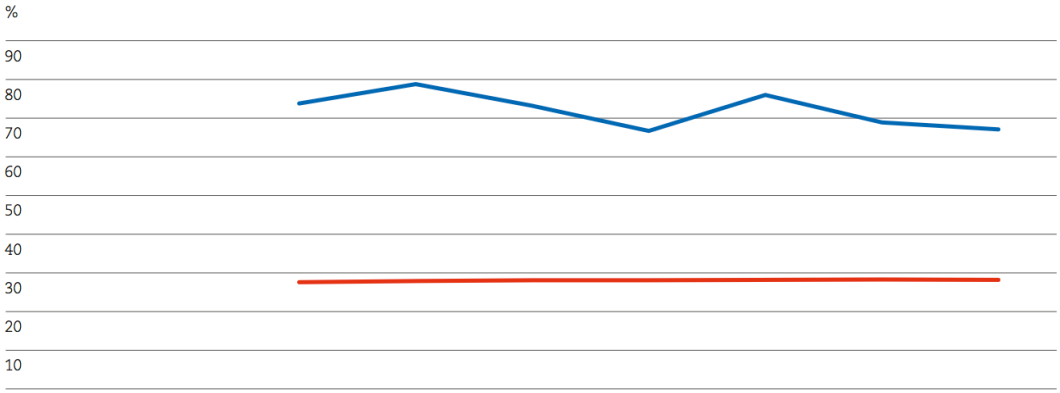
Observation Design

The following section outlines the case study selection of the chosen production company as a representative of the majority of the labour force in film production in the United Kingdom. By examining a typical establishment in the UK film production ecosystem, this research seeks to resonate further than the particular case it is examining.

Available statistical data suggests that the majority of labour force in film production is not in the so called 'high-end film production' but in small, independent film companies. (BFI 2014, p. 178). Figures below reveal that a typical British film production company is based in London, employs fewer than 10 people, is multidisciplinary and produces one film per year.

Figure 3

Figure 22.3 London and South East percentage share of the film and video production and total workforce, 2007-2013



	2007	2008	2009	2010	2011	2012	2013
Film and video production	73.8	78.8	73.2	66.7	76.0	68.9	67.1
UK all industries	27.6	27.9	28.1	28.1	28.2	28.3	28.2

Source: Office for National Statistics Labour Force Survey and Annual Population Survey

Notes:
Year means the year to September.
See note to Figure 22.1.

Figure 4

Table 22.6 Numbers of employees in film and video production by size of workplace for the UK, 2013

Workplace size band	Number of workplaces in band	% of total workplaces	Number of employees in band	% of total employees
50+	65	0.8	8,789	31.0
11 – 49	315	4.0	6,483	22.9
1 – 10	7,485	95.2	13,089	46.2
Total	**7,865**	**100.0**	**28,361**	**100.0**

Source: Office for National Statistics Inter-Departmental Business Register

Note: Percentages may not sum to 100 due to rounding.

This type of company does not account for the largest proportion of the total film production turnover. By far, the greatest turnover is generated by the few large high-end film productions (Figure 2). However, the high-end part of the UK film industry can hardly be used to represent the prevalent cultural attitudes in film production because, as shown in previous figures, it does not represent the majority of UK film output by volume nor does it represent the majority of UK film labour force by company. While taking into account the influential position and socio-economic pedestal enjoyed by the high-end industry, this document asserts that if searching for a case study that is representative of and relatable to a majority of industry practitioners, one should search in smaller, independent echelons of the film production milieu in the UK.

The choice of a small independent film company as a representative case study is also in part because of the role of technology and innovation. There is a prevalent notion that the high-scale industries are also the most technologically rigid (Alcorta 1994, p. 1) and that most innovation will start in the part of the industry where the incentive to change and adapt is the highest, due to many factors, like economic instability and high competition (Kehoe & Mateer 2015). Further, like many small- to medium-sized production enterprises in London, the case study company secures its income by tendering to a variety of visual and media platforms, making most use of the media convergence. These companies are hybrid entities, and are separately categorised from the traditional production companies (Northern Alliance 2009). They differ from traditional production companies in refusal of narrow creative specialisation, and inclination towards ownership of most of the production workflow. In other words, such companies are representative because they offer services across the workflow, rather than a specific area of contribution to a given production.

The usual output of these kind of companies are short format commercial/advertising videos, mainly directed at the internet, mobile devices or digital television, or aimed as business-to-business communication (Olsberg/SPI. 2012, p. 11). The income from this commercial work funds one or two larger filmic projects aimed at the cinema or festival screening market. Often, the lone feature film project is crucial as it is the *raison d'etre* of the whole company. It is also in this activity where these small companies challenge the work of the elite, by claiming a piece of the pie in the context of feature-length theatrical releases.

The flexibility and technological/creative solutions employed by these small companies to produce creative results similar to those created by large studios, in turn motivates the elite to be progressive and emulate the efficiency, workflow, software or hardware employed by the smaller entities (Fehrenbacher 2015). Such small companies can compete because they have the advantage of flexible and creative teams that are prepared to take risks with technology and ideas that may be yet to percolate to the larger firms (Quinn 1985; Stringer 2000; Chesbrough & Teece 2002).

To conclude, although the fieldwork of this research will be conducted in a specific setting, it is expected that the assumptions in this research reflect a wider context. There are limits to how far any analysis of specific creative industries can be generalised across geographic borders. However, considering the global technological homogenisation and the international reach of technological innovation, it is fair to say this should be a useful general reference, in particular on the privileged side of 'the digital divide'[26].

❖

The research fieldwork took place between 2014 and 2016. An initiation period took six weeks. At this period, the researcher visited the project only at key moments in the film pre-production. The line producer of the film made significant dates available to the researcher, for example, when the new post-production suite was installed and when principal photography crew meetings with the post-production crew took place. This initiation period was also used as an icebreaker for the participant observation that would follow. During this period, the researcher was introduced to the majority of company employees and stakeholders in the film project. Information sheets were disseminated and an official contract signed, assuring both parties to mutual commitment to both the research and the film project (Appendix II).

[26] Digital divide is used to describe a gap between those who have ready access to information and communication technology and the skills to make use of the technologies and those who do not have the access or skills to use those same technologies within a geographic area, society or community. It is an economic and social inequality between groups of persons.

The most intensive part of participant observation took eight months, and coincided with the commencement of the shoot of the film project. As can be seen in the Archer's Mark Participant Observation Consent Form (Appendix II), over the period of the participant observation, the researcher operated on the following agreed-upon schedule:

- Four full days a week
- For a minimum of six months or until the edit is finished (in actuality, it took close to a year to finalise the edit)

A working day was structured as follows:

- The first and last hour of the working day, the researcher could retreat from the activity to review the previous day's notes and consolidate that day's notes respectively
- In the between hours, at least half of the available time would be allocated to work relevant to the research
- In the times when the researcher was not working on the main project, he would be performing additional post-production duties for the company

As the above agreement demonstrates, the participant observation was fully overt. It is sensible to conclude that this is ultimately a case study. The finite time component of one project, and one specific company makes for a well-demarcated research territory in both space and time. Nevertheless, to emphasise a previously raised point, the choice of the company and type of the project allows for an extrapolation of the situation across the sector, given it is a judicious choice and location.

A voice recorder and a notepad were used to record the field notes. The voice recorder was used with two different goals in mind: to directly record the words of the participants and to record the description of the researcher's interpretation of a situation. The user interface of the recorder, the adjustable file structure, and the ability to add markers in the recording, offered a swift and effective method for thematically organising the notes. This enabled the initial crude coding of the material to happen almost instantly, whilst the notes were being created.

The key method for data collection is 'thick description', which in practical terms, means that the notes mainly consist of the researcher's direct interpretation of an event. Each change in setting or activity was considered as a new event. For each event, the initial keyword description was recorded, including the location, the number of participants and the activity. At the end of each day, a summary was compiled in diary format that included the notable outcomes. An example of such a day summary is included below (Appendix i)

After the data collection stage, the analysis stage was characterised by transcription of all interviews and all audio notes. The transcribed material consisted of two bundles:

1) Semi-structured interviews and

2) Transcribed notes condensed and organised into a diary format

After the first read of all the transcribed material, a swift coding process ensued. It should be emphasised that the coding process did not have the intent of informing the actual results or outcomes of this study. It was merely used as a second level exploration tool of transcription. Once a primary, crude coding was done, the coded data was used mainly to create thematic and relational tree maps, in order to further crystallise and better articulate the 'deep text'. The software used was the TAMSAnalyser, free open source software designed to run on Apple OS, created by anthropologist Matthew Weinstein to aide his participant observation research (Weinstein 2012). After two rounds of light coding of the interviews, thematic parallels were drawn with the existing transcribed notes into diary form, and those thematic parallels became the main the main thematic collections.

The thematic collections appear at first as disparate, individual concepts, and are later (in discussion) constructed into a homogenous narrative. This type of constructing of an overarching narrative by tracing a common denominator through different contexts is typical of a multi-sited ethnography in a true anthropological fashion, as it follows a product value chain (a film) through different human perspectives and networked spaces (Marcus 1995, pp. 105–106).

> Multi-sited research is designed around chains, paths, threads, conjunctions, or juxtapositions of locations in which the ethnographer establishes some form of literal, physical presence, with an explicit, posited logic of association or connection among sites that in fact defines the argument of the ethnography. Indeed, such multi-sited ethnography is a revival of a sophisticated practice of constructivism... ...Multi sited ethnographies define their objects of study through several modes or techniques. These techniques might be understood as practices of construction through (pre-planned and opportunistic) movement and of tracing within different settings of a complex cultural phenomenon given an initial, baseline conceptual identity that turns out to be contingent and malleable as one traces it. (Marcus 1995, p. 106)

Film is superbly suited for the multi-sited research described in Marcus' quote above. Following the workflow gives the researcher the needed thematic arrangement, which will always be initially premeditated but will be subjected to spur-of-the-moment changes in the contemporary non-linear ecosystem of film production. A level of flexibility and opportunism is elementary to keeping the research focused.

❖

Prior to any engagement in the field, the researcher had to seek clearance from the University of Greenwich ethics committee. The application for the ethics approval consisted of a draft interview example, an example of a clearance and information sheet, and a standard ethics questionnaire used to determine the type of interaction in the field as well as nature of the informant (whether researcher will be working with vulnerable peoples, minors etc.). The process included questions as to the handling of acquired data, privacy issues, and data security. All the recorded audio data has been encrypted and is playable with software owned solely by the researcher. The ethics approval form is included in the appendix. Further, upon the finalisation of the thesis and before its submission, the work will be handed over to the individuals that have been observed in the participant observation, for final consent.

CASE STUDY: Notes on Blindness

> Perhaps there will come a time when term independent will become redundant as term digital. (Knudsen 2015, p. 66)

Company Profile: Archer's Mark

Archer's Mark is a multi-award-winning independent production company, founded by director-producers Brett and Jamison. For the first five years of its existence, the company produced solely commercial content for some of the world's biggest brands. Listed in the top 50 most creative companies of the United Kingdom in the 2016 report by Creative England (Creative England 2016a), Archer's Mark is growing in influence and relevance due to the success of their first feature film *Next Goal Wins* (Archer's Mark 2014)[27]. Although it officially launched its film department with the release of *Next Goal Wins*, it has had film production as one of the primary goals since the start. *Next Goals Wins* went on to win the BIFA for best documentary and Brett and Jamison were named as two of BAFTA's Breakthrough Brits and Screen International Future Leaders. According to Creative England, their slate focuses on "strongly authored fiction and documentary stories, as well as projects that blur the boundary between the two" (Creative England 2016a).

Many companies know advertising but very few know football

Brett and Jamison, University friends, do not have any film-based academic background. Mike studied literature and Steve was training to become an architect. They developed a more avid interest in filmmaking through an initiative where they were both asked to teach filmmaking basics to disenfranchised children. This activity gave them a chance to get more hands-on time with film recording equipment and develop their own skills. Their extracurricular interests were very much centred around visual media. After completing their degree programmes, Brett started working as a copywriter for an

[27] *Next Goal Wins* synopsis taken from the site of Archer's Mark:
"After suffering a world record 31-0 defeat at the hands of Australia in 2001, American Samoa – officially the worst football team on earth – are still in search of their first ever competitive win. When maverick Dutch coach Thomas Rongen arrives on the island to help the team achieve this elusive goal, he discovers that his ramshackle team includes an emotionally scarred goalkeeper and the first transgender player ever to play international football."
The film premiered at the Tribeca Film Festival 2014 and was released theatrically around the globe. It won the Best documentary at the 2014 Moët & Chandon British Independent Film Awards as well as the Special Jury award at the 2015 Abu Dhabi International Film Festival.

advertising agency and Jamison devoted himself full time to photography and visual arts. It was during a football practice that the idea for the company was born. Brett's company at the time was turning away short video projects about football solely because the budgets were considered too low. They were both of the opinion that it was possible to produce films at such proposed budgets and therefore asked Brett's company to give them a chance to realise such a possibility.

Their confidence to achieve this did not come from craft prowess or creative inspiration, but the factors that are the result of being at the right place at the right time. First, coming from basic grassroots filmmaking, they were both multi-taskers, and in order to fulfil the project within the tight budget, they were forced to take on multiple roles. Second, their interest to exploit visual media commercially happened in parallel with the rollout of the first Canon 5Ds Mark II in the UK, a flexible, lightweight camera that impressed them.

> I mentioned to you that by pure chance our first office was next door to the DOP who had bought an American import of the 5D. He was the first guy in UK to have one! And we borrowed it, hired him and the camera, for music video shooting. And instantly realised this is a complete game-changer. The quality we could produce, the fact that you could fit prime lenses. Obviously the resolution and how lightweight the kit was. Instantly we realised that at the price point – couple of grand, 1500 quid - you buy a shitty camcorder at 7 grand back in the day - you can imagine how transformative that is. That was a complete no brainer for us. (Brett 2015; interview with Petkovic)

Finding themselves at the forefront of the "Canon revolution" made both Brett and Jamison very conscious of the role technology plays in defining the success of one's business. Due to their use of the first 5D available in the region, they had a very successful first year as a company and immediately invested in four additional Canon 5Ds, and an editing suite.

The technological advantage over other smaller companies gave them enough work to start investing heavily in new staff and technical kit. They brought in Adam Booth, an Assistant Director (AD) with producing experience. Booth initially worked as an AD in their first short films and videos and by 2010 he became head of production at Archer's Mark. He supervises the daily processes on the work floor and oversees the commercial side of business. Around that time, they also started working on their first feature length idea that would draw on their refined style and specialised commercial work for football themed brands. This is how *Next Goal Wins* was born.

Feature length department / from 5D to RED epic

Aware that technical trends can make a difference in the commercial viability of making a film, Archer's Mark continued to invest in cutting-edge recording devices. Investment in new kit was possible through keeping the workflow in-house and thereby securing high margins in their commercial work. They acquired a RED epic camera that was still in its beta testing stage and took it to American Samoa – where the large part of material for *Next Goal Wins* was shot. Being a few thousand miles from the closest technical help was a huge risk for a young company with a prototype camera in their hands. However both Brett and Jamison consider this move vital to the success of *Next Goal Wins*. This was a documentary that would set itself apart by having an aesthetical finish on par with blockbuster films. Shooting on 5K was clearly aimed for theatrical release, and very unusual for a documentary production. At this time, even the large studios were just experimenting with end-to-end 4K workflows (Koo 2011). And although the film did not have an end-to-end 4K or 5K workflow, the mere fact that it was recorded on 5K implied considerably more issues for post-production and mastering.

The first feature took four years to finalise from conception to mastering. It was, according to all those interviewed for this thesis, a steep learning curve. Nevertheless the film was finalised in its entirety from a budget Archer's Mark were able to extract from commercial profits. The production process was also kept in-house until the final stages.

The product, although produced in a manner that in no way can be described as a sustainable film production model, was of a high quality unusual for documentaries at the time. It did come at a cost; shooting in such high resolution and considering theatrical release for a documentary required additional steps that a young company with no experience in feature film production did not anticipate. Grading 5K material for example, was impossible on in-house equipment. The mastering and digital cinema packaging (DCP) had to be done elsewhere as well.

The release of *Next Goal Wins* was a huge success in terms of a feature length documentary. After winning awards in various international film festivals (including the British Independent Film Award for Best Documentary), it was bought by broadcasters in several territories. As a consequence, the film paid for itself, which is rare for an independent documentary, according to Brett (2015; interview with Petkovic).

The success of *Next Goal Wins* opened the doors of traditional film funding channels. Screen International listed Brett and Jamison as future leaders, a label that came with personal coaching by industry leaders and further widened their network. *Notes on Blindness*, their third film, would be the first film not fully financed by their own pocket, but through a range of investors.

Company structure

> Initially we just thought, we want to make a film together. Then we realised that if we were to build more of an infrastructure around us, then that infrastructure will give us the stability to think a little bit more long-term. And then very quickly, all of a sudden we realised that the structure around that should be a production company, and that the advertising could support features, and features could support advertising, and that we could move talent one way and resources the other. (Jamison 2015; interview with Petkovic)

Archer's Mark now employs eight people full time on fixed contracts, and regularly uses the services of about forty freelancers, from producers to colourists. The film department has now been fully formed, which is also visible in their new website, released at the end of 2015 (Archer's Mark 2015). The border between the two departments, commercial and film, is increasingly clear. However the technical kit is used for both activities.

Physically on the premises, one would hardly notice the division between creative disciplines in the company, however the labour roles are more clearly delineated. Booth, the head of production and the work floor, concerns himself creatively only with the commercial side of things, however he does have strong influence on the directors' talent pool. Sarah Rhiannon Cutler, the new head of business is also directly concerned only with the commercial context, but her role is a two-layered one. In her search for new creative talent for the commercial side of business, she keeps in mind the most important aspect of the Archer Mark structure: the creative cross-pollination between departments.

The film directors that Archer's Mark enters into contract with all have a feature length film plan. Archer's Mark facilitates the research, development, and production of the idea in the long term. It is able to do this because it owns much of the high-end kit needed to at least get a feature length production started. In the short term the directors are expected to work on commercial projects for the company. The directors and other creatives are hired in first place for their storytelling and filmic capacity, and are expected to utilise that in shorter advertising form, while slowly developing their long format idea. The commercial projects maintain the company's revenue stream, and provide work for

staff between the film projects. The technologies acquired are specialised for high-end feature length film production, but are used primarily for creating commercials.

Jules Quantrill was the first and the only editor on a fixed contract and is now the head of post-production. Quantrill answers directly to Booth, although Brett and Jamison also maintain direct contact with him on all matters Post-production is mainly in-house. Most needs are covered in editing, motion and graphic design, grading and mastering. Working under Quantrill, on a fixed contract, Yasuyuki Otsuki is the in-house motion animator and compositor. Recently a new assistant editor/tech support person was appointed to lighten the technical aspects of the growing post-production facility.

Representing the median

Archer's Mark is representative of the majority of video production entities and the labour force in the independent film and video industries. According to the BFI yearbook, it falls into the largest groupings in most classification aspects: it is based in London; it employs fewer than ten people; and its turnover was less than £250,000 for most of its existence, although it sharply rose after the first feature film success. Further, like the majority of other media companies, Archer's Mark generates income from varied activities and it cannot afford to specialise.

However, as of 2016 the position of Archer's Mark is quite specific and their case can be prescriptive for other companies with similar structures and goals. As a company, it is at a turning point; it is about to take steps that will most likely increase their labour force above the threshold of a small business towards a medium size one, and/or increase their turnover to a level most smaller companies are striving towards.

Researching a company that has thus far been very aware and responsive to technological changes, adapting to them in advantageous ways, can serve as a useful instrument for companies striving to achieve the same. But as we will see, establishing processes, relationships and workflows for creating and safeguarding independent content in a volatile production milieu, and in a time of economical and technological uncertainty, is a significant challenge.

Notes on Blindness

In the analysis of the data this thesis will provide a comprehensive anthropological account of the production and post-production process of the film *Notes on Blindness*, which will shine new light on the processes needed to create an environment conducive to the production of independent films. It can deliver a strong message about the workflow needs and craft dynamics of a "non-studio film".

The following paragraph (including the inconsistent quotation) is a one-hundred-and-fifty-word synopsis used in the Electronic Press Kit (EPK) for the *Notes on Blindness* film.

> "I knew that if I didn't understand it, blindness would destroy me" - JOHN HULL
>
> In 1983, after decades of steady deterioration, writer and theologian John Hull became totally blind. To help him make sense of the upheaval in his life, he began documenting his experiences on audiocassette. Upon publication, John's diaries were described by author and neurologist Oliver Sacks as 'a masterpiece… The most precise, deep and beautiful account of blindness I have ever read.' Following the Emmy Award-winning short film of the same name, NOTES ON BLINDNESS takes a creative approach to the documentary form. Actors lip-synch to the voices of the family, embedding John's original audio recordings within lyrical cinematography and textured sound design. The result is a poetic and intimate story of loss, rebirth and transformation, documenting John's extraordinary discovery of 'a world beyond sight'.

Notes on Blindness is a perfect example of crosspollination between traditional visual forms and innovative narrative forms. The project began in 2012 and grew organically in the hands of two directors: Pete Middleton and James Spinney. At first there was a short film, then a longer short, and later a feature length re-enactment documentary and virtual reality sensory experience, which both premiered at the 2016 Sundance Festival, within the New Frontiers section of the festival. Middleton and Spinney, a directing duo, began their collaboration after University (both not connected to film or filmmaking). Directing was never a final aspiration. They are typical multitasking creators born out of the explosion of cheap technologies. Both directors are able to edit on FCP7 and Spinney worked as freelance editor for BBC for a short period of time.

> I suppose you are at first just interested in just making things. So, you kind of have an idea or something and you want to make it happen. (Spinney 2015; interview with Petkovic)
>
> [T]hrough that desire to produce, make something. You know that you have to take on board multiple roles. The borders between directing editing and producing are often murky.

> And we fell in the crowd of people that have similar hunger to make stuff. Quite broad range of things; some comedy shorts, dramatic and documentary, music videos etc. So there was very much that collaborative quality to these productions whereby everyone would get involved and do whatever was needed to get it together.
> If you really boil it down, technology was at the heart of it. That's what enabled us to do it. It was comparatively cheap. (Middleton 2015; interview with Petkovic)

The director pair began work at Archer's Mark as commercial directors. After recognising Brett and Jamison's interest in long-form documentary, Middleton and Spinney presented a single-scene piece called "Rainfall" to the company. It was based on narration from John Hull's book 'Touching the Rock'.

The idea from the onset was a long format film. Brett and Jamison acknowledged the potential of 'Rainfall' but suggested a longer short film first before tackling a feature length. The idea for film was formed while researching another idea on blindness and sensory perception. The directors came across John Hull's book. The foreword of the book is based on tapes that John kept in his period of sight loss.

> We got in contact with John, started with another project with him and eventually he sent us this box of tapes. I guess it's the same way lot of these projects develop. You get to know each other, form that bond of trust. You let it percolate for few months and then it comes to fruition. (Spinney 2015; interview with Petkovic)

> They showed us a short film thy called 'Rainfall', which is now a scene within a feature film. And they said: "What we would like to do is to turn this into something longer". At the time Mike and I were in the throws of *Next Goal Wins*, I think we just came back from our shoot and they knew the we have feature documentary ideas and ambitions that match theirs. So initially, at that stage it was too far for us to go to straight to a feature length docu (sic), but we were able in the meantime, to help them produce and get funding through New York Times, to make a second short. But it was more than just a single scene. It was more of a representation of what a fuller feature might be, still following the same subject matter of John Hull's life.
> And then based on success of that short film, we've been able to raise the finance to make a feature film.
> We are now mid-shoot in a 1.3 million dollar documentary paid for by somebody else, which is the first of our films that has been paid for by outside funding. All being produced in-house, shot with our kit, cut in-house. (Jamison 2015; interview with Petkovic)

From the beginning of this project, the directors were compelled to innovate. The processes needed to happen in a different order, since the only way to develop the script was to scrutinise the original recordings, cut them in pieces, and then construct a narrative out of them. Hence, the sound editing took place a long time before the initial script was developed.

> You have basically 16 hours of recordings, which is then transcribed and edited down into selects, and that's kind of the first stage, even before any funders, there was a heavy amount of audio [work] to be done to see if the project kind of had legs. (Middleton 2014; interview with Petkovic)

It was clear from the onset that the script only would not do justice to the aural experience of the cassette notes. The idea to use the original notes exclusively for the audio in the film was a hard sell on paper. Therefore the production office utilised the presentation tool Prezi to make a readable script with audio accompaniment. This file was sent to prospective funders instead of a hard copy of the film script. The reader was able to open the presentation, which was similar to a PDF file, but was also able to hear the original recordings as s/he read the script.

This method proved to be effective, and reinforced the notion the film was an inherently aural/visual experience, independent from the textual narrative form. To paraphrase Middleton and Spinney, the didactic value of artistic film can be found in aspects of life not easily described by text. Visual accounts of (for example) yearning, loss and absence, or in this case blindness, are very much the fabric of artistic cinema. These ideas are exploratory and hardly ever formulaic, and increasingly rare nowadays. The directors also felt that the authenticity of story and character can be increasingly found in documentary rather than fiction cinema: this is attractive from both a creative and commercial point of view.

For this thesis, it is important to emphasise this, because the main aim is to define the steps taken in order to maintain control over production and output of such an idea. As the following chapters demonstrate, the production model for a film with a strong independent character and cinematographic vision may differ from imminent production and technological trends in order to keep the strong grasp over the core filmic idea. This does not mean it has to move away from innovation. Rather on the contrary, the innovation, as is presented here, is evident in most aspects of the production.

Funding, production and post-production

Notes on Blindness was an international coproduction. It gathered funds from a large number of stakeholders, none of which holds a stake large enough to steer the film away from the vision of Archer's Mark. The co-producers with Archer's Mark are BBC Storyville, Arte France, BFI, Creative England, UK Tax Credit, PROCIREP, Impact Partners, Cinereach, and the New York Times.

As mentioned, the original audio notes played a crucial role in the production process. The directors decided to exclusively use the original audio notes and old interviews for the documentary because of the authentic authority of the tapes. As the notes are about specific events in the past, they were re-enacted by actors as in a fictional film. The actors would playback the original notes, creating a specific atmosphere of directly playing out a memory, a memory reconstructed from the original audio and their performance. This concept of play-backing audio created in the past has been done only one time before, in a film *Arbour* (2010) by Clio Bernard. In *Arbour* however, the lip-synching is limited to the re-enacted audio interviews. *Notes on Blindness* goes further as it reconstructs the parts of life that are described in the original cassette tapes.

A specific production model had to be adopted right from the start to realise the film's ambition. This involved a multitude of adjustments, from the above-mentioned interactive "audio script", to casting the actors capable of hitting the timing right without getting frustrated about the tempo dictated by the tape, and still able to give the character their own flavour. The production model was also adjusted: an audio playback system needed to be developed by the post-production team to enable play-backing by the actors and maintain a level of flexibility regarding the timing of the audio. This meant a presence of a whole new unit – a mobile audio editing station and an operator – on the shooting floor at all times. This was a new dynamic that influenced the shoot considerably.

The model chosen for the postproduction was characteristic of the company and the specific nature of the film, but not in any way characteristic of the dominant trends in larger film productions at the time. Archer's Mark chose to extend the in-house production capacity, so investments were made to grade and master on Archer's Mark premises.

Film impact

The film surpassed the initial goals set by the production company in both reach and impact. It also surpassed the expectations economically, as it generated a small profit (the exact amount was not disclosed).

After the film's premiere at the Sundance Film Festival, it has been screened at a number of A-list[28] and other 'big brand' festivals, for example, the Toronto International Film Festival, the International Documentary Festival Amsterdam and the Sheffield DocFest. It also won prizes at DocFest, the San Francisco Film Festival and others. The highest honours came after its cinema release, with a win for best documentary at the British Independent Film Awards and three British Academy of Film and Television Awards (BAFTA) nominations, including Outstanding British Film of the Year. The reception of the film was overwhelmingly positive. It has accrued five star reviews by *Guardian, Daily Mail, The List* and *The Times* among others, and it has been a BBC film of the week five weeks in a row.

The film has been sold in various territories such as the United States and Australia, and while Curzon and BFI hold the rights of its theatrical release in United Kingdom, the ownership by ARTE France means that the there is a guaranteed television release in France. Netflix bought the exhibition rights and the film has been globally released through that platform.

It should be further noted that Archer's Mark released a number of less common versions of *Notes on Blindness*. The DVD and on demand services offer four different versions for the blind, partially sighted, or hard of hearing, as follows:

1. **The standard version** is the original film soundtrack with no extra description or sound effects.
2. **The audio-described versions** use a spoken description to relate what is happening outside of the dialogue. Audiences can choose between versions by audio-describer Louise Fryer and Tony-nominated actor Stephen Mangan.

[28] Surprisingly this description is not as subjective as one might assume. The International Federation of Film Producers Associations (FIAPF) is an institution that has the power to hand out the hefty accolade.

3. **The enhanced soundtrack version** uses more original narration from John and Marilyn to tell the story, along with extra sound design and music. It is a version that evokes the action, rather providing a literal description.
4. **The hard-of-hearing version** has descriptive subtitles.

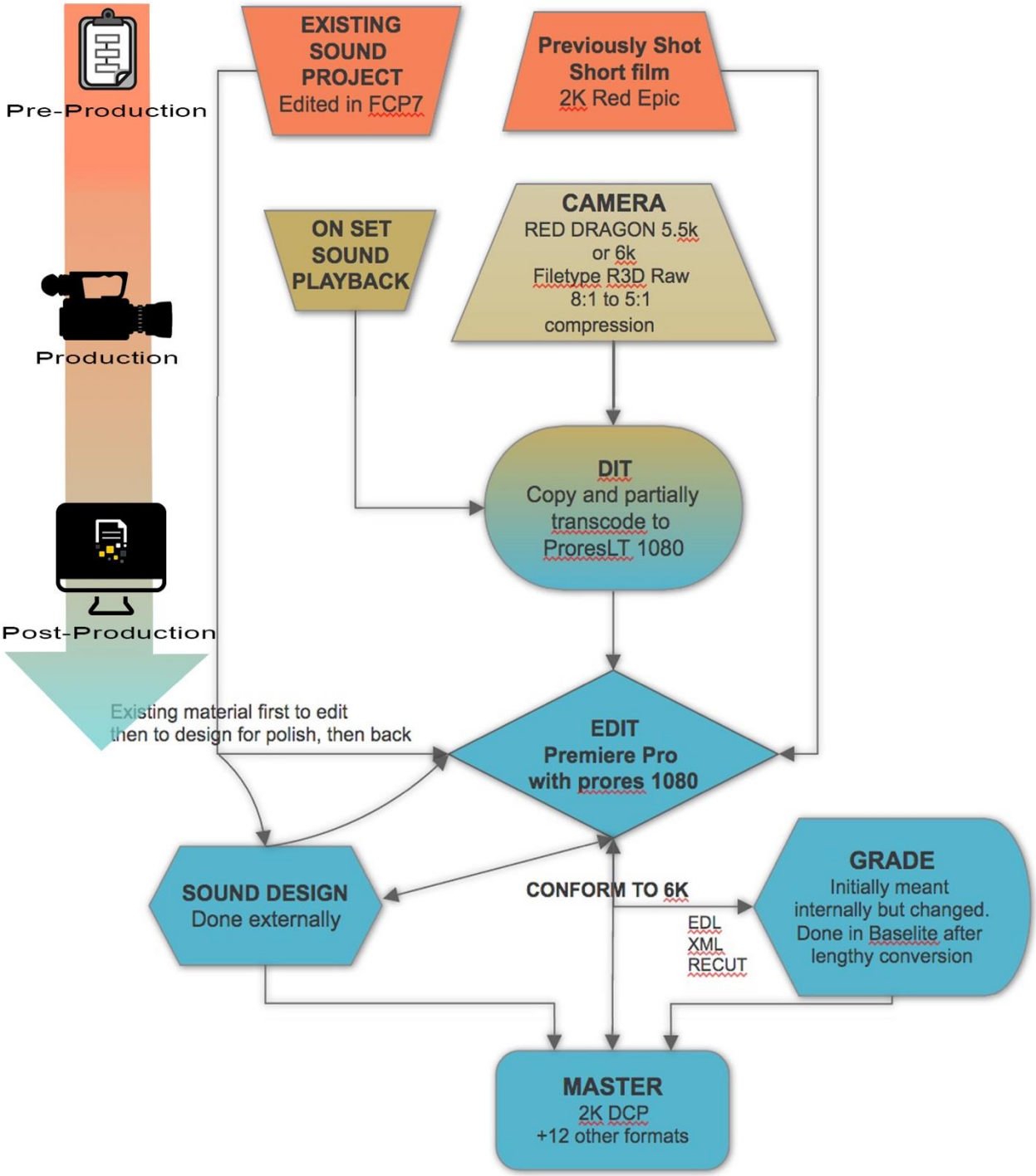
Chapter 3: Results
Workflow, organisation and the in-house model

Having covered the background of the workflow concept and its history in the film industry, this chapter will critically analyse the organisational challenges new processes pose for independent film productions. The chapter will first offer a detailed summary of the *Notes on Blindness* workflow. The workflow outline will be followed by the participant observation outcomes, structured in episodic examples. After that, a discussion will offer context to the observation material, relating it to the existing literature. The participant observation subjects were predominantly below-the-line craft practitioners and to a slightly lesser extent, the producer and the director. The findings regarding the workflow structure are case-specific but represent the intricacies and perspectives towards issues that occur in most film productions. The chapter will then focus on the coping mechanisms independent productions acquire to become sustainable. This chapter not only gives a description on general workflow choices on *Notes on Blindness*, but also illustrates the context for the individually lived experience of the below-the-line participants, covered in Chapter 4.

The research findings from participant observations of *Notes on Blindness* is an account of a highly successful feature film production that followed a specific organisational ideal that informants called 'in-house production'. In posing questions of creative endurance in a changing world of digital processes, this thesis will present the in-house model approach as a potential strategy to cope with the anxiety created by changing film production practices.

Before listing the most notable issues that transpired from the analysis of the participant observation field notes and interviews, what follows is a summary of the workflows of the *Notes of Blindness* case study.

Figure 5 – Chart of *Notes on Blindness* workflow



Production workflow summary and technologies used

Core crew mentioned often in this observation report:

Mike Brett: Executive producer and Managing Director at Archer's Mark

Steve Jamison: Executive producer and Managing Director at Archer's Mark

Adam Booth: Floor Manager at Archer's Mark

Jo-Jo Ellison: Producer

Garry Floyd: DOP

Mark Gee: Camera Operator

Emin Atilgan: Camera Assistant

Jules Quantrill: Editor, occasionally DIT

Diana Nechilciuc, Craig Ferreira, Monika Radwanska and **Christopher Heasman:** All DITs at some point in time

Dusan Petkovic: Researcher, Post-production supervisor, DIT and Assistant to the Editor

Pre-production

Preparations and initial communications for the film were handled mostly face-to-face, as the largest proportion of the team works in the same place. File sharing and collaboration was done through Google documents and Dropbox. Script pitches were, aside from normal word processing, done with the Prezi presentation tool and combined with existing audio.

Production - Camera

Form the onset, it was clear that the production would use in-house cameras: two REDs that had been upgraded to RED DRAGON chips before the start of the production. The cameras were capable of shooting a maximum of 6K at full-format[29]. It was the first time

[29] Full frame sensor is a popular naming for a sensor with the same dimensions as the 35mm filmstrip. However, in this case, the jargon had a different meaning. Firstly, RED DRAGON camera is not exactly full-frame but has a slight crop factor, called APS-H.
On a non full-frame camera, in case of RED DRAGON, full-format means that the camera when the whole area of the sensor is utilized to create a picture (the lens/picture ratio is used that can project an image over the whole sensor), and can produce an image of 6K format. (RED 2016)

the company was capable of producing a 6K file, and during the *Notes on Blindness* shoot, 6K was the predominant resolution. For various reasons such as frame speed changes, the resolution would occasionally drop to 5.5K or 5K. At some points there were three RED cameras on set (the third one was privately owned by the operator). The format used was the RED RAW file with resolutions varying between 6:1 and 10:1.

The RED Dragon cameras were combined with special vintage lens kits. The main kit assigned to the first camera unit were the Bausch and Lomb Super Baltar vintage lenses, and the principal photography was done using Super Baltar T2.3 primes: 35mm, 50mm, 75mm and 100mm. The second unit used the same when possible, but also had a set of Cooke S2 sphericals. Macro shots were mainly done by the third unit and shot with Schneider 138mm circular diopters of 0.5, 1.0. and 2.0. All these are vintage lenses that are unusual for usage on a modern camera. The Bausch and Lomb Super Baltars are legendary lenses frequently used in the 1960s. The Godfather and the Godfather: Part II were shot using these lenses. A vintage sales site describes them as follows: "These lenses help to soften the clean look of modern digital cinema cameras and have a warm rich tone with beautiful cool flares." (Gulf Camera 2017)

The combination of cutting edge cameras and vintage lenses were central to attracting the desired camera crew. The first unit consisted of only a DP, a camera operator and a camera assistant. The second unit was two people and the third unit was a sole camera operator.

The shoot was split into two phases: 1) a more traditional studio shoot for all interiors, which took around two-fifths of the shoot; and 2) field shoots which were similar to documentary shoots. For the second shoot type, the crew was smaller than the studio setup. The crew size would change throughout the shoot, varying from just four people to a full crew of fifty people set up at the studio.

The image sensor, often casually called the 'chip' is the component of a video camera that collects light and translates it into digital signal. The role of the sensor is equivalent to the role of the film emulsion in the analogue film context. A number of sensor technologies competed in the early digital market, but at the moment the majority of cameras use the CMOS 'Beyer array' sensor (complementary metal-oxide semiconductor). Beyer array relates to the colour filtering and recalculation system of each light sensitive unit of the sensor. Most profession video camera producers have their own designed sensor, and they tend to vary significantly in speed, data creation capacity and light sensitivity (Cambridge In Colour 2015; Brown 2014).

It should be noted again that there was no sound recording at all on set. The whole soundscape would be recreated using the original tape recordings of John Hull. This process is described in detail later on.

Production – DIT

The digital imaging technician (DIT) unit included the audio playback unit as a result of the radical use of audio in the film. The DIT itself was one person with a laptop, two kinds of drives (RAID and typical, more portable ones) for creating two copies, and two RED card readers. The third copy of files would be created in the post-production facility. The software used for the data copying was Shotput.

The audio playback unit consisted of a laptop with all the audio files and audio software and a small mobile Bluetooth-connected mini speaker. The unit would be directly on the set, answering to the first AD, and moving in and out during the blocking[30] of a scene and before scene rehearsals with actors (although it is a part of the workflow inventory in this section, later sections are devoted to the intricacies of introducing this unit to the film set).

Two people, changing regularly, would occupy the two functions. As the shoot progressed, increasingly one person filled both functions.

Post-production

Editing of the film was done almost simultaneously with the shoot. Once the first rushes were brought into the edit room, they were copied onto another local RAID, and transcoded to 1080 by 1920 Apple ProRes LT files. The ProRes files were used for the edit (proxies to the originals, which were too large and therefore compromised the speed and flexibility of the edit. Editing the low-resolution files is called an offline edit). Two editors on two editing stations connected to a server roughly edited the scenes the following day. The editing software of choice was Adobe Premiere ProCC.

[30] Blocking is a term borrowed from stage arts and it refers to the positioning and movement of the actors, camera and lights within the scene. It effectively includes processes in pre-production like splitting a script in shots through story-boarding, for example (a more precise term for this stage is French production term 'decoupage'), but is referred to mainly in context of rehearsing the chosen shot positions and movement on set (Moura 2014).

The edited scenes were exported and uploaded to a Vimeo account for the directors and heads of departments (HODs) to see.

The unique idea for usage of sound in the film, made the sound post-production workflow unusual. The directors had an edited audio track of the film before the final script, using the original tapes and sound design only. After assembling roughly edited dialogue-only scenes into longer chunks, the audio tracks were sent to the sound-editing studio.

The sound edit was the only aspect of post-production planned for outsourcing. The reasoning behind this was the need for a higher calibre sound designer, who was capable to tackle and appreciate the task of recreating the whole sound scape in the studio. At the sound-editing studio, the larger chunks were 'enriched' with a lot of Foley[31] and some preliminary music, and then sent back to the editing suite for further edits/consideration. This is unusual, as back and forth between sound and edit can create technical problems. After the sound edit, the sound was mixed in stereo, 5.1, and Dolby Atmos, which was again highly unusual for such a low budget film.

An entirely new grading set was acquired by Archer's Mark to colour correct in-house. For reasons that will be covered later, it was not possible to use it, and the colour correction was outsourced. The software purchased by Archer's Mark was DaVinci, and software used by the other studio was Baselight. Mastering of the film was done entirely in-house, including the DCP (digital cinema package).

General timeline and finances

Notes on Blindness took a little longer than a year to make, from the moment the production got the "green light" to the DCP output for a first deadline at the Sundance Film Festival. The idea for the film however, was built over more than four years and, as mentioned in the methods chapter, included the creation of one test scene and two short films before embarking onto the feature length film.

The main infrastructure support and social capital came from Archer's Mark. The company's close knit network with creative freelancers made it possible to ask for a

[31] Foley is the process of live-recording sounds to reproduce everyday sound effects (from footsteps to gun shots) which are then added to video in post-production to enhance audio quality. The process is named by Jack Foley, a legendary sound technician who, together with his crew, came up with the process (Rodrigues Singer 2001; Stinson 1999).

number of favours, including offering lower pay. The rest of the financing was mainly cash injections from eight different stakeholders. According to Ellison, one of the toughest jobs of being a producer on this project was managing the expectations of different stakeholders. This was the first time Ellison and Archer's Mark had to manage this number of stakeholders and their varying claims to steering power in the process. This affected the workflow in a number of ways.

The film had several hard deadlines, most importantly the last day for submission to the 2016 Sundance Film Festival, January 16th 2016. This made the whole production already more compressed than envisaged. However, during production the stakeholders imposed a number of additional deadlines, aimed to follow the progress and steer the film in the direction they felt was right. The number of deliverables was unusually high from the start. For example, BBC Storyville and ARTE France already had broadcasting platforms agreed for a number of territories, making the list for the mastering considerable, as each outlet (television, Pay-Per-View, Over-The-Top etc.) had different video/sound format requirements.

As the money was received in small and fragmented amounts, the production operated on a shoestring at all times, which effectively decided the workflow solutions. A number of ideas were abandoned to make the workflow simpler just because they could not be accounted for during the whole length of the production.

The film production was ambitious according to all involved. It reflected strongly the contemporary situation in media production, where the project management triangle[32] (Olsen 1971; Atkinson 1999; Barnes 2006) hardly applies any more (Atkinson 1999; Bronte-Stewart 2015). The same stakeholders that set the increasingly demanding deadlines also handed out the fragmented and insufficient budget. That leaves the filmmakers with responsibility for quality without control over budget and timeframes. The results following in this chapter describe the organisation and processes in the production of *Notes on Blindness* utilised to uphold the promise of high quality while having minimal

[32] The project management triangle is a useful model to illustrate the consequences of change on the basic three constraints in manging a project. The triangle reflects the interrelation between the constraints and insinuates trade-offs – one side of the triangle cannot be changed without impacting the others. Project quality takes root in all three variables of the triple constraint and is affected by balancing the three factors (which are in most cases represented as time, cost and scope) (Van Wyngaard et all 2012).

to no control over funds and deadlines. The chapter starts with description of how the production crew perceived their organisation and processes (industrial self-theorisation, the soapbox pitch), and is later juxtaposed with (often-contradicting) participant observation records.

Notes on Blindness workflow observation: The Soapbox pitch vs. the deeper text

Caldwell and others have exposed dualities and distinct contradictions in contemporary film making; a stark difference exists between: 1) the informant's direct avowal, mirrored in the position the individual wishes to play in the industry/company or within his/her romanticised view of filmmaking; and 2) undisclosed actions and embedded rituals that offer the deeper text and understanding of the practice (Caldwell 2008, pp. 351, 368; Mayer et al. 2010). Caldwell warns of the level of "spin" present in the behind-the-scenes insight given by the informants.

The first mentioned property – the perceived industry identity – could be called the "soapbox pitch," and is the first layer of each disclosure. In this research, most informants often disclosed a large amount of spiel during interviews, which was triangulated with observations. While the actions during the observations did not contradict their description in the interviews, the motivation for certain actions was often contradictory between the disclosure in interview and what was observed.

The motivators and considerations for the organisational choices derived from direct observation are categorised here as "the deeper text". The observation revealed factors and anxieties at play that are not disclosed by informants yet are strongly affirmed in their actions. There is a clear dissonance between what was said and what was done and, from a research perspective, this is interesting and revealing about the culture of filmmaking in the twenty-first century. Participants are seeking to manage the perception of themselves and their filmmaking processes, which are sometimes distinctly at odds with the observations of practice. For this reason, the first section of the observation analysis will focus on the "soapbox pitch." This was the chosen organisational model described by the informants. The following sections will then reveal deeper motivations for the chosen model.

Pursuing in-house: The soapbox pitch

Throughout the research the informants frequently referred to a film production structure that is characteristic of some independent filmmaking activities. It was most of the time named 'end-to-end', or 'in-house' production. Both terms are erroneous if compared to their use in other disciplines, but in the case of filmmaking, they describe a production model where most, if not all, aspects of production are facilitated with tools coming from one production entity. It may seem evident that such productions exist, but it is uncommon to see these types of production organisations produce output material that competes at major film festivals. To the contrary, it is assumed that the in-house production model does not nurture most talented breakout directors (Campbell 2014).

The informants, especially the heads of the agency (Brett, Jamison and Booth) refer to popular literature and the blogosphere when pontificating about the in-house workflow model. The online resources they draw from in particular come from the production of advertising content. Creative advertising companies started cutting the costs of the more expensive aspects of short video clip production by first housing the post-production units in-house. Then slowly, it became common for advertising agencies to expand their production capacity into a full-fledged mini production studios (Shore 2009; Campbell 2014; Reeves 2017). However, Brett highlights how expanding in-house production capacity worked for Archer's Mark due to occurrence of major brands bypassing creative advertising agencies to work directly with content production companies. Indeed, the occurrence of advertising agencies acquiring their own production kits is a reaction to a trend. According to a report from the Society of Digital Agencies, a network for marketing professionals, the share of brands claiming that they do not work with any agencies at all has doubled to 27 per cent in 2015. (Pathak 2015).

As a result, Archer's Mark has a direct connection to a few high-value brands that could utilise both their creative acumen as well as their capacity to turn over projects fast using in-house equipment. However, making such a choice is less common for a fully-fledged film production. Film production practices are understandably more rigid, if not solely due to the length of the final product. Still, few film companies utilising this kind of production model generally name the financial motives first. After all, once a film production company ventures into long format it is hard to justify weeks or months of renting key aspects of a production kit.

> For *Next Goal Wins*, we realised, if we wanted it to be a cinema film, we wanted to shoot with a cinema camera. We realised if we have to rent a camera for 6 months, you might as well buy one, and we ended up buying a RED Epic. (Brett 2013; interview with Petkovic)

This narrative is repeated for post-production by almost everyone at Archer's Mark.

Booth, the head of production at Archer's Mark, acknowledges that accumulating high-end equipment in-house is not such a self-evident idea as it might appear, as it bears risks that make it an unpopular strategy for feature-length film production. The high-end studio industry, together with distributors, has managed to keep itself at a distance from independent media producing models by constantly increasing the output requirements for high-end film. HD became 2K, became 4K, became 6K, and so on. The use of 3D, IMAX projection, and Dolby Atmos, all create a huge pressure on the independent filmmaker at the distribution end of the production line. These new advances come with a price tag: equipment capable of producing this is much more expensive than the Canon 5D with a few lenses. The high-end studios are attempting to normalise hyper-technical solutions to the viewing experience as a means of fending off the challenge from low-budget independents and changing the production process along the way.

Yet, Booth is convinced that all you need to make a large investment is transparency for less than a year.

> If you're hand to mouth, of course it is difficult to pay forty thousand pounds for a camera body only. But if you have a steady stream of advertising work and can semi-guarantee you'll be budgeting the rental of this camera for around 40 days a year, it's a no brainer. (Booth 2015; interview with Petkovic)

It helps to be a specialised short content production company with a slate of strong contacts. If 80 per cent of your revenue still comes from advertising, it is not surprising to look to advertising firms for favourable production models. If the production capacity is already there, adding capacity to generate creative concepts makes Archer's Mark attractive to clients looking to sidestep costly advertising agencies for smaller projects.

The additional argument to house a full production workflow, according to the directors of Archer's Mark, is connected to the proximity and instant availability of what is ordinarily exclusive equipment. Buying a high-end kit as a company allows for allocation of the kit in the off-hours for further investment. Whenever the company does not use the kit for production purposes, it can utilise it in another useful way. In the case of Archer's Mark, this meant lending the camera kit for free to budding directors for short films. This gave them a creative credit without much involvement and a strong relationship with future talent that almost always turns to them for work.

> And if you buy that camera, and then you know that 30% of the time it is not actually used, that is 30 % of free camera hire that you've got to offer to short films, to independent directors who need to take it out and use it, for camera tests, for lens tests, for low budget features that cannot afford to bring a cinema camera on board. All of those things are things we've done with a camera and all of those things actually provide really strong financial basis for the company because you can get deferred fees for the camera, if you so desire. And that can pay off two to three years down the line, but there is no immediate need for income from those things. Definitely it is a massive investment in talent and the people we attract into our directors slate. We bring in people who love having this playroom, this sandpit in which they can experiment creatively. (Brett 2015; interview with Petkovic)

The in-house workflow allows everyone at Archer's Mark "playtime" with the kit in the off-hours. "At our place, even the receptionist knows more about RED than a bigwig producer" (Brett 2015; interview with Petkovic). This enables fast reactions in day-to-day business and provides unaccounted-for training time. "Instead of renting earlier in order to train the operators, they can test it all in their own time." (Booth 2013; interview with Petkovic). Brett and Booth further explain the efficient scheduling, speedier meetings, and more equal division of labour, as people are able to multi-task alongside their core role. The informants claim that this is a secure and obvious way forward for a growing company. However, the soapbox pitch has two limitations: in reality, it is not as rigorously pursued as in theory; and it is not as common in production of media longer in duration than advertising. Thus, although the reality is different, the Archer Mark team still vigorously emphasise and practice the ideal of in-house production.

Before dwelling on deeper analysis of the merits of the in-house model, the thesis will name the exceptions to the in-house system in the Archer's Mark context and the informant's reasoning for the choices. Also, it should be highlighted that the in-house model is far from the most evident and accepted form of labour organisation in modern film production.

Strong logic / reverse actions

To understand the reasoning for the in-house model, it is important to consider the exceptions to the rule. The strong sense of logic in defining the in-house production as economically superior by the Archer's Mark senior staff is in conflict with the general consensus that outsourcing expertise and labour is prototypical for the financial and creative efficiency of the film businesses (Davis & Kaye 2010). Most of the industry is still in search of new ways to maximise the benefits of the outsourcing paradigm, as described in Caldwell's paper on hive-sourcing (Caldwell 2009).

On the surface, the reality of the *Notes on Blindness* production actually speaks in favour of outsourcing as well. There are a number of actions taken that will directly speak against some of the arguments named by the makers of the film in the previous section.

Most notably, the sound design was entirely outsourced. It was edited and mixed by Joakim Sundström. Sundström was the most experienced person in the crew, having done sound design for significant films with much larger budgets and much wider audiences, for example, *The Constant Gardener* (2005), *In This World* (2002) and *Touching The Void* (2003). This supports the assumption that outsourcing in film production increases the quality of the product, by allowing every company to utilise its specialisation to the fullest (Dolgui & Proth 2013). Outsourcing was the topic of significant debate in the 1990s following a drive for low production costs as a consequence of economic globalisation. However such debates are more subdued nowadays as outsourcing has become standard practice. Low cost is still the main drive behind it, but today one can also search for the most skilled specialists at a certain budget. (Anon 2010)

The reasoning behind the sound being outsourced does not completely negate the soapbox pitch offered by Archer's Mark. Sound was easily the most demanding and complicated aspect of the film due to the nature of the film concept: the use of the original notes tapes as the only sound (which meant no recorded sound on the set at all). Therefore, aside the already extraordinary idea of actors playbacking to the original tapes, all the other sound had to be recreated. The complexity of the task and the lack of experience with a project as large as this prompted Brett and Ellison to outsource. The sound was therefore edited first by sound assistants in Barcelona and Sweden, and then finalised by Sundström in Sweden.

❖

The second instance where part of the post-production was eventually outsourced was the subject of much more contention than the pre-planned outsourcing of the sound design. As mentioned previously, colour correction was to be handled in-house. Investment in the full DaVinci Resolve suite was a major part of the plan to make post-production self-sufficient at Archer's Mark. In the same period as the pre-production of *Notes on Blindness*, Blackmagic (introduced above) was pursuing an aggressive and, according to Brett, effective pitch of 'one software for all post-production'. Archer's Mark heads bought into it and decided to invest in the grading kit that was by now 'also capable of editing'[33]. The full version of this suite was seen as a hefty investment for a small house and it was informally assumed in the industry that only specialised post-production houses had such hardware and software in their possession.

The experimental editing features aside, Da Vinci is the benchmark standard as a grading suite and therefore no significant issues were expected on that front. The proposed strategy was to hire an outside specialist who would also train the in-house staff on more intricate features of the grading tool, rendering the company staff capable of handling increasingly larger grading projects. Until that moment, Brett and Booth had assigned work to the new kit only for shorter and 'non-tent pole'[34] commercials, where the intermediate knowledge of the in-house editors was adequate for the task.

What followed was highly unexpected and destabilised the ambition of the company leaders to achieve self-sufficiency. As the edit approached completion, Ellison started taking the necessary steps to secure a skilled specialist to come in-house to grade the film. At first, she had a few people in mind but they were busy or contractually-tied to a grading company. Next, she tried calling others in her network and beyond, who had an acceptable resume and show reel (the minimum requirement was at least one film with wider theatrical release and a extensive experience with commercials). Remarkably, not one person could make themselves available due to the following unanticipated factors: if Archer's Mark wanted to hire them, the film would have to be graded at a company

[33] The editing aspect of this issue will be covered in last chapter.
[34] Using the term from the feature film industry. Tent pole production is the one production which is expected to keep the company financially afloat, the productions the create significant revenue for the company

they were attached to; if they were freelance, the film would have to be graded on their own kit.

Not one person was willing to step out of the comfort zone and grade on a set they were not accustomed to on a daily basis. Each individual gave a similar twofold reasoning for this:

1) Due to the complexity and customisability of the software, they were convinced they could not offer the same quality service as on their own equipment setup.
2) For people with contracts - they were tied to their grading set due to contractual issues. For freelancers - they needed to make a return on their investment (and would charge separately for the renting of their setup). (Ellison 2016; interview with Petkovic)

It is worth noting that grading specialists who had less experience/technical proficiency than the required minimum, did offer to grade the film at Archer's Mark. However, after lengthy deliberation, Brett and Ellison decided to outsource the grading to an outside freelance colourist.

Outsourcing contributed to further complications in the workflow, as the chosen colourist used a competing software to the one Archer's Mark purchased. A whole array of conversions needed to be performed to make the transition successful, adding to further loss of control.

An initial reading of this experience would suggest self-sufficiency is, in reality, less pervasive, and could be perceived by an outsider as fictitious. Although this section serves to counter-weight the 'soapbox' statements by the practitioners involved in this film, an in-house narrative was pursued despite the evident stepping out of the all-in-one paradigm deemed so advantageous by the Archer's Mark staff. The reason for this lies in the potential, or the promise that the in-house model offers to a relatively small crew embarking on a large project. The deeper context of the in-house model seems much more important than its simple economic proposition. The following sections present the deeper text of the workflow choices perceived by Archer's Mark for in-house production.

Pursuing in-house: The deeper text

Individual reasons for preferring one organisational method over another – or, on a grander scale, for a specific group's uptake of one organisational method over another – should be examined beyond the self-evident text. Formal interviews and focus groups only delve into these motivating factors to a limited extent. Deeper digging into human conduct beyond the obvious is necessary for achieving a more reliable sense of why a certain approach might dictate an alternative narrative.

The group of practising professionals who comprise independent cinema tend to defend the notion of self-sufficiency in order to maintain the credibility of the ambiguous term 'independent'. Attempts to define 'independent' always raise objections, since there is increasing uncertainty as to what or whom independent cinema is actually independent from (Tzioumakis 2006, pp. 2–4; Baltruschat & Erickson 2015). In the case of *Notes on Blindness*, the researcher observed that all of the film production protagonists saw self-sufficiency as an ideal to strive for in order to create films they considered valuable. Executive producers Brett and Jemison, producer Ellison and the directors kept repeating this, but their views were also palpable in their sense of pride when describing all aspects of the process coming directly out of the offices of Archer Mark.

The following are informants' reflections on the activities through which they felt the strongest affinity to the in-house context. The informants' actions reveal the way in which they defined ownership of this type of workflow and justified certain actions that seemed inconsistent with the notion of independence they expressed. The deeper text regarding workflow orientated around:

- financial complexities and the anxieties of film production;
- in-house communication rituals and communication difficulties when outsourcing; and
- bonding and protecting an unconventional film idea.

These aspects will be covered in the following sections, in the respective order.

It's all about the money, but not entirely

As identified thus far, the close-knit human network at Archer's Mark agreed that the production system they were aspiring to achieve would be highly beneficial to their productions. Although beliefs do not always reflect reality, it is reasonable to take their argument seriously.

Jo-Jo Ellison, the sole film producer, had the task of financing a film she described as a "period drama on a documentary budget". Financing was done through a complex structure of six financers, including Archer's Mark. In order to apply for a tax credit scheme,[35] Archer's Mark had to characterise the financing as not 'in kind' (requiring technical, logistic and material goods), but as one of cash injections. Thus, the producer had to budget for and rent Archer's Mark's own equipment. Such an approach is quite normal in film production, wherein a film is registered as a separate financial entity that pays for the services of its own production company.

However, there is a clear problem in this kind of financial agreement, relating to working on a tight budget. To qualify for the tax break that enables production, producers must effectively quantify very important human relationships; but this leaves producers with very little leverage to push down costs. On tight budgets, such leverage is crucial. As the film producer, Ellison had no power over in-house budgeting, nor did she feel comfortable with negotiating the price of the services offered by her own company. In her own words:

> Having everything in-house is amazing but I do think some things can be outsourced. Let me put it like this, as an in-house producer for a film I cannot use my negotiating power to get the prices down of the stuff we have here. If I'd negotiate I'd essentially be negotiating against myself. General price is set by the others in the company, and I could get a better deal elsewhere. (Ellison 2016; interview with Petkovic)

Nevertheless, Ellison still greatly advocated for keeping the workflow in eyesight, even if doing so had a direct effect on costs. Ellison also utilised another in-house aspect, which she felt added immense value to the project:

[35] For all British qualifying films, regardless of budget, the production company can claim a cash rebate of up to 25% of all UK spending. More information on this tax relief can be found on the HMRC website.
https://www.gov.uk/hmrc-internal-manuals/film-production-company-manual

> There is one other generally bad thing about in-house but amazing for me. As we were a close family and we all wanted this film to succeed, I could ask post-production people, actually everyone that is part of Archer's Mark, to put in ridiculous hours! [laughs] Oh that sounds terrible! (Ellison 2015; interview with Petkovic)

Ellison used this practice during production and post-production. As the producer and the executive producers all found, the budget and deadlines were near impossible to comply with. They resorted to forming a tight group that was incentivised by social cohesion and future opportunities, rather than money. This reinforced a spirit of independence, if not a coherent notion of it.

In driving social cohesion as a bonding tool, the producers clearly saw financial benefits for *Notes on Blindness*. But as the first example shows, such benefits were not always the primary motivating factor. Rather, reasons for keeping the team socially close stretched further than the financial logic. Ellison noted that the project management triangle saying – "Fast or cheap or good: You can have any two" – did not apply. "We were forced to push for all three" (Ellison 2015; notes by Petkovic).

A certain degree of overview (and the ability to survey work) is essential for maintaining control over quality. But how is this achieved when the budget does not allow for a position to oversee processes? In the production of *Notes on Blindness*, the physical size of the spaces for interaction and the directness of communication played significant roles in maintaining a high working drive amongst participants.

Bonding and direct communication to offset the lack of workflow supervision

Ellison was the only producer on this film. She had a number of production assistants who managed to lighten certain tasks, but she had no line producer and was generally the only person (other than the researcher) with an overview of both the creative and the financial departments. In her words, hers was "a terrifying task" (Ellison 2015; notes Petkovic). The chronic lack of budget and time created a particular atmosphere of urgency, leaving her with no other option but to intervene in all processes.

Lacking an understanding of some critical aspects of production – as well as another manager to support her – Ellison compensated by constructing trust links in all departments. This would not have been possible had she not had a prior working history with her staff. Their familiar faces meant that she could cross producer boundaries, put

on a specialisation hat and have unrestrained conversations with heads of departments (HoDs) about their crafts, without fearing for her stature as a producer. Ellison unabashedly misused jargon and revealed herself to be naïve to the specialisations of others, in order to squeeze detailed argumentation from them about their recommendations.

She consistently pushed for frequent HoD meetings to establish workflow details, which were later communicated to as many involved persons as possible. Untypically for a production with such a large number of stakeholders, Ellison kept the documentation of all departments (with the exception of financial papers) open and transparent to the entire crew. The financial papers remained private, due to the differently negotiated pay between crew members and requirements of financial confidentiality by certain stakeholders.

Ellison pursued an assertive version of micromanagement – most likely out of necessity and reflex, rather than a focussed leadership strategy. She fluctuated between presenting herself as a leader and operating as a micromanaging bureaucrat, filling empty spaces in the production crew caused by budgetary shortfalls. This affected her use of project management technologies in the production workflow. During pre-production, Ellison repeatedly attempted to implement software-based project management solutions that would lighten the managerial burden. However, her attempts failed and, instead, schedules, lists and timelines were created and managed in Microsoft Excel and project management was conducted via Google Docs. There was a question of priorities: investments in improving efficiency ran the risk of exceeding the efficiency gained. Ellison's reasons for abandoning other software options related to time constraints (there was not enough time to educate everyone involved) and budget issues (all of the management tools Ellison considered were only accessible through a monthly paid subscription). Furthermore, the nature of the project did not suit the use of new management tools. The usual sales pitch for new organisational tools such as management software or collaboration applications emphasises increased efficiency and therefore more time for creative work. In the case of *Notes on Blindness*, use of new technologies to communicate bureaucratic and administrative steps in the production process seemed to increase communicative distance, and this ran contrary to the goals of the producer. "Everything was built on direct communication. Constant communication, and trust!" (Ellison 2016; interview with Petkovic).

As *Notes on Blindness* was a highly unusual visual product, it dictated nothing less than immediate communication. Therefore, the crew seemed to spontaneously resort to the most widely accepted communication channels. The organisation of the film needed to correspond to the spirit of the film idea.

A good example of this is the way in which the producer managed the crew's knowledge of the sound playback workflow. Ellison did not share details of the technical sound workflow on set. As described above, the sound playback unit was a very unusual addition to the filmmaking process. In addition, there was generally no sound recording on set. In the few cases in which sound was captured on set, Ellison kept the details of the agreed workflow out of emails and Google Docs. Only the directors, themselves, communicated about how sound would be recorded, during HoD meetings. It is possible that Ellison felt that leaving space for organisational trial-and-error would be more helpful than setting sound recording procedures in stone. In this way, workflow adjustments occurred on set without much friction, as only loose agreements had been made.

The producer's key challenge in managing this particular production was maintaining sufficient overview of all departments. Productions that cannot afford a technical coordinator (most independent productions) are left with producers to mediate workflow negotiations between HoDs. Producers target the best value/price balance, in order to keep both finances and marketing on track. Serious issues arise when a producer is not workflow literate, as this leaves departments open to arguing their points of view as best they can. Departments have differing agendas based on their unique short-term ambitions, rather than the quality of the final output. This places the producer at a disadvantage in making the best possible decision for the project as a whole, and thus a producer must have tremendous foresight and negotiating skills in order to manage this process well.

Example 1

The *Notes on Blindness* camera operator wanted to utilise everything his camera had to offer. Similar to everyone on the team, he was poorly paid. In consequence, he saw this film as an opportunity to shoot resolutions he may not have otherwise had the opportunity to try (in order to increase his experience/knowledge of the latest industry technologies and to demonstrate his prowess to future employers). The whole team felt strongly about utilising their tools to the maximum. However, just as in any ecosystem,

on set, this striving for personal bests created imbalances elsewhere in the production workflow.

From the onset, it was obvious that the production would use in-house cameras – two REDs that had recently been upgraded to RED DRAGON chips. The cameras were capable of shooting a maximum of 6K full-frame, and this enhanced capability was designed to entice the desired camera crew (as the budget was not satisfactory to do so on its own). It was the first time the company was capable of producing a 6K file, and this caused considerable excitement in the camera department.

Shooting in high resolution increases file sizes and often requires additional file transcoding. Eventually, this can not only cost more but also prevent post-production staff from working freely with the material. On *Notes on Blindness*, the post-production department was adamant about keeping the resolution under the maximum of 6K. This debate was conducted via email and culminated in a face-to-face discussion at an HoD meeting. Ultimately, it was Ellison who decided that the shoot would start on 6K. This resolution later dropped slightly, but only after it created costs that were unaccounted for due to the purchase of extra storage units.

Here, the producer was responsible for balancing the two sides and was eventually dependent on each department's ability to defend an argument and engage in the conflict. Had the producer not been in a position to command the respect of each specialist, the task of mediation would have been immeasurably more difficult.

On set, an editor might insist on meticulous script continuity bookkeeping, and this can slow filming considerably. On *Notes on Blindness*, the editor's request for script continuity[36] was ignored, for budgetary reasons. According to the first AD on the project,

[36] Script continuity or script supervision, or simply continuity has arisen as by-product of the film production processes. In contrast to theatre where the action evolves in chronological order as intended in the script, the film recording has the luxury to film without regard to chronological order of scenes, in order to increase efficiency and speed of the shoot (bundling similar scenes/locations/cast together for minimal changeover time between sets). In order to in order to keep the seeming continuity between scenes which are adjacent in the script but not adjacent in the shoot period, a role has emerged called in Unites States 'the script supervisor', and in United Kingdom 'Continuity'. Their role is to oversee the continuity of the motion picture including wardrobe, props, set dressing, hair, makeup and the actions of the actors during a scene. The notes recorded by the script supervisor during the shooting of a scene are used to help the editor cut the scene. They are also responsible for keeping track of the film production unit's daily progress. The role is considered crucial in film production.

lack of script continuity was the main thing that differentiated the *Notes on Blindness* set from other, 'professional', sets. It should be noted that the post-production department never got its way in any argument. This will be further discussed in Chapter 4.

When a third party cannot oversee an entire film set, ad hoc organisations such as the *Notes on Blindness* film crew, themselves, must rely on strong social capital, close teamwork and informal transparency. The producer must take on a role of mediator/people manager in order to create focussed teams. This is a tedious and painful process, but a necessary one, given that whatever workflow is negotiated, it will have a profound effect on the course of production.

The communication in this example developed, almost naturally, into direct dialogue, with no issues left unsaid. To facilitate this direct communication, space was spontaneously created in such a way that the paths of most crew members would cross. As the post-production department was not as mobile as the camera department and was housed at the Archer's Mark premises, more crewmembers were present alongside the producers and post-production crew who spent time there. The camera tests were done inside the same space or next door to the Archer's Mark offices.

Thus, *Notes on Blindness* – as a self-organising entity – created a mechanism to diminish the potential damage of a lack of workflow streamlining. It kept most pre- and post-production technological processes close by, and even combined them with the above-the-line processes to ensure that most of the workflow was conducted in one place. Here, in-house held a literal meaning. *Notes on Blindness*, with its atypical ideas, demanded an unusual workflow with shortened communication lines; to facilitate this communication, the physical space was tangibly compressed.[37] More conventional films, without an idea as original as *Notes on Blindness*, might struggle to be made by such an independent production company – a fact that was not lost on the crew, and to which the self-organising processes seen in action could be attributed.

[37] The lingering question is whether this version of the 'in-house' solution is replicable or whether it simply fit the highly unusual film it was designed for. This question will be addressed in the discussion section.

Deeper text: How much can a networked space be compressed?

All of the *Notes on Blindness* production spaces were instantly crowded when in use, even when crowding was highly counter-productive. Again, this issue would probably not have existed had the producer outsourced and spread out specialisations. The following are examples of multiple production activities that were conducted in very compressed spaces.

Example 1: Editing HQ

The production headquarters and the main editing suite were located in the same space. This was not only the result of a general lack of space in the rapidly growing company, but it was also designed to speed up the production crew's communication with stakeholders, as the editor was sat literally behind them. The production crew were aware of this rationale, as described by Booth:

> I worked at a few production companies and there is obviously a point where your knowledge has to stop of a certain process. Mine stops with post, like I don't know all the ins and outs of post, but I don't have to cause I've got Jules here and he's got the knowledge and he's got this piece of equipment that he's learning on and can give me that extra piece of knowledge. Clients or agencies asking me technical questions, I don't have to phone the post-house or have to divert into a company that isn't our own because there's people here will know the answer or can figure out and answer from the equipment we've got here. (Booth 2014; interview with Petkovic)

The HoD meetings, production phone calls and editing all took place in a single space. This might have been bearable for the production crew, who would have been used to most production companies' semi-open space arrangements, but the post-production crew and the directors genuinely did suffer. This extended the working hours of the editors and directors beyond the norm and played into the hands of the production crew, who were looking to increase work hours in order to meet squeezed deadlines.

Jules Quantrill, the editor, did not appreciate the distractions of the condensed space, which prevented him from getting into "that reflexive state" in which editing became a fluid performance. He did, however, appreciate the directness of communication when discussing the deliverables of different client expectations, as he was able to directly manage these in negotiations with the production team. After ground rules were set, the combined group was able to work together.

While explaining the technical side of things and the in-house benefits of the arrangement, Brett instinctively referred to the importance of this compressed space again:

> While the intrinsic value of Archer's Mark – yes it's cultural and yes it's the people – but it's also the physical manifestation of it in this building. You walk in the door and first thing you see are two cinema cameras on the shelf which everyone in building knows how to use. There is a steady cam, underwater rig, all these things that create a sense of play. (Brett 2015; interview with Petkovic)

The directors also had views on this. Often irritated by their inability to concentrate on post-production tasks due to constant distractions in the space, they nonetheless mentioned the effect it had on the intimacy of the team, increasing the respective groups' ownership over the end product. It was precisely the fact that the various teams got under each other's skin that made the difference, they held. However, the directors remained critical of the fact that the editing space was shared with the production office. Pete claimed:

> Although we could work with Jules who was under contract with the Archer's Mark, which meant we could work 18 hours a day, we think we could have done much more and faster if we were left in isolation during the editing period. (Middleton 2015; interview with Petkovic)

This perception could be deceiving, however, as during participant observation, the meddling factors seemed to prompt the directors to work more efficiently rather than to explore more options. No matter how much the crew admired or maintained the directors' vision, most were of the opinion that the directors found it difficult to make up their mind on direct choices presented to them. This indecisiveness, in contrast to the overall focussed vision, was often at the root of conflicts on set and possibly led some individuals to leave the project. This will be discussed in the following section. But the principle remains that, with regard to space, the people who were fully committed to the task intentionally kept the communication space tight, and this resulted in tighter physical spaces, as well.

Example 2

The DIT situation during the shoot was problematic. Usually, the appointment and role of the DIT is an afterthought during film production (this will be discussed in Chapter 4), and this was no different on this production. However, considering that no one was overseeing the DIT position but the technician him/herself, the line of communication between the DIT and the rest of the crew began to naturally shorten.

In this particular case, this resulted in the restriction of physical distance between the DIT and the three active camera units. During the shoot in Cambridge on an empty, derelict college campus where the crew stayed for five full days, the DIT unit was stationed with the production, make-up and wardrobe teams, approximately 100 metres from the planned set. The shoot culminated on day four, with three simultaneously active camera units. Camera unit 3 was operated by a single person, taking macro shots; nevertheless, all camera units outputted 6K material and required proper data management.

The DIT spent the first three days running from one camera unit to the other, picking up full cards and dropping off empty ones. On day four, the DIT moved closer to the set in order to achieve a better overview of the camera units, as the chance for error was high. The DIT, on his own initiative, installed the unit right next to camera unit 1, in a space that was not assigned for him. The DIT presence in this space was physically obstructive, but the DIT still went for it, despite the fact that it aggravated the electrician crew, among others.

Such shrinking of physical space is reflected in the general manner in which post-production tools tend to be pitched to production professionals. For example, Adobe Creative Cloud's main slogan is "All your creative tools, All in one place", which is an almost comical commentary on the *Notes on Blindness* model of in-house production. Blackmagic, the company behind DaVinci Resolve, is also starting to offer an all-in-one software solution. This is a remarkable move, as DaVinci Resolve is an industry-acknowledged high standard grading software. Enabling video and sound editing in an established grading tool requires a clear step away from the primary market. However, this is not a recent phenomenon. Since VHS, production equipment manufacturers have been looking to satisfy 'self-shooting' videographers, as the base of semi-professional consumers ('prosumers') has eclipsed the professional market. However, in the case of *Notes on Blindness*, independent cinema, finding itself between consumer- or prosumer-generated images and high-end mass production, chose the basic tools of the high-end industry but the workflow solution of self-shooters. As Brett jokes, when chatting about a specific workflow management solution: "Yes, I will have that RED camera, thank you, but I have no money for data management or any kind of deep workflow yet. Someday maybe" (Brett 2015; notes by Petkovic).

Deeper text: Further bonding, guarding the idea, collateral damage and outsourcing

As mentioned above, in the case of *Notes on Blindness*, both producer and directors felt comfortable with keeping most of the labour in-house. They attempted to create strong bonds between their workers on the basis of non-material incentives. In the following examples we see the protection of the close-knit community by their above-the-line colleagues, with the goal of preserving the highest level of individual craft by key craft practitioners.

In her interview, Ellison stated that one of her main reasons for using the same crew she had used for the first short films and test shoots – and for keeping the team tight – was to protect the directors:

> They have such vivid and clear visual and style references, regarding every department. When it comes to costumes, colour pallet, everything… almost like a rule book… to maintain that… directors feel much safer, constantly supported.
>
> I really can't see outsourcing would ever work with a film like this, that belongs too much to the directors and that belongs to all of us. Every single tiny detail of the film is being thought through and I think it wouldn't have the amount of attention if it was left to an outside shooter or given to an outside edit.
>
> Having everything in-house doing it within one space, increases a sense that we are not two competing parties, that we are doing it all together, which is very nice.
>
> People are overworked cause we're in it all together
>
> (Ellison 2015; interview with Petkovic)

The critical concern of this self-management through bonding was that the network of individuals might discriminate against persons with different approaches to the film concept and the directors' vision.

For many already mentioned particularities, the key players in the film production had to share a high degree of flexibility and to endorse the directors' vision and ideas. What this created was a homogenous group of like-minded professionals, with project-specific workflow skills that met the production's demands. This group consisted of individuals who were highly flexible in adapting to the unorthodox production system, but inflexible with others who were not entirely attuned to this newly discovered workflow and work ethic.

Example 1: Collateral damage

Notes on Blindness changed assistant directors (AD) four times. One AD was below the desired competencies and two others left frustrated before the production finally settled with Tom Lancaster, who showed the right combination of grit and team spirit, according to Spinney, the director. It is interesting that the especially sensitive position of AD needed so much adjustment. The AD is one of the key roles on large sets, as he or she is the administrative and managerial leader – a person who moves the machine and keeps the directors in a creative, reflective state. The Creative England[38] website describes the AD role as follows:

> First ADs' main duties are assisting the Director, co-ordinating all production activity, and supervising the cast and crew. They are also in charge of a department of other Assistant Directors and Runners. Overall, they provide the key link between the Director, cast and crew, whilst also liaising with the production office, and providing regular progress reports about the shoot. (Creative Skillset n.d.)

The emphasis here is on coordination and supervision. From the following excerpt, it is clear that the AD role on *Notes on Blindness* involved with particular challenges:

> On the grand scheme of things, given how experimental the processes were, both creatively and as production processes to a certain degree. I think having that core team and having with us the people who have been with us since the short film and have seen the success of the short film and what is meant to us, they trusted in us. And actually the problems we had, and actually the heads of departments who left during the production, no one who we worked on with on the short abandoned us, there were plenty of people who did, but I suppose that is telling.
>
> Our costume designer, couple of first AD's key, key departments, who left because maybe they didn't quite believe in the project the same way as the people who have been invested in the short film, and have seen how we work. (Middleton 2015; interview with Petkovic)

In *Notes on Blindness*, the ADs with solid professional experience in the film industry ended up frustrated by the lack of systems in place during the shoot and the chaotic nature of the production. Attempting to maintain established processes and pressing the crew to stick to timeframes proved difficult, as the crew were clannish and very attuned to each other's creative stances but lacked logistical oversight of the entire filmmaking process. The ADs also had a hard time grasping some of the budgeting priorities. The first

[38] Creative England is one of the leading institutions in the United Kingdom for funding, training and managing knowledge about the creative industries (British Council n.d.).

AD, Guy, found the lack of script continuity on set indicative of the amateur nature of the endeavour. These issues, combined with a lack of response from the HoDs regarding time, workflow and logistics issues, literally drove the ADs away.

In the words of both directors, the HoDs developed a certain "shorthand" with the directors. The director of photography (DOP), who – similar to the directors – was not supposed to be overwhelmed by workflow issues, consistently involved both the camera operator and the first camera assistant in the creative dialogue, leaving no one in the camera department to oversee workflow. The excuse for this used by all involved parties was the "experimental" nature of the film. Trying and failing and changing plans on the spot was the norm. In this way, the *Notes on Blindness* set challenged the core role of the AD and few ADs had the patience or soft skills to control the HoDs' anxieties on set. Strong rapport between the HoDs was a powerful force and essential to the intimate, experimental project, but the need for structure was just as powerful. It could be suggested that the first outweighed the second in the production of *Notes on Blindness*, resulting in an AD position that was difficult to fulfil.

Example 2: Stance towards outsourced specialists

> When you're working on a project that has quite a unique aesthetic approach and is between genres. [With heads of department we worked with before in close relationship with Archer's Mark], having co-developed that lexicon in previous production, allows us all to go in with higher momentum, I think. (Spinney 2015; interview with Petkovic)

Another consequence of the drive for tight relationships within the core in-house crew was raised expectations about the portions of the production that were outsourced. On *Notes on Blindness*, these positions related to sound design and a single special effect shot. This example spans both outsourced production steps, demonstrating their similarities in the interaction between the in-house team and the outsourced specialists.

The in-house team that communicated with the outsourced party tended to emphasise a specific issue in this communication: lack of transparency in the outsourced party's workflow steps. Unable to anticipate each other's work steps, the parties often found themselves guessing at what was and was not possible. In the case of the special effect shot, it was not possible to track previous versions of the rendered shot, and the directors did not understand why. Traditionally, outsourcing agreements stipulate that the sourced party does not need to reveal its processes or its competitive advantage. As a

result, the outsourced environment has contractual 'black boxes' (Sirmon, Hitt & Ireland 2007; Wüllenweber et al. 2008).[39]

The core in-house team was unsatisfied with the creative process of the contracted entities. They had outsourced a specialised VFX company for one specific shot, in which the protagonist, John Hull, dreamt of a wave of water entering a local supermarket while he shopped for groceries with his family. Although Archer's Mark owned the software for the 3D effect, the company did not have the human expertise and the render power needed to complete the shot in-house. Instead, the work was outsourced to an international VFX house, which began to deliver the pre-renders and rough animations on a regular basis. Within days, the directors were fully engrossed with giving feedback to the VFX company, but were met with a peculiar type of resistance: when they stated a preference for a previous version of the shot they were told it would be impossible to retrace previous renders. The directors could not understand why this was the case, and when they enquired about it with the VFX company they were not given a clear answer. The answer turned out to be that this was simply the way the company worked. In the interview with the directors, it emerged that the directors were less displeased about the impossibility of backtracking to previous versions of a shot than the lack of transparency in the VFX company's answers. The directors shared their discontent about their lack of insight into the outsourced company's workflows with the in-house crew, and were met with agreement. This eventually led to the best possible compromise: finalising work with the VFX house in a hurried manner.

On the second occasion, the relationship with the outsourced sound department seemed even thornier. As described above, sound design was outsourced for a very straightforward reason: the complexity of the sound task and the crew's lack of experience with sound on such a large project. Joakim Sundstrom was a highly experienced sound designer who seemed like an appropriate hire, considering the enormity of the task at hand.

[39] This is yet another 'black box' term, not to be mistaken with Jenkins' 'black box fallacy' from Chapter 1 and the feminist theory of 'black boxes' described in Chapter 2. The term simply describes the systems or businesses in which inputs and outputs are transparent, but inner workings are opaque (Business Dictionary.com n.d.).

However, the experience and professional standing of the sound designer meant that the core production team had to accept his workflow by default. The core team needed some time to adjust to his working manner and this required constant relational repositioning and power bargaining. Phone conferences were frustrating for both sides.[40] Sundstrom managed to force his opinion on the production process due to (as the rest of the crew called it) his "brand". His professional expertise enabled him to define his own working pattern. According to Ellison, he also asked for very little money "because he likes these kind of films" – a decision that gave him moral leverage over the producers. The combination of these factors gave Sundstrom a strong position from which to make workflow decisions with few consequences for himself, forcing the production company to accept what he was offering.

In hindsight, the involvement of an industry-recognised professional increased the "star factor" of the film – Sundstrom's name was mentioned in reviews more often than that of any other crew member. However, Ellison reiterated that she would have preferred to produce the sound closer to home and that others could have done the job just as well. This jaundiced opinion certainly does not reflect the general attitude of the in-house crew towards Sundstrom's work; rather, it probably reflects the affiliation of the in-house group and their professional respect – an important factor in the game of social capital exchange that occurred at the production house.

The human relationships that formed around the owners of the film concept had a protective influence on the film's integrity, at the expense of deeper relationships with transient out-of-house professionals. Such professionals attempted to link to the closely bonded in-house group through standardised interactions that were dictated by their traditional functions in the film hierarchy and consistent with filmmaking conventions. When outsiders did not indicate flexibility or understanding towards the (often) irrational and inefficient working patterns on the *Notes on Blindness* set, they eventually disengaged from the project. The spatial proximity between the main players in the film production enlarged, in effect, the dissonance with factors that were physically further away.

[40] The researcher recorded some of these phone conversations but the parties involved requested that nothing be quoted from them. In this thesis, the conversations are reported more generally. Proof of the authenticity of the phone conversations is available upon request.

The above examples describe the by-products of teaming up under one roof to produce an unusual film such as *Notes on Blindness*. If human actors were the only concern, the overall consensus of everyone involved would have been that in-house production was the right path to take. But the question remains: How was the in-house workflow affected when non-human actors were added to the equation? Since the *Notes on Blindness* film concept was unusual, it could be speculated that the technology involved had unpredictable demands in itself. Indeed, the technology required an entirely new entity to be brought on set for sound to be dealt with in an original way. However, there were unexpected disappointments associated with these decisions. The following section explores the way in which the *Notes on Blindness* crew dealt with these technologies and innovations.

Innovating in the *Notes on Blindness* workflow – Successes and failures

After spending three-quarters of a year fully immersed in the *Notes on Blindness* production, the researcher obtained a general feeling from everyone he spoke to of constant growing pains. The film producer noted that there was a constant sense of learning something for the first time. The crew's attitude was one of resignation towards the continuous learning curve imposed on them by the consistently changing and multiplying technologies. This implied an environment in which testing by error was often the only way to meet time and value demands while attempting to maintain the integrity of the film idea.

This section describes the anxieties brought about by the introduction of innovations into the *Notes on Blindness* filmmaking space. The innovations covered in this section fit the following description:

> An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behaviour is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery. (Rogers 2010, p. 10)

The terms 'innovation' and 'technology' are often used synonymously. However, technology does not necessarily refer to a specific physical construction, but may also refer to innovation in an organisation or political hierarchy. This view is very much in line with Foucault's conflated treatment of technology as a form of an idea (Behrent 2013, pp. 55–57).

The first example covers the most disruptive addition to the *Notes on Blindness* production workflow – on-set playback.

First, the exact process of on-set playback will be described, followed by an analysis of the effect of the innovation on crew dynamics, their familiarity with the craft routine and the sense of departmental hierarchy on set.

Innovation example 1: Audio playback

The playback workflow was agreed over a number of pre-production meetings. The solution was thought out and proposed by the editor, Jules Quantrill, and the researcher. It was then tested in a set environment, but only crudely. In retrospect, a number of things appeared problematic once the solution was applied to the real film set with its large crew. Some of these issues might have been predicted and addressed earlier in the process.

The proposed method was as follows:

As explained in the background of the film, the directors used the original audio diary cassette tapes created by John Hull, himself. During the scripting period, they reconstructed the entire dialogue and voiceover track. Thus, this track was present even before shooting began – a highly unusual occurrence.

The entire film dialogue was edited with software and structured as a five-chapter narrative. In accordance with the script and the shooting schedule, the edited dialogue was split into separate scenes. The scenes were then put into a sequence/timeline. This created roughly 150 audio scenes, including scenes with multiple versions, comprising the narrative and shooting backbone of the film.

Each audio scene was to be treated the same. Before each piece of dialogue in a scene, two frame long peeps (1/25 of a second) would be placed. The first peep would be placed two seconds before the start of the dialogue, and the second peep would be placed one second before the dialogue. These peeps would be placed in as many places as possible. The only time when this would not be done is when the dialogue pieces were too close to each other. In these scenarios, the challenge would be for the actor to time the dialogue accurately. Also, before each sound bite, a voice would be added, stating the scene number for double reference (see Figures 4 and 5)

Figure 6 – Example of a scene prepared for playback

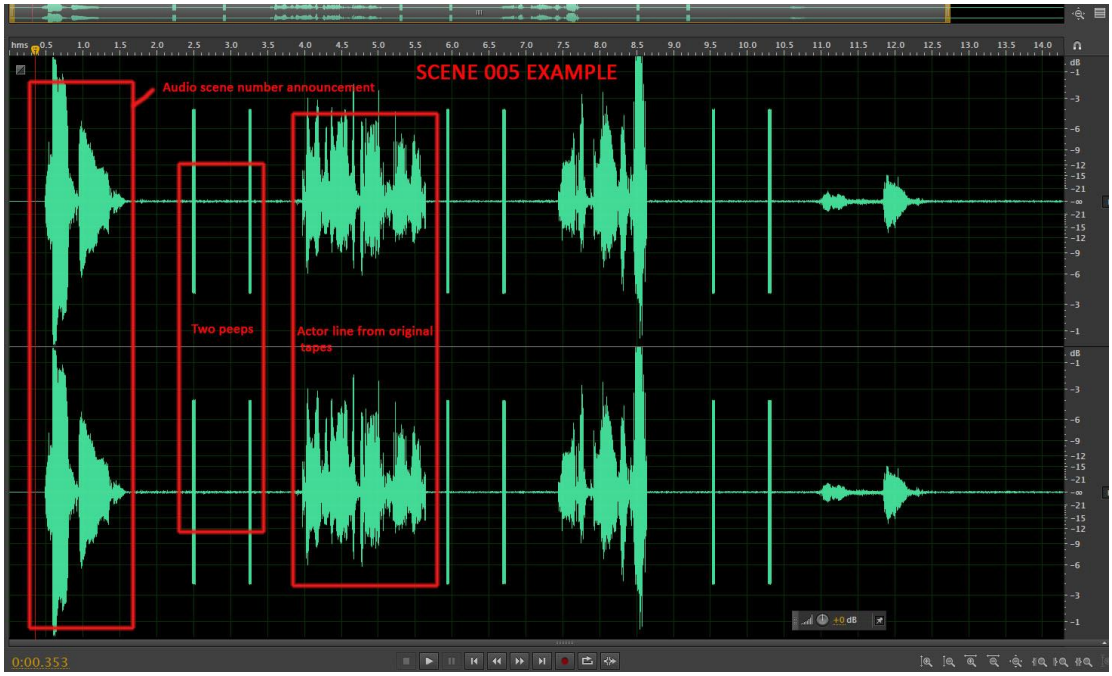


Figure 7 – The example scene in the script

5a INT. COTTAGE B&B - DAY 5a

Dust particles swirl in the morning sunlight. John and Marilyn entwined on the bed.

5b He beckons her to the window. 5b

first peeps

JOHN (V.O.)
Do you remember the way the tide came in? Right up the main street.

second peeps

MARILYN (V.O.)

third peeps

Yeah.

They both gaze out.

John seems momentarily distracted. He squints his right eye.

The auditions for the cast were conducted with the prepared sound bites, as it was anticipated that this innovation would be extremely invasive to the actors' concentration. The directors needed proof that the actors would be capable of playbacking – staying in the moment and not being distracted by the peeps. The two actors chosen for the lead roles were impeccable in their delivery of the playback, and this was one of the main criteria for their selection.

When it came to handling the playback on set, the initial idea was that one person would control the playback and this playback would be relatively inflexible in both timing and delivery. The sound byte would be pre-prepared, and it would only need to be played back on a normal player. If some leeway was needed with the timings, it was initially thought that the playback person would just press pause and play between the lines. Both the editor and the researcher were sceptical of this approach, but were assured by the rest of the team that it would be sufficiently flexible.

The post-production team insisted that the playback should be conducted with sound editing software. Such software would offer more flexibility, such as the ability to add peeps, create space between dialogue lines, delete peeps and even delete or add dialogue lines. It is fair to say that the crew were unsure of how necessary this flexibility would be, but the rigidness of simply pressing play/pause seemed – to all concerned – quite risky. For the producers, however, complicating the playback meant that they would need to recruit more qualified staff and be less flexible with who could operate the playback. The technology imposed a requirement for a new team member, and this team member would need specialised skills – he or she could hardly be chosen at random. Eventually, just prior to the shoot, the post-production team relented and decided on simple playback. This enabled the production to use student interns for the role.

It should be noted that the physical playback unit consisted of a laptop and a Bluetooth mini speaker, both owned by the producer. The job was clearly seen as a one-off and not a single pound was spent on the unit, despite the importance of sound to the film and the believability required for the audience to accept the lip-syncing.

A new role in a close-knit network

The audio playback system was created to facilitate the lip-syncing process during production and post-production. However, on set, the role of playback was interpreted differently.

To understand the discrepancy in interpretations, note that the movement organisation of the scene on set was agreed as follows:

1. Set design finished and final check-up
2. Directors, AD and DOP enter, blocking
3. Actors enter, blocking
4. Camera enters, finalising blocking, actors leave
5. Playback unit enters, finds neutral spot
6. Make-up, first positions, make-up out
7. Shoot

It was the actors who warmed to the playback system first, seeing it as a helpful tool for memorising the text. They started demanding that the playback enter increasingly earlier than agreed so they could become accustomed to the text on set. Initially, the playback unit entered the set during blocking, but eventually the main actors started requesting that the unit enter their make-up suites prior to the scenes so they could practise the playback and timing as they got ready.

While this eased the tension on the other side of the camera, the presence of the unit initially raised tension with the camera unit, who saw it as a nuisance on set – at least until everyone was ready to shoot. But the fact that the actors were more comfortable having the unit around made everyone more aware of it. Practically, the ideal placement of the unit was in a space where it would not inhibit the movement of the actors and camera crew or the view of the directors – including the AD – while being close enough to the action that it would be audible to the actors. Finding this space was yet another task for the already burdened assistant director.

The adoption of the unit became apparent from the AD's control over it. At first, the unit was not allowed to move until the AD determined where and when. But when the actors became accustomed to the innovation and invited it on set earlier, this process began to change. Initially, the director of photography (DOP) – who was quite a restricted person – started to directly communicate with the playback unit during the shoot. Heavily immersed in blocking the scene and fully invested in interpreting the directors' ideas on the spot, the DOP started listening to the audio track with great attention. The playback refreshed the DOP's memory and "filled the space with the scene, before the actors were there" (Floyd 2015; notes by Petkovic).

Having audio playback running during the blocking seemed to make scenes easier to visualise. Within a week of shooting, the person carrying the laptop and the little Bluetooth speaker became fully immersed in the ritual of the 'hot set'. The playback unit became a busy unit during the shoot. The actors, the DOP or the directors would shout "Playback!" and the unit person would play the audio while looking for the 'sweet spot' in which to stand, close to the actors and the DOP but at a sufficiently safe distance so as to not inhibit the action. The AD eventually relinquished management of the unit. Moving the audio unit on and off the set was finally only announced by the third AD.

It did not stop there. As the crew grew aware that audio was being played from sound editing software, an obvious next step followed – editing the sound bites. This had both beneficial and frustrating effects. On the one hand, scenes were easy to adjust to the space they occupied; for instance, a pause between sentences to allow an actor to walk from point A to point B could be adjusted to the pace of the scene or the physical distance between points. But on the other hand, the directors wanted to test different orders of words and even add new dialogue, and this made recording increasingly stressful for the actors. This resulted in the two main actors not preparing their lines, but rather memorising and rehearsing them only just before the scene, as facilitated by the playback unit in the make-up room. It is questionable whether this had any effect on their performance (for which they were both highly praised), but it is certain that they felt less in control. This was stated a few times informally by the actors, but later contradicted in other informal statements. It should be noted that the main actor, Dan Skinner, performed one of his strongest scenes after playbacking a 3-minute monologue prepared only an hour before the shoot. The new technology enabled immediacy in his execution of the dialogue, but it also left him uncomfortable with his control over the performance.

Innovation example 2: Post-production software/hardware shifts – Buying into convergence

The fine detail of this specific case will be covered in Chapter 4, from the point of view of the individuals involved. However, the case should also be treated as an example of an attempt by a competitive independent cinema company to transform its value chain processes. Just as the literature review looked separately at the cultural and individual dilemmas in converging film media, the analysis of this example is split in a similar manner. This approach aims at correlating wider issues with the specific decision making processes of individual actors and revealing the context of independent actions in this unusual cultural domain. In particular, the analysis shows how even insiders to the process sometimes failed to understand both the cultural context and the individual actions that resulted from it. The best example of such a misunderstanding relates to the case of a misplaced investment by a company with tight budgetary constraints.

Archer's Mark invested in a substantial piece of equipment – their largest post-production purchase to date. However, their purchase of the DaVinci Resolve[41] grading suite was justified in several ways:

1. The company bought into the sales pitch, which promised a grading suite and an editing station in one. The editing/grading station would manage the full post-production on *Notes on Blindness*.
2. The company's prior experience with outsourcing colour correction and mastering had been both unsatisfactory and costly.

[41] "DaVinci Resolve 12.5 combines professional non-linear video editing with the world's most advanced color corrector so now you can edit, color correct, finish and deliver all from one system! DaVinci Resolve is completely scalable and resolution independent so it can be used on set, in a small studio or integrated into the largest Hollywood production pipeline! From creative editing and multi camera television production to high end finishing and color correction, only DaVinci Resolve features the creative tools, compatibility, speed and legendary image quality you need to manage your entire workflow, which is why it is the number one solution used on Hollywood feature films." (Blackmagic n.d.)

DaVinci Resolve is an industry leading colour correcting tool that, at the time of this case, had just entered the offline editing market, attempting to compete with AVID, PremierePro and Final Cut Pro. The software's combination of world leading grading and editing capabilities was an ambitious product offering and was spoken about throughout the industry.

3. After the production of *Notes on Blindness*, the company would keep the grading suite for all of their commercial and short format work, and this would give them a competitive edge and an extra service in their portfolio (which they could subsequently charge for). This was consistent with the company's desire to operate as a complete 'in-house' solution.
4. The software would enable the company to maintain creative control in-house on non-commercial projects.

Booth described the motivation for buying the DaVinci Resolve suite:

> After Mike and Steve did *Next Goal Wins*, we paid a reasonable amount of money to a post-house to finish *NGW* and came out of that experience thinking: "You know what, it was a relatively unsatisfying experience in terms of what they did there was not so far from what we can see ourselves being able to do here." And Mike and Steve said, "Do we want to pay that much money on the next film, to have a relatively unsatisfactory experience at a post-house, or is it better to take the amount of money that we're gonna spend on post, invest it in our own equipment and do it all here? And then we can satisfy ourselves that it's done properly and done the way that we want it to be done.
>
> So that was one of the incentives behind buying this grading suite. We wanted to be able to do on *Notes on Blindness* what we couldn't do on *Next Goal Wins*, which is being able to finish the whole thing here. And that comes back to my point earlier about wanting to be able to do that whole process from one end to another. (Booth 2015; interview with Petkovic)

The company leaders seem to have bought into the post-production 'black box' that DaVinci Resolve was attempting to become. This was not naïve on their part, as the end-to-end mantra was reflected in the strategies of two of the most notable technology companies in that space. Blackmagic was probably the most ambitious and prone to claim making about the validity of its solutions, and Adobe was the market leader. Both had been highly successful offering their own distinct version of end-to-end workflow – the grand narrative and holy grail of independent film making.

Like many companies in the same market, Archer's Mark had been a loyal Final Cut Pro customer until the infamous and disruptive jump from Final Cut Pro 7 (FCP7) to Final Cut Pro X (FCPX)[42] forced them to rethink their post-production approach. Slowly, other

[42] FCPX was heralded as a disruptive breakthrough in video editing before its release. However, popular media publications showed a general consensus of major disappointment and astonishment around the release of FCPX. The user base slumped and FCPX became a frequent object of ridicule (Team Coco 2011; Motion Array 2014; Opam 2015).

non-linear editing (NLE) software, such as PremierePro and AVID, crept into their workspace, through pressure from clients or external collaborators. Their first feature length film, *Next Goal Wins*, was edited on FCP7, which was by then an aged software with no manufacturer support. Archer's Mark considered the whole endeavour a painful experience.

Notes on Blindness, with the biggest budget the young company had ever managed, presented Archer's Mark with the opportunity to invest in self-sufficiency and grow capacity in the very field that had caused them organisational problems and incurred around £40,000 in unanticipated costs during the finishing stages of *Next Goal Wins*. Their idea was to invest a similar amount of money into their own kit and keep the kit for other projects. However, a number of clashes hampered this plan.

First, a simple editing test proved that the current version of the software was insufficiently stable for work with 4K and higher, even though this had been one of the main sales claims. The original sales demonstration had worked amazingly well, but once the technology left the perfectly calibrated showroom, its operations became increasingly difficult. The initial idea was to cut the RED camera's original RAW files, but the first test proved that this would not be a viable option.

The alternative to working with the original RAW files was switching to proxies – or going 'off-line' –the traditional editing workflow on large films. [43] Switching to a more traditional workflow meant that DaVinci had to 'win over' the editor through user friendliness. But in the traditional workflow, it was hard to shift the editor to a new interface. Quantrill, who was an advanced user of the software and known for personalising the software interface (power usage and software personalisation will be discussed in Chapter 4), did not want to shift to a new software unless there were significant benefits for doing so on a critically important project.

[43] This process entails exporting lower resolution files of the original footage in a format that is compatible with the editing software. The lower resolution footage is called 'off-line' footage or 'proxies'.

When editing traditionally, with low resolution proxies, other software is more viable. PremierePro, for example, is much closer in user interface to the now redundant FCP7. As Quantrill, the editor, was an FCP7 specialist, DaVinci had little chance in a comparison to PremierePro.

What prevailed was editors' anxiety to edit the flagship feature, encumbered as they were with aggressive deadlines and an editing platform they did not feel fully comfortable with.

Second, very soon after Archer's Mark purchased and installed the studio suite, both Quantrill and the researcher started training on it with the aim of acquiring sufficient proficiency to edit with it. Neither person dwelled on DaVinci's grading aspect, for which the software is primarily known, as there was little doubt that the film's grading would be conducted in-house (since Archer's Mark had bought the best technology money could buy for this purpose). It was of no great relevance whether the in-house staff would do the grading work or an experienced freelance colourist would do so, as, either way, the goal of grading in-house would be achieved by the company's investment in the equipment.

As the staff started spending time with the DaVinci kit, a new conflict of interest arose. Archer's Mark's producers and managers felt that buying the most expensive piece of equipment and reserving it solely for *Notes on Blindness* would be unsustainable. From the first day, Brett and Jamison started selling the DaVinci grading suite as a package for finishing commercials, and within weeks, more time had been allocated to these projects than to *Notes on Blindness*. Intermittent work on the film was not an option once shooting began, and the crew warned the bosses that they needed maximum time with the DaVinci kit in order to prepare for the big project. However, financial reality prevailed – Brett, Jamison and Booth could not justify spending a large amount of money on the grading suite without immediately working to repay the investment.

These two reasons, relating to technical and financial anxieties, were enough to make the editor switch to PremierePro for the *Notes on Blindness* edit. However, there was also a physical issue: although the transition to PremierePro had been decided, the physical computer and space where this transition was supposed to occur was operating as the DaVinci suite, which had to run on the fastest and latest MacPro computer.

The producers found themselves in a situation that should have been predicted. Regardless of their choice of editing software, they knew that they would need to conduct the menial task of editing on the most exclusive hardware, which was also needed to pay back the investment that had been made in that hardware. Clearly, for the producers, the solution was to move editing to another machine or space; but such a move was risky, as all other equipment was outdated. Moving the project would pose new technical risks.

The heads of Archer's Mark saw a solution to this situation: investing in a new editing suite in addition to the DaVinci suite, in order to free the DaVinci suite for generating direct income. The new computer was placed in the space that had previously been designed for the production team, but as production advanced, the production team would be more flexible and on location more of the time, therefore freeing the editing space.

However, given that the production personnel and editors used the space simultaneously, as mentioned above, this did not turn out quite as intended.

Grading *Notes on Blindness* and unexpected complications

As film editing approached its various deadlines, the DaVinci suite was finally brought into action. All other activities on the suite were cleared and the suite was vacated. As the post-production personnel did not feel sufficiently specialised to tackle the company's longest and most innovative project, Archer's Mark planned to call in a freelance professional to grade on the premises. In the process of appointing this colour grader, all informal networks were explored and exhausted – a number of freelancers were contacted in the company's attempt to strike a balance between getting a good financial deal and ensuring a feature film experience. This led to a completely unforeseen issue: a freelance specialist could not be found.

> Every colourist we asked was either under contract with a post-house, or attached to his own set and not ready to move. (Ellison 2015; interview with Petkovic)

> All the reputable colourists are signed to post-houses. Freelance colourists tend to have their own setup… They don't want to. They were all like "Yeah yeah, but come see what I can do here, cause I work here and it's my setup, projectors and such." (Spinney 2016; interview with Petkovic)

All but one of the colourists who were approached by Archer's Mark were unprepared to use a grading system other than their own. The company had not anticipated this, and their anxiety over their DaVinci suite purchase grew. Still, rather than pressuring the production team to hire just any colourist who was prepared to use the in-house technology, they opted for a qualified and experienced person who would not use the in-house solution. This decision was consistent with their previous resolutions, in that the requirements of the film trumped all other considerations. But it was not a simple or unproblematic resolution.

The chosen colourist fulfilled two important criteria: he offered a low price if the grade could be done at his own place (a producer requirement) and he agreed with the directors' vision. His grading software/hardware kit was entirely different from that of Archer's Mark. It was called Baselite, and was a direct competitor of DaVinci, with an entirely different workflow. This decision to change location and software brought an array of additional transfer steps. In this case, the directors underestimated the work and were overwhelmed by the difficulty of making changes on the new software. However, Quantrill put the transfer issue into perspective:

> In general it's always a tricky thing with grades, especially on a project this size. Cause you go from the conform and that's not always a fun part. Using Premiere and RAW footage. (Quantrill 2015; interview with Petkovic)

The process of relinking proxies to the original high resolution[44] (in this case 6K) footage is notoriously complicated and technically tricky on large projects. In such projects, it tends to fall under the remit of editing assistants and DIT units, and in problematic situations it even has a dedicated position called the 'conform editor'. In *Notes on Blindness*, the process involved three software applications. From PremierePro, footage had to be conformed in the DaVinci suite before being transferred to Baselight through a complicated process of metadata export and relinking in different locations. This did not seem to faze the production team and the directors, but the length of the process meant that it would be especially important to find an adequate person for the task.

> What would've been much worse than changing site and moving to another operating system would be to work five days with someone that wasn't very good (Middleton 2015; interview with Petkovic)

[44] Conforming is a generic term that describes the process of reconnecting an edited sequence from low resolution proxies back to the original source material, whether this is on film or a high resolution digital signal (Green n.d.; Brown 2014).

Interestingly, the authority of the colourist of choice seemed to override all prior innovation ambitions and transcend any technical issue that could occur due to this unexpected move away from the in-house paradigm.

Colour management is one of the most technically demanding aspects of digital imaging acquisition, and the moving image is only one aspect of the larger technical narrative of colour management in digital print, photography, distribution and exposition.

There are many more affordable 'plug and play' prosumer colour correcting tools on the market then there were only a few years ago, just as there are many increasingly accessible tools in other realms of film production (such as editing and cinematography). Nevertheless, on a professional level, colour correction is still regarded as a highly specialised craft, requiring a mix of expert technical knowledge and the creative and artistic skills of the general film making process. Therefore, colour correcting specialists can easily exert strong authority over their craft. This situation of colour correction contrasts with that of other post-production and production roles, in which specialisation boundaries are increasingly deteriorating (as described in Chapter 1). The following section will briefly list the *Notes on Blindness* processes that were most affected by this deterioration of craft boundaries.

Blurred lines, everyone does everything

In small, close and closed networks – such as that comprised by the group of individuals who brought *Notes on Blindness* to fruition – workflows with clearly compartmentalised processes are problematic. First, as previously described, such networks exhibit a tightening of spaces, leading previously isolated practices and movements to intersect. Second, this tightening is problematised by another occurrence in the labour force: craftpersons begin to acquire knowledge of the entire workflow, and especially the phases that run adjacent to their core activities.

During the *Notes on Blindness* shoot, the crew size varied depending on the complexities of the scene. However, even with a hugely experienced DOP such as Garry Floyd, the directors still found moments to pick up the camera, point it and shoot. These moments were at first mostly limited to more basic shots, impressionist inserts and similar scenes.

The more demanding the technical setup (relating to movement and the number of extras), the more reliant and comfortable the directors were with the DOP's choices. However, as the shoot progressed, the delineation of tasks began to shift. The directors sought to 'look through the camera' occasionally before taking an actual shot, and eventually they simply shot, even in more complex shots.

This would slightly irritate the DOP, but in general he did not mind, as he considered the most important facets of the shot composition to remain fully in his control. Further, "giving them [the directors] that sense of control" seemed to soothe their creative state.

The directors' involvement in shooting was made possible due to their prior experience with the RED WEAPON camera. More precisely, it was the experience they had accrued from working overtime for Archer's Mark, directing commercials and other shorter pieces with the same in-house camera, that enabled them to feel comfortable with the high-end video recording device. When the directors filmed, the assistant cameraperson performed technical and metadata quality control.

The directors did not restrict themselves to operating the camera; they were also hands-on during post-production. However, the directors' involvement in editing was more contentious than their use of the camera, and this will be fully unpacked in Chapter 4 in the analysis of the role of the editor. Here, it merits attention in the context of the workflow.

Both directors had edited in their previous jobs and were well versed in the old version of Final Cut Pro (FCP7). Also, as indicated above, there was already a large chunk of previously edited sound in the film. In addition, and to further complicate matters, the directors also incorporated scenes from a previous short film into the feature length version (or reshot using the short film version as a visual reference). The first task of the editing team was therefore to convert two years' of work, bundled into one disordered project from FCP7, to a PremierePro project. It should be noted that, when using FCP7, the directors had disregarded conventional media management and file, resolution and sample rate consistency (in line with the prosumer-level usage). Thus, it took the editors considerable time to untangle the 2-year-old project clutter from the legacy software and transfer it successfully to the new software platform.

Furthermore, the directors actively edited on an editing station that was adjacent to the main station occupied by Quantrill, the head editor. At one point, the project had four editing computers in one room, together with the editor. The editor's assistant (the researcher) and both directors all edited different scenes, simultaneously. Anxiety and creative tension aside, this situation posed a new problem for the post-production crew. Having different versions of the same project on a platform that had not been specifically designed for collaborative editing required careful handling of the versions without help from an automated system.

Finally, the directors did not restrict themselves to using the auxiliary computers, but, as with their camera usage, as the project progressed they felt increasingly comfortable with taking the editor's seat and editing while the editor commented from the director's chair.

The directors weren't the only persons to usurp other specialisations. In addition to the DOP, the entire camera crew used the facilities of the DIT unit on set. This usage ranged from applying quick grades on shots they had just made to checking composition and colour on the monitor and formatting testing and short edits of two or three shots in succession to check whether 'it cut'. While the DOP did not involve himself in these tasks, the second assistant to the first unit and the head of the second unit were consistent in their interest in using grading and video editing software on set, and showed proficiency with this software to an intermediate level or beyond.

These short examples further reinforce the transformation of filmmaking craft roles, illustrating a loosening authority of certain specialisations and an increased focus on workflow.

DISCUSSION

In his seminal work, *Production Culture,* Caldwell notes that there are "at least three ways that film/video operate beyond instrumentalism: in machine design, in systems of use, and as coded cultural performances on the set" (Caldwell 2008, p. 153). The participant observation in this chapter has dwelled mainly on the final of these approaches, which is probably the most elusive of the three. Focussing on cultural performances on set can yield valuable information about deficiencies and issues in machine design and in the systems of use. By investigating the organisational labour principles created by new technologies, the anxieties experienced by craftspersons and the juxtaposition of the 'meaning' exercised by machines against the coping strategies of independent film practitioners, we are able to more accurately account the dynamics at play and speculate on the future of the medium.

A far cry from the Golden Age

A great deal of theoretical work has stressed that technological tools exert a similar influence on craft culture as do humans, simply through their use in the networked performance of a craft (Law 1992; Latour 1996; Caldwell 2008; Sennett 2008; Sporton 2015). Machines are not merely tools that reflect our world vision, but intelligent actors that shape and reshape our production values, relationships and production cultures.

The current situation of film production as a discipline in turmoil is partly due to the influence of new machines on production modes (Gunning 1986; Manovich 1999; Christensen 2013). The technologies that have replaced century-old processes are complex and ever changing, so independent practitioners are largely of the opinion that investing in technical expertise is, by default, a poor investment (No Film School 2015; KEWG International 2016). Larger studios feel similarly: it is easier to hire a company that

does only tech than to appropriate all relevant technologies and develop in-house experts for each one.[45]

This manner of operating stands in stark contrast to the vertical integration of studios in the 'Golden Era' of film production.

> For much of motion picture history, Los Angeles has been the global centre of feature film production with Hollywood's vertically integrated studios providing one-stop facilities catering for any scale of production. Today, the studio set-up paints a very different picture as the industry reacts to the fast-evolving digital landscape of film production and newly forming business strategies. (Sergi 2012)

As written in *Production Culture*:

> This situation is a far cry from the nostalgic descriptions of a golden age when studios cultivated both in-house technical accomplishment and a sense of interpersonal cohesion through the notion of "a close knit colony of artists". (Caldwell 2008, p. 155)

Across the economy, the general situation in craft labour has moved away from that exemplified by mid-twentieth century institutions, in which the binding factors were shared commitment and sharp mutual exchanges, even amidst strong hierarchy (Sennett 2008, p. 31). High-end film production, in particular, has bought into new globalised market-driven production ecosystems. In return, high-end studio products are notably unvaried and growing increasingly rigid (Thompson 2014). The strategy described is to assign larger budgets to fewer 'tent-pole' productions. This is considered a risky move by some, considering that the gaming industry utilised the same strategy a few years back, and this led to a number of large gaming companies going bankrupt (Rainey 2016).

Paradoxically, for a media practice in a self-proclaimed crises, 2015 saw the highest spending on film production as well as the highest earnings for industry produced films, globally (Rentrak 2016).[46] However, the situation is much more volatile than recent

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[45] Michael Cioni, the CEO of Light Iron, a leading digital technology solutions and DIT company that caters to the US studio industry, has speculated about the ambiguity of new technical positions in film production (Cioni 2015). What preoccupies him most is the consistent lack of understanding about new workflows and the level of management needed to implement new processes, due to this lack of understanding. This is why – on a large, industry scale – companies such as Light Iron continue to thrive. Production outsources digital workflow management to a third party, at a considerable cost (Kendricksen 2013).

[46] It is unclear whether this document accounts for inflation.

numbers show. Looking at the last five years only, one can see the biggest slump in movie-going audiences on one side and the biggest sales on the other (BFI 2014; MPAA 2015). This discrepancy can be accounted for by the steep rise in ticket prices due to mark-ups on exhibition solutions such as 3D and IMAX, which in turn complicate the production process. With the escalating affordability of production tools, adoption of the latest business trends[47] and unprecedented market volatility, the big studios are demanding increasingly bigger productions for less and less money.

As the stakes become higher for high-end cinema, filmic exploration and experimentation are becoming unwelcome eccentricities. Independent filmmaking was traditionally a space in which filmmakers could engage in such practices. This is still true, though independent filmmaking is now going through its own period of anxiety. The reality for independent filmmaking is that the prevalent business model does not seem conducive for making films with a strong individual idea. At the expense of efficiency, independent filmmaking keeps wrestling with the trends by innovating its production organisation and appropriating existing and affordable tools, as the experience of Archer's Mark shows very clearly.

On the basis of participant observation of one of the most successful films to have been produced in the United Kingdom in 2016, this thesis sketches the argument that independent filmmakers are choosing a production model that, in many ways, contradicts the globalised workforce model ushered in by new technologies, in order to preserve authority over the film idea and defend experimental agency. This production model, somewhat surprisingly, engenders in its own way a tight sense of community and

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[47] The Netflix culture document was first published in 2009 and has been reworked each year since: "We're a team, not a family"; "We're like a pro sports team, not a kids' recreational team"; "Coaches' job at every level of Netflix is to hire, develop and cut smartly, so we have starts on every position" (Netflix 2016).

The film industry has adopted the same ethos as the contemporary IT business model, replacing the word "family" with the word "team". There is no job security; rather, everyone is considered replaceable, efficiency is the keyword and meeting targets only measure value to the group. It seems only a matter of time before studios will embrace the VORP score technology (Value Over Replacement Player – a statistic popularised in baseball that demonstrates how much a hitter contributes offensively or how much a pitcher contributes to his team in comparison to a fictitious 'replacement player' (Woolner 2001)) to measure the value of their employees, as is already done in the IT sector.

the integration of production processes – traits most commonly ascribed to the early cinema studio era.

In-house production: The coping mechanism

Most of the examples cited in this chapter navigated the concept of what was defined by informants as "in-house" production. The in-house idea proved, however, to be much more flexibly and ambiguously defined than expected; it was mentioned with great frequency in many contexts and used to justify many different approaches. We can easily discern the contradictions between the 'soapbox pitch' and the reality of pursuing something as ill-defined as an in-house workflow. A balancing act operates between playing into the economic narrative of self-sufficiency and control over the creative purpose and using in-house as an alibi for creating mechanisms to protect a project from the negative consequences of the modern production culture. Such negative consequences are expressed in the work of Hesmondhalgh and Sennet, for example (Sennett 2008; Hesmondhalgh & Baker 2010; Hesmondhalgh & Baker 2011), who claim that various creative cultures share "expressions of victimisation and anger on the part of many workers; a sense of being on the receiving end of harsh and aggressive treatment" (Hesmondhalgh & Baker 2010, p. 17).

The rationale for this sense of disaffection and anxiety can be found in the organisational economics of the film industry, itself. What we know as the traditional project-based system of film development and production, characterised by the demise of traditional linear careers and punctuated by short-term project-based employment and informal personal networks (Hirsch 1972; Miles & Snow 1986; Powel 1990), was adopted by the film industry from the late 1950s onwards (Balio 1985). Today, it remains the most ubiquitous organisational form in the industry (Reich 1991).

The psychological effects of the organisational and economic pressures in contemporary creative cultures were initially elided by academia, especially in the 1980s, when individual workers were seen "not as subjectivities, as unique individuals or social psyches, but as bearers of an objective structure or relations of production and reproduction which are conditioned not by psychology but by history" (Clegg & Dunkerley 1980, p. 400; cited by Thompson & McHugh 2009, p. 15). This thesis disputes this viewpoint and instead claims that, in an analysis of organisational systems, one must take into account multiple factors, including (but not limited to) the historical. The actions of the individuals involved in the production of *Notes on Blindness* strengthen the

argument that psychological factors significantly affect the organisational structure and culture that is chosen by the individuals. This method of developing and justifying choices of 'in-house' production and the importance of maintaining an association with the moniker 'independent' combine into a powerful method associated with a creative and occupational identity for participants.

The in-house work method thus strengthens the sense of independence in the phrase 'independent film'. For Geof and Auslander, the notion of independence in independent film is not one of an idealised true essence, but one relating to a cultural construct. No independent film has ever been entirely void of institutional input, industry collaboration or larger industry distribution networks (King 2013, p. 17). The same can be said of *Notes on Blindness*. The participants in *Notes on Blindness* did not see in-house as the absolute definition of filmic integrity and efficacy. Rather, they chose the intrinsic potential of the in-house model as a figurative goal to strive towards, but were also ready to compromise. On the other hand, the term 'independent' should not be entirely dismissed as instable or undefinable, as it elicits another fixed aspect in such films – the strong individual vision of (often) young filmmakers (Tzioumakis 2006, p. 1).

> Ideally, an indie is a fresh, low-budget movie with a gritty style and offbeat subject matter that express the filmmaker's personal vision. (Levy 1999, p. 505)

The direct communication and strong bonding that was described above should therefore not be considered a defining trait of *Notes of Blindness*. Rather, it is the major characteristic of independent film, of which *Notes on Blindness* is a representative sample. Also, as shown above, a range of complex dynamics and deviations from the aspirations of in-house workflows indicate that the notion of independence can still be asserted even when problems are resolved in a way that is far from independent, in the sense of self-reliance.

Given the perpetually dwindling number of 'secure' jobs in production studios, further deterioration of film industry unions (which previously stood for a sense of belonging to a larger craft narrative) and the new role of the Internet and technologies, which alienate workers from both the workplace and other workers (Saundry et al. 2007; Banks 2010), it is a surprise to see direct collegiality achieved by the in-house system. It is clear that a sense of belonging to a cooperative is still an important aspect of creative industry craft identity (Sennett 2008). The in-house production model represents an active attempt to

compensate for the increased lack of formal alliances with other craft practitioners, through the creation of strong personal bonds in a small, insular community.

In more recent years, major studios have taken on international migration patterns and begun to outsource their services overseas. This has led to a rise in specialised studio facilities selling only one comprehensive service (Sergi 2012).

Such patterns might seduce independent producers into emulating the model of major studios, on the basis that it must represent significantly better efficiency and access to talent. On the face of it, independent film producers should be the biggest beneficiaries of the globalised talent market and the dwindling cost of technologies. However, if this were the case, why did the producers of *Notes on Blindness* pursue the opposite strategy so insistently? An even better question is: Why did they find outsourcing and stepping out of the in-house perspective such an unsatisfactory experience (in relation to both the special effects shot and sound editing)?

To answer this question, one must look at the actual product and the individual workers' commitment to pursuing a 'good job'. In contrast to the industrialised output of major studios that was discussed earlier, independent filmmakers take pride in delivering 'good work', as reflected through the artistic integrity of the final product (Sennett 2011). Although the notion of doing good work is underdefined and possibly dubious,[48] one might ask: What happens when a crew firmly believes that the product and their labour are 'good work', in the sense that it is both of high professional quality and reflects a level of social good (i.e. a unique artistic expression)? The need arises to bundle the proximate capacities together and keep them protected from all anxieties, discontents and frustrations. It seems natural that such an insular group would have a hard time communicating with other groups (such as businesses it has outsourced work to), given it has so much invested in its own notion of good work.

[48] "[W]orkers may have good experiences of work that is oriented towards limited, or even ethically dubious ends. This might be called the Oppenheimer problem. As Richard Sennett discusses, Robert Oppenheimer, director of the Los Alamos project that created the world's first atomic bomb, wrote in his diary: 'When you see something that is technically sweet, you go ahead and do it and you argue about what to do about it only after you have had your technical success'" (Sennett 2008: 2).

Sennett holds community (and community engagement) as a basic pillar of craftsmanship. In an environment lacking formal community pillars, informal connections become paramount as the only available alternative for validating the craft act. Such a Marxist view is somewhat reflected in this thesis. Although the motives for a group of like-minded craftspersons to turn inwards might be primarily economical, strategies for maintaining a level of craft that will result in 'craftsman's pride' revolve around community and engagement, often to the detriment of economic benefit (e.g. the *Notes on Blindness* crew worked for only a modest salary).

Furthermore, it should be noted that, in this case, the individuals were not yet masters of their craft but people who were clearly aiming at becoming so. The key people involved in the production of *Notes on Blindness* were close to achieving the benchmark set by the popular credo: "to master a skill you need 10,000 hours of practice" (Ericsson et al. 1993; Gladwell 2008). However, they were not yet at that point. This brings forward another consideration – the individual craftspersons of *Notes on Blindness* utilised closed groups and closed doors to reduce their insecurity in their craft and deliver – unhindered and unsupervised – to the best of their abilities.

According to Ellison, it would have been impossible to relay an unusual idea to a team that was out of sync, creatively and socially. This sounds a bit like the 'soapbox' production spiel – a justification for drawing production inwards – but it was proven true during production. Team members who were acquired in manners typical of modern production (with no regard to physical proximity) proved the most difficult to work with. Outsourced workers, in particular, found the closed group difficult to appease.

Or, to give an example from television, a producer may take great pride in putting together a programme that is slickly appealing and amusing about the pleasures of motor vehicles. But if this programme serves to trivialise and distort serious issues of consequence for societies, including climate change and consumerism, then should this really be understood as good work? (Hesmondhalgh & Baker 2011)

Given the lack of managerial figures on *Notes on Blindness*, it fell to the producer to safeguard the creative intent of the individual practitioners – particularly the directors. In this context, the producer cultivated trust, intimacy and sense of purpose to make up for the cost effectiveness they had sacrificed by not hiring the cheapest service providers for the standards required. Both academia and professional spheres would benefit from further inquiry into the subjective state of these individual practitioners, including their fears, anxieties and personal aspirations, in order to better understand the effect of these simple human traits on what is produced by the process.

Technological turmoil and further complications

The research into *Notes on Blindness* offers insights into the grassroots uptake of certain technologies and the practical problems that can occur in the diffusion of innovations (Moore 2002; Rogers 2010). The bell curve and the chasm that Rogers and Moore identify were observed as predicted and their basic presumptions were not questioned. The focus of this thesis is the day-to-day dynamics between machines and humans and the negotiation and exchange between actors with equal agency.

The examples cited in the results section navigate around two challenges: Issues of innovation within the in-house team, and the issues of convergence and accumulation of technologies due to continuous innovation.

The two cases of attempts at innovation present a mixed picture. Predominantly, they illustrate a mixture of successes and learning curves of varying slopes. What stands out the most are the unexpected issues that arose after the new technology of the DaVinci suite was adopted.

In a time of converging content consumption, we are also experiencing diverging modes of production of that same content (Jenkins 2006, p. 15). Considerably less academic data concentrates on divergence in modes of production, than there is on convergence in media consumption. Notwithstanding several works combining media production, convergence and process management (Lawson-Borders 2003; Jenkins 2006; Caldwell 2008), an alarmingly small volume of academic work has studied the practical problems of convergence/divergence in production processes. The present study of Archer's Mark and their workflow changes for *Notes on Blindness* offers such an account.

Today, most software and hardware producers recognise that, to the largest proportion of their market, streamlined workflow is more important than picture quality. This can be deduced from the actions of contemporary market leaders such as Adobe and Blackmagic, whose strategic decisions signal an acknowledgement that filmmaking craftspersons are fatigued with the issues that arise from puzzling different products together (e.g. interoperability and connectivity). Their promises, expressed in slogans such as "end-to-end" and "all-in-one", aim at tackling this fatigue. For most manufacturers, it seems that the issue of interoperability is solved by offering as much of the workflow as possible in one package. If we revisit the Blackmagic DaVinci site mentioned earlier, we can witness this focus on the workflow, firsthand:

> DaVinci Resolve 12.5 combines professional non-linear video editing with the world's most advanced colour corrector so now you can edit, colour correct, finish and deliver all from one system! DaVinci Resolve is completely scalable and resolution independent so it can be used on set, in a small studio or integrated into the largest Hollywood production pipeline! From creative editing and multi camera television production to high end finishing and colour correction, only DaVinci Resolve features the creative tools, compatibility, speed and legendary image quality you need to manage your entire workflow, which is why it is the number one solution used on Hollywood feature films. (Blackmagic n.d.)

If we accept that these claims are made in good faith, we might conclude that it was reasonable for Archer's Mark to buy into the Blackmagic pitch, given their in-house ambitions. They observed the live tests of the software and, given that they were already looking for a high-end grading solution, decided to invest. When they hit the first economic issues relating to usage priorities between projects, and later, when they decided not to use the software to edit *Notes on Blindness*, there was not much to worry about, as alternatives were at hand, in-house.

However when the company was unable to hire a colourist to work on the new machine, they were visibly surprised and disappointed. They had made a misstep in acquiring a kit that was unlikely to return their investment in the short term; more than this, they could no longer attract an expert craftsperson to strengthen their in-house community and increase the grading capacity of their post-production staff.

This event is symptomatic of the age of convergence. Cheskin Research warns that the idea of convergence is dated, and that any assumption that all devices will converge into a single device that will do everything – an ultimate black box – is fundamentally flawed. As Jenkins warns, this is a fallacy; we see more and more black boxes filling our space, promising to be the ultimate one, yet our understanding of how they fulfil their function is opaque. Jenkins also warns of the following:

> This pull towards more specialised media appliances coexists with a push toward more generic devices. We can see the proliferation of black boxes as symptomatic of a moment of convergence: because no one is sure what kinds of functions should be combined, we are forced to buy a range of specialized and incompatible appliances. On the other end of the spectrum, we may also be forced to deal with an escalation of functions within the same media appliance, functions that decrease the ability of that appliance to serve its original function. (Jenkins 2006, p. 15)

The crux of this quote is that no one is sure of the kinds of functions that should be combined. This space of uncertainty is the same space that is bombarded by the advertising slogans for film production models. Just as smartphones are now being sold as devices capable of much more than telephoning, post-production tools are being advertised as capable of a plethora of operations outside their core function. This could explain why Archer's Mark did not foresee issues when assigning their hopes to one of the many new black boxes. But what about the colourists and their attachment to their own software/hardware setups?

The answer to this might be less abstract than expected. The colourist – at least the good colourist – occupies an interesting place in the film ecosystem. She or he is a product of digital technology, itself, and is considered to have taken ownership of one of the most technologically specialised aspects of cinema – colour management. One should note that the history of the colourist is a complex narrative of conflicts with the camera department.[49] Colour is considered an important artistic element, while also technically difficult to replicate (Stauder & Blondé 2004; Trémeau et al. 2008). This makes colour software, hardware and colourists, themselves, highly specialised in the workflow. The power struggle for colour authority ownership has been translated into many attempts to

[49] Lucas' thesis describes, in amazing detail, the production complications that DOPs consider the fault of colourists (Lucas 2011, pp.122–147)

introduce standards to regulate the colour management process, which, until recently, have all been more or less unsuccessful (Duiker et al. 2015).

Therefore, it can be asserted that the colour specialist feels a great amount of anxiety when parting with a familiar colour management setup. As demonstrated in this research, most are not prepared to shift from their existing setup or to take risks with equipment they have little control over or experience with.

A high degree of specialisation the colourist holds is becoming increasingly rare in the independent filmmaking workflow. The in-house model, for example, seems to assign less value to such specialist knowledge and more significance to multitasking 'play' within its circle. The physical proximity of subteams results in constant tinkering with equipment by the entire crew, who feel empowered and able to intervene. As described above, crew members habitually cross craft boundaries – the team multitasks.

> Today, greater premium is placed on the technical and conceptual multitasking skills that younger worker bring organisations. (Mayer et al. 2010, p. 216)

It should be emphasised that, in cinema, multitasking is nothing new. Charlie Chaplin composed his own music, Dreyer did his own production design and Cronenberg and Tarkovsky often held the camera; however multitasking is now more relevant than ever (Knudsen 2016). Although focussed on screenwriting, Knudsen advocates for the "total filmmaker" (one who is capable of fulfilling most production roles) or, when at least three persons are in charge of screenwriting, directing and editing, for each to be fully informed/educated of the intricacies of each craft (Knudsen 2016, ch. 3). This view, while plausible hypothetically, is rare in actuality due to the technical intricacy and cost of filmmaking. The idea underplays the complexity of each task in the modern workflow. Amalgamation of the key narrative processes into a single craft/role may be possible on small projects, but Knudsen specifically points at the potential for this approach in long form narrative cinema, which certainly reveals a lack of detailed knowledge of filmmaking processes. Knudsen goes further in praising democratised craft technologies, ignoring the phenomena that drive an increase in multitasking, which are more often than not a matter of existential and financial survival.

As is often the case, there is an element of truth in Knudsen's proposals, despite their controversial nature and failure to understand the role of the specialist. The convenience of using the binary code as a common denominator undoubtedly invites craftspersons to explore production disciplines that are adjacent to their own speciality (Murch 1999). The in-house approach seems to protect this idea by shielding craftspersons from the real drivers of multitasking and using in-house as a means of creating a single entity (if not a single person) with complete responsibility, capacity and agency in the filmmaking process.

One additional aspect that hinders the play factor within the in-house workflow model is another convergence issue – the accumulation of older technologies. Craftspersons are forced to keep specialising within their core activity, given the rise in different ways of accomplishing this core specialisation. Simultaneously, they are expected to increase their horizontal knowledge to incorporate processes that are adjacent to their specialisation. The constant search for improved technology and processes demands increasingly deep and narrow knowledge and practice, with tremendous risk to the craftsperson of a revolutionising technology that will make him or her redundant.

This individual struggle is defined in detail in Chapter 4, in which Quantrill, the editor of *Notes on Blindness,* is used as an example. Quantrill must continue to specialise in his editing craft due to the accumulation of editing software and in-out hardware, while also increasing his knowledge of adjacent crafts such as colour grading and audio design. In the case of workflow, in general, it cannot be discounted that the specific workflow of one project occurs simultaneously with that of other projects, which require different types of attention depending on their progress and nature. Therefore, viewing a workflow as an isolated event and attempting to solve it through operational checklists (Swenberg 2012) is inefficient. The in-house model seems to exist to minimalise external influences on human agents, but it is not immune to the effects of the accumulation of new and old technologies, as was seen during the observation.

Not that far from the Golden Age after all

Is the in-house solution something an independent film production company should strive for? It might be easy to answer yes, but not all projects are created equal, and not all independent production entities are the same, as discussed above. However, in-house, as practised by Archer's Mark, does set out a viable option for small/medium production companies with ambitions and a strong work ethic.

As a business model, striking larger contracts with a smaller number of high-end commercial brands (such as Nike, in the case of Archer's Mark) allows for greater investment in infrastructure and less need to offer varied styles to appeal to more customers. As described in Chapter 2, Archer's Mark branded itself as a niche advertising company, and this allowed them to sell a style rather than to consistently adapt to the demands of impulsive marketing officers of different brands. Such branding of production firms is a recognised trend in the film industry (Caldwell 2008, pp. 245–256), in which a number of high-end companies follow the fundamental approach of Don Schultz and 'integrated marketing techniques' (Schultz 1992; Kim et al. 2004). For Archer's Mark, this niche characterisation was also true of their feature film department. Their first film was a sports documentary, in line with the general format of their advertising campaigns (stylised mini documentaries). The second documentary had nothing of the sports theme, but was shot and edited contiguously with the house style. It is possible that the in-house model fit a particular group of creative individuals with a strongly formulated visual language and the will to guard their specific vision.

Further, and most importantly, this research asserts a certain revival of the craft workshop that is described so romantically by Sennet (Sennett 2008; Hesmondhalgh & Baker 2011). These workshops are ultra-dense creative spaces where craftspersons safeguard and nurture their creative impulses while remaining shielded from the negative aspects of the modern technological and economic upheaval. Such workshops are loosely defined and negotiated through constant compromise with external factors; nevertheless, they are delineated spaces that dictate their own norms. There is unquestionably a need for more research on the human organisational and behavioural consequences of new film production workflows. As this study has shown, such workflows may be amongst the last examples of the remaining atelier, despite (and possibly because of) their technological complexity and dependency.

The networks that are formed inside these workshops are not formed through industrial self-disclosure and doublespeak (Caldwell 2008). Rather, they are the result of shared anxieties in corroded work situations, as ushered in by new technologies. In this organisational model, independent filmmakers –craftspersons – shield their autonomy from these potent external factors and consequently conserve their autonomy as a necessary ingredient in the process of elevating their craft into art. This autonomy is described by the historians Margot and Rudolf Wittkower as a prerequisite for

craftspersons to transcend their discipline and become artists (Wittkower & Wittkower 2006; Sennett 2008).

On the basis of recent trends in television and broadcasting, we might conclude that we are moving towards increasingly automated workflow processes:

> Since automation can be defined in the wider sense as the use of equipment to replace mental and manual labour, any repetitive process in the broadcast chain can possibly be replaced by some form of software application. (Austerberry 2011, p. 8)

However, the desire to conquer the interoperability issues brought about by the plethora of technologies might render us incapable of 'playing' with technologies and seeing what comes of this play (Sporton 2015). The in-house workflow offers a possible refuge in which human error and experiment can be retained in the creative process, despite an ecology that increasingly eliminates the human factor from its workflow. This 'collective tinkering' may produce unexpected results (von Busch 2013) without consequences for the craftsperson's industrial standing.

Finally, it should be noted that the in-house model is quite the opposite of Brockman's vision of connective social organisation – or togetherness in networks, as he described in relation to the organisational politics of the Internet (Broeckmann 1999). Similarly, the model does not resemble Sennett's network of Linux programmers (Sennett 2008). The distinction is that this kind of 'social making' (Carpenter 2011) is conditioned by real physical proximity. And although this proximity can create a chaotic workflow, the workshop's:

> [V]ery essence lies in the personalised, face-to-face authority of knowledge. [...] Since there can be no skilled work without standards, it is indefinitely preferable that these standards be embodied in a human being that in a lifeless, static code of practice. (Sennett 2008, p. 80)

Sennett's vision of human agency and cooperation inevitably leads one to question the 'human being' on which it relies so avidly. The craftsperson, just like the technology that he or she is surrounded by and the production culture he or she composes together with this technology, is not a fixed value. Therefore, the following chapter will take a detailed look at the experiences of two craft roles in the production of *Notes on Blindness*. Maintaining the emphasis on post-production, the chapter will examine the roles of editor and digital imaging technician. These accounts of individual experiences of the production culture will shed valuable light on the feasibility and sustainability of the organisational forms described in this chapter. They will also elaborate on changes in technological appropriation and filmmaking practices on the user interface level, and further explore the effects of the blurring of craft lines. Finally, the chapter will propose a set of best practices for craftspersons weathering the technological maelstrom.

Chapter 4:
Individual experience in new post-production workflows: Perspectives on the editor and DIT

Previous chapters have outlined the characteristics of individual professionals in the craft of filmmaking and taken a bird's eye view of the entire workflow structure. This chapter will now take a closer look at examples of individual human components of the described workflow. Individual appropriation of a workflow depends on the practising individuals and their mind-sets regarding the imposed and invented structures. The chapter will observe how individuals reshape their environment and dictate the direction in which new workflows move. Finally, descriptions of individual workers' personal relationships with software tools will provide insight into the pressures these individuals face in the dynamic and multifaceted modern filmmaking workflow.

More precisely, this chapter will examine two positions in film post-production. One position is long established and elementary to the definition of film, and the other surfaced in line with the transition to digital recording. These positions are, respectively, the editor and the digital imaging technician (DIT). As in the previous chapter, here, the text is structured to first present the observational results and provide examples of grouped deep texts, and thereafter to link to the findings of existing literature.

The editor

The role of the film/video editor is highly flexible, requiring constant adaptation to new technologies. The role is also essential to the process of filmmaking. The digital intermediate – a 'rupture' period in film processes – would have been unthinkable without the editor's rapid uptake of computer technologies for editing.

> Despite the additional steps in this process, the convenience of avoiding tape- or glue-splicing and the ability to instantly review one's work led to the rapid adoption of computer-based editing. (Lucas, p. 2)

By complicating the technological route to the final product, the editor's role in the filmmaking process has also become more complex. In the creative process, the editor can be considered a broker and a translator. He or she is often the first person a director converses with after seeing the footage, as the editor is responsible for translating the

director's ideas to the audience using the available material. The editor is also a broker between the director and the technology in the workflow, responsible for channelling a director's vision and allowing the director to remain in a reflexive state during the creative process without complicating his or her vision with details of the technological process.

At the present moment, however, this idealised framing of the editor's position is further from reality than one would think (and further than editors would like).

The editing process of *Notes on Blindness* was representative of the situation that editors face today. Although the film was innovative and therefore not necessarily representative of the most common creative path, its innovative nature ultimately compressed the typical editing workflow, forcing editors to tackle the standard challenges of editing in a much shorter period of time. For example, when working with a new piece of software and hardware, the editor, Quantrill, encountered a number of issues that were quite typical of editing work. Further, as described in Chapter 2, the film was edited in an independent production house that shared several recognisable features with the majority of smaller production houses; thus, Quantrill's experience was likely similar to those of most editors at comparable production companies.

Editing *Notes on Blindness*: Observations

> An editor, it sort of progressed over the years. I still think that editor's core job is to guide the telling of the story. Now obviously it's very technical-based, and I don't think you can go into a job not knowing basic level of tech. Cause you otherwise you just sit in front of a desk, not able to do anything. (Quantrill 2015; interview with Petkovic)

As Archer's Mark took the lead on *Notes on Blindness*, providing logistics and infrastructure assistance, they also tied their main editor to the project. Quantrill had been involved with Archer's Mark since the company's early days. Initially, he had been hired as a freelancer, but he was soon offered a fixed position in recognition of his work on a number of successful projects.

Quantrill had a technical background and was highly versed in the technical facets of editing. He had edited Archer's Mark's first long format documentary, *Next Goal Wins*, and Brett, Jamison and Booth all saw *Notes on Blindness* as a clear next step in Quantrill's career. Quantrill was a soft-spoken and flexible person to work with, according to his colleagues. Although he was praised by his colleagues as a good storytelling editor with a strong sense of visual rhythm, he was often insecure when interacting with professional colleagues with a storytelling (rather than a technical) background and approach. However, this likely improved after the successful reception of *Notes on Blindness*. "First feature length is a big deal, makes all the difference" (Quantrill 2015; notes by Petkovic)

The researcher was Quantrill's assistant editor – a position that allowed for particularly close observation. The two other people who were directly involved in editing the film were the directors, Middleton and Spinney.

Transitory technology, space and movement

Quantrill thought of himself as an FCP7 editor. Having learned the craft on Apple's seminal software, he was one of many individuals who had honed his craft during the DSLR revolution, with the rise of affordable editing software solutions.[50]

Quantrill's first long form project, *Next Goal Wins*, was directed by Brett and Jamison and edited on FCP7; this came to be a disheartening experience for Quantrill. The FCP7 software, which had once been dominant in video editing, had been abandoned by Apple after their release of FCPX, which was often proclaimed as a 'disruptive innovation' (Cioni 2011; Dudas 2012). The FCP7 user base immediately migrated to two alternative platforms, AVID and PremierePro. Many businesses with post-production facilities faced a dilemma in whether – and for how long – they should use FCP7 as their main editing platform (now without customer support) before embarking on a costly and risky changeover to

[50] The DSLR revolution is a popular name for a surge in the usage of photographic cameras in prosumer and high-end cinema and television production. The affordable photo cameras, which are capable of recording in full HD, have been at the root of the explosion in digital content since the mid-2000s. The trend started with the now iconic Canon 5D mark ii and a short film, *Reverie*, by Vincent Laforet. The revolution marked a few significant leaps: first, a jump in quality towards video emulating the 'cinematic look' and, second, the affordability of high-end, large sensor cameras and therefore a rapid increase in the prosumer, semi-professional and professional filmmaker base, which became capable of outputting video quality that had previously been owned by high-end production houses, only.

new software. Businesses with contracted post-production staff had to invest in courses for staff to train on other software.

Archer's Mark, which depended largely on freelancers and short advertising projects meant for Internet distribution, did not need to switch quite so urgently. Rather, the company ran newer programs in parallel with older software, but on stronger systems. However, *Notes on Blindness*, their largest project to date, could not be edited on FCP7. Not only had Quantrill had a harrowing experience on his previous high level project with Archer's Mark, but the FCP7 workflow could not support for any newer technological developments, such as 4K (and higher) formats and RAW files. Further, the lack of manufacturer support, an inability to utilise up-to-date computer memory and slow and limited rendering engine options made FCP7 incompatible with modern workflows.

As mentioned in Chapter 3, DaVinci came rapidly into contention because of its promise of seamless 4K+ editing. However, it took only a few tests with random material from the Archer's Mark database to prove that the software's claim was nothing more than a sales pitch. Quantrill imported around ten minutes of random R3D 4K material, and the software kept its smooth playback and responsiveness. However, he then simply stacked two shots on top of each other and gave the top layer 50% opacity, creating a superimposition. The program began to lag in playback and needed render time. After a few more tests, Quantrill was convinced that DaVinci was not ready to handle an intricate edit with tens of hours of 4K (or higher resolution) material. Thereafter, he dabbled with AVID before deciding on PremierePro. To an experienced editor, PremierePro might appear most similar to FCP7, as it has a similar user experience. Quantrill was of the opinion that PremierePro improved on FCP7 but was similar enough that it would not be too difficult for him to switch to it – ensuring the project would not be put in jeopardy.

The following situations are examples of a range of issues that are typically faced by film/video editors, relating to the way in which they internalise new situations and shape the space around them, accordingly.

Example 1: Accumulating interfaces and dealing with legacy issues

On *Notes on Blindness*, the change in editing software did not go smoothly. *Notes on Blindness* was not a new project; the directors had already been working on it for more than a year. Further, the peculiar nature of the pre-existing audio meant that there was already an audio edit to start from. All of this work had been done on FCP7.

The only way to continue with the existing project was to convert the existing files into a PremierePro project. This was a more difficult task than expected, as the original files had been generated and managed by non-editors (the directors), who had used FCP7 due to its intuitive ease of use rather than its capabilities for media management.

The numerous switching between interfaces irritated Quantrill, who claimed that "it increased the human error" possibility. He also thought that computer error would be more difficult to detect – if also less likely to occur – due to the frequent changes in interface. Quantrill quickly adjusted to PremierePro and was mostly delighted by the software's improvements on FCP7. Within days, he stopped looking at FCP7 in nostalgic terms. Even more, the back and forth shifting from old to new increased his irritation with FCP7. He still had the superior speed of use on the old software, but the flexibility of PremierePro was a positive gain against a loss in speed.

During the film edit, Quantrill was regularly pulled away from the project in order to assist with other projects at Archer's Mark. After all, he was the Head of Post-Production and most technological issues fell under his remit. Thus, at the start of the edit, Quantrill was sometimes forced to revisit FCP7 and work occasionally with AVID. Each time he came back to *Notes on Blindness*, he expressed his need to "get into the mood". In this way, he was referring to letting his "muscle memory", as Ellis calls it (Ellis 2015, p. 24), kick in and for the interface between editor and computer to fade into the background so the focus could come back to the film.

Another legacy issue was Archer's Mark's outdated server, which was incompatible with the file sizes of the 6K images. The server was used only for backup and the edit was done from a local RAID storage unit containing proxy HD footage.

This already intricate mishmash of new and old interfaces is further complicated when it is taken into account that the editor is not the only person making executive decisions. In an independent film context, where there is often no single person managing the entire procedure, the DOP can also make decisions that affect the post-production process. One final example in this section (albeit somewhat tangential) illustrates this situation:

During the *Notes on Blindness* edit, Quantrill was tasked with managing various smaller projects that were running in parallel. One of these projects was a complicated interactive shoot for YouTube. The shoot was being edited by two other editors, who changed during the process due to complications with the first editor and problems with the file

transcoding. Quantrill was called to solve a particular issue – the project did not link to the original files and was impossible to conform. The film had been shot on a new specialised camera called a CODEX, which can be described as a high-end version of a GoPro – a small and sturdy camera that can easily be attached to other objects. The main difference between a GoPro and a CODEX is that the latter can shoot most professional formats.

The DOP, having a choice between almost 20 formats, decided to use the 12 bit RAW dpx sequence. This was a surprising choice, for the RAW dpx format was the only format that was incompatible with all of Archer's Mark's software. The 12 bit dpx sequence is one of three dpx sequences available on a CODEX camera (10, 12 and 16 bit). The 10 and 16 bit sequences are widely available and readable, but the 12 bit sequence is rare. Rather eccentrically, the DOP chose that very format. The difficulty with this decision arose not only from the seeming randomness of the choice of a rare and complex format, but also from the fact that the DOP had the option to shoot in Prores and DNxHD – either of which would have been high quality and post-production friendly formats. Further, the DOP chose the 12 bit RAW format to shoot material that would end up on YouTube – a platform that does not require or even support this resolution.

When interviewed, Quantrill initially conformed to the industry-driven narrative of the editor as storyteller. This narrative is still vibrant and thriving, spanning most online and offline industry outlets (Renee 2013; Reynolds 2013; London Film School 2017). However, the difference between the imagined perception of the work of an editor and the reality of the lived experience is stark (Caldwell 2008, ch. 4; Caldwell 2013). At the beginning of the *Notes on Blindness* edit, Quantrill's first instinct was to consider the work of an editor to be one of a narrator – the first person immersed in the material. Days later, he would mutter about the reality of the craft, emphasising the accumulation of editing software and how he was expected to know all of it. For Quantrill, the primacy of storytelling as a defining skill for an editor was conditional on actually knowing how to execute it on various platforms.

Yasuyuki Otsuki, the motion graphic compositor, mentioned how interesting he found it that the freelancers at Archer's Mark knew so little about the tools they used every day. He was baffled as to how they could even find work in the modern market. This opinion echoes the difficulty editors now face, as the market expectation of their software understanding is cumulative and extensive.

Example 2: Muscle memory and space appropriation – The editor's coping mechanisms

One of Quantrill's coping mechanisms was to create a shortcut system that was as uniform as possible across software platforms. "Recreating the keyboard" of his favourite software (FCP7) in PremierePro made the transition to this software smooth.

In hard- and software industry, such coping mechanisms have not gone unnoticed. Manufacturers have been creating keyboard shortcut presets to emulate those of competing software packages for some time. For example, PremierePro CC has Final Cut and Avid Media Composer presets. It is worth noting that, due to patent (Adobe Systems Inc. 2006; Apple Computer Inc. 2009) and functionality issues, some frequently used commands are slightly different in each software, and this makes an exact recreation of keyboard shortcuts impossible. Some manufacturers provide keyboard skins that fit over conventional keyboards with default configurations for major editing software.

At Archer's Mark, having similar but not identical keyboard shortcuts made the transition to PremierePro possible in a short period of time, but to Quantrill, it also made usage frustrating. This was especially because he had to regularly return to the old software and adjust it accordingly. Initially, his disposition shifted from sluggish and irritated when using PremierePro to simply irritated when he was required to switch back to FCP7 for a side task.

On a day in August 2015, about four weeks into the edit, Quantrill was visibly irritated about having to switch back to FCP7 after a long break; the FCP7 keyboard shortcuts were now confusing. It had taken less than a month for Quantrill's muscle memory to kick in entirely and for PremierePro to be fully adopted without inhibiting the editor's creative state, actions or speed.

However, the presence of the legacy software and the constant switching between interfaces, combined with the expectation that editors should perform many other activities than editing, contributes to the anxiety of many editors. During the participant observation, Quantrill stated on multiple occasions that he thought manufacturers played into these anxieties when creating all-in-one post-production solutions.

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The interaction between Quantrill and the machines at his disposal needed to be symbiotic in order to work optimally. Thus, he was cautious – as any editor would be – about dealing with the increasingly vast volume of hardware and software alternatives.

Quantrill, as the editor of *Notes of Blindness*, had an explicit vision of how the editing space should be organised for the film. As a whole new editing set was acquired, it would be installed in an entirely new space that had already been dedicated to the film. A new table was bought, together with the new machine (one that allowed users to work while standing – a legacy of the film editor Walter Murch[51]).

Quantrill took a full week to set up the space: positioning the table against the windows; minimising the cable runs to reduce clutter on and under the table; making space for the keyboard; tweaking the distance to monitor screens. All factors came under scrutiny. Those that were most deliberated over related to habits that could not be easily justified by reason (distance to monitors, for example, could be discussed from an optometric point of view). One of the most notable decisions pertained to the position of the controls in relation to each other. Specifically, the position of the keyboard, mouse and large volume knob was tested over a long period of time, with many iterations (Quantrill's mouse under the keyboard, not next to it; the volume button where the mouse would traditionally be found). In plain sight, this behaviour could be called 'fidgeting', but its ritualistic aspect promoted a sense of walking in new shoes or placing furniture in a new room.

The other aspect of spatial systematisation was not physically manifest. The abstract, digital arrangement of an operating system and applications is highly personal to each editor. Quantrill's management of keyboard shortcuts was mentioned above in terms of the accumulation of software and the need to train new habits, but this is only one example of his many manipulations of the digital space.

Manufacturers of editing software have been attuned to this need for personalisation since the advent of digital editing. AVID has provided customisable keyboard shortcuts at least since launching their Media Composer 7 software in 1998. Today, all software relies heavily on the flexible user experience that AVID's Media Composer first offered.

[51] This legacy began with pictures of Walter Murch standing next to his workstation, which was elevated to chest height. Thereafter, Murch was interrogated about the process numerous times (Renee 2016).

For Quantrill, the most important adjustable interface features were the keyboard commands, the workspaces and the timeline view. According to Quantrill, PremierePro significantly improved the arrangement of workspaces, and he spent a vast amount of time creating the 'perfect' setup in this system. His actions were not only the ritualistic quirks of a craftsperson adjusting software that must be fully mastered, but they also had an effect on his own physical positioning and his ability to relax and enter a state of reflexive engrossment in the visual material in front of him. Also, the arrangement of functions on the screen affected the directors' participation in the editors' work. Would they peek over an editor's shoulder or use the external monitor fixed over the comfortable couch? Would they be active or passive in the act of editing? Or, would they have a tendency that needed managing? (For example, placing a director who tended to meddle in the edit further away from the computer could lighten the editor's tension.)

The viewing monitor had a specific function in the editing room. it removed the director from the editing table, and this had certain advantages – the editor would not feel scrutinised for his or her approach towards a certain goal, but only for the output seen on the screen. However, the disadvantage of this, as James and Pete pointed out, was that it was more difficult for the directors to express the changes they would like implemented.

In this production, it was clear that thinking in a digital timeline paradigm was ingrained in many persons, beyond the editor. Seen to visualise the flow of the video assembly, software timelines were a genuine legacy of non-linear digital editing. If directors were closer to the timeline view on the computer, they would immediately start talking in terms of blocks:

> "Can you more this bit forward/backward few frames?"
> "Please let this clip overlap with this one."
> (notes, Petkovic)

This influence over the digital editor changed the way in which filmmakers thought about assembling the film. Sometimes, this change in perspective helped the editor immensely; but during the edit, it could create tension. Establishing a perfectly balanced distance between the protagonists in the edit (i.e. the editor and directors) was difficult.

This challenge was much more complicated when the film directors were actually *capable* of editing. As an in-house solution for *Notes on Blindness*, it was implied that the directors would spend a great deal of time in the editing suite with the editor – perhaps much

longer than they would if the post-production were to be outsourced and paid at a daily rate. It can be assumed that the directors' sustained presence in the editing suite seduced them to become more hands-on in the edit. However, their impact went much further than this, as will be covered below.

Who edited? Editing as a collaborative process

> Previous generations of filmmakers have always experienced editing at sort of discursive remove in that they had conversations with the editor which he then enacted in front of them. We, it was always part of… There was a much more immediate link for us. I think that continues in these times. (Spinney 2015; interview with Petkovic)

The directors Pete and James pointed to an interview with Walter Murch that they had recently read. It was about Murch's work with the director Catherine Bigelow. In their words:

> [Walter Murch], working with Kathryn Bigelow, he'd be working with her and then she'd leave at 6. And then when he was on his own, he was able to explore things he didn't have to talk about. That was really important to him, that he didn't have to explain what he was doing, that he could just do it. I think if you have edited on your own, for us as a directing duo, directly with the material, you kind of become accustomed to way of working where you don't necessarily want to just articulate an idea, rather you want to experiment with something you don't necessarily know what you're looking for, don't know where you're going, but you just play around and see what happens. And I think, there are times when we feel like… Even working with Quantrill, however wonderful that is, that accommodating space for that, even if it's just couple hours a week, just to have that element of play, not to have to explain. Really important! (Spinney 2015; interview with Petkovic)

This admission was greatly significant – the directors were quoting an editor who was pleading for unrestrained 'playtime' to support their own argument about their need to edit the material on their own terms.

Given the general declines in pricing and the rise in format options for video editing and production, the number of people who are now capable of editing at one or another level has increased dramatically. Manufacturers have recognised this and begun to invest more resources in user experience – the ease and intuitive operability of the interface – which has, in turn, enticed even more users. While similar issues were discussed above, in relation to cameras, this particular development in software design raises specific questions about the position of the editor as a craftsperson with decisive authority over a specific part of the post-production process.

In the context of *Notes on Blindness*, this new facet of the editor's role presented itself in a new light and represented a new perspective on the editing craft.

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In this chapter, the physical space dedicated to the *Notes on Blindness* edit has been described as something akin to a finely tuned operating theatre – a space that was created by the editor for maximum efficiency and quality output. However, this account is far from complete, without acknowledging some further important factors. Although the position of the main editing computer, the viewing monitor and the assistant editors were all managed by the editor, the entire space – given the constant presence of the directors and producers – became a *Notes on Blindness* creative hub, of sorts. The factors at play in creating this hub were: two restless directors with editing experience who were unhappy with the aforementioned viewing monitor that had been specifically designed to distance them from the editor; and producers who, due to functional overcrowding in Archer's Mark's space (as well as their proximity to the post-production employees), decided to occupy a corner of the same space.

The directors imposed a particularly hands-on approach to the edit because they had a clear vision of their desired output. However, they were unsure of how the material should be dealt with. They were also frustrated about having to convey their ideas verbally while feeling perfectly capable of creating what they were asking for in the editing software. The solution was that, instead of using a single editing suite, an editing hub was created with four computers: Quantrill's main computer; the researcher's computer (at an assistant station); and two iMacs for the directors. A logistically intricate but technically simple workflow was created in order to enable simultaneous work on the film project. Collaborative workflows are customary in broadcast and high-end film production, but in the context of independent film, there are simply not enough funds for the equipment to enable such working patterns. On *Notes on Blindness*, the collaboration was made possible by the intuitive and simple interface of PremierePro, which accommodated varied levels of technical literacy, even though PremierePro was

notoriously bad with collaborative workflows.[52] As often happened, a workaround was improvised to keep the projects in sync.

This situation clearly frustrated Quantrill during the edit. On a number of occasions he questioned his role in the film, noticing: "If they edit themselves, why need me at all?" Quantrill's insecurity over his role as editor was justified. If everyone claimed to be able to edit, what gave him an advantage as a craftsperson?

His doubts were also inflamed by the sense that the directors were not taking any of his creative choices seriously, and in his words, were "just doing what they want". This assertion was posed as a direct question to the directors in an informal manner during the edit, and also formally in an interview conducted by the researcher after the edit was completed, asking them whether they would really rather edit on their own. The obvious follow-up question about their thoughts about the role of an editor was also discussed.

The directors did not see the editor in the traditional sense, as a broker between the directors' idea and the material. In the case of *Notes on Blindness*, they viewed the editor as a person who facilitated their hands-on work with the material. And they needed this time with the material, for two reasons:

1) Their overfamiliarity with the material, which in a different context might have hindered the creative process, enabled them to connect the dots much more rapidly. Having worked for almost two years with the original audio sound bites, they had tried many options and had made up their minds about what worked and what did not.
2) As mentioned above, they felt the need to play with the material, simply because they were able to. They also insisted on the word 'play', in this case. They considered play different from the abstract imagining process and were convinced that such play helped the editing, as long as the editor was present.

[52] This is why AVID was avoided, even though AVID has the most advanced collaborative solutions for editing projects with a large number of editors. As AVID is technically more advanced for real time collaborative projects, it is also considerably less user friendly. PremierePro was not designed with collaboration in mind, but it is currently the most widely used editing package, which speaks to its user friendliness.

Surprisingly, in both formal and (numerous) informal instances, the directors indicated that they would never edit a film without an editor. Their reasoning can be deduced from the following interactions.

Oversight – Guarding the bigger picture

Quantrill had been informally assigned to keep an eye on the big picture. The directors preferred to dwell deep in the minutiae of a scene, leaving Quantrill to supervise and point out the consequences of their minor decisions with respect to the project as a whole. This meant that Quantrill effectively lost sole authority over the cut – the intrashot space. His authority was instead shared with non-editing professionals who were capable of using the editing software. Quantrill's insecurities, as previously mentioned, were a testament to this loss of authority. Traditionally, minor editing decisions fall under the editor's remit; such decisions relate to what the best known practical literature on editing describes as 'the cut' – the moment of transition between two shots (Eisenstein & Leyda 1947; Murch 2001). In contrast, the larger plan – the grand scheme of the film idea – is typically omitted by editing agents, who regard it as the realm of the director.

In the case of *Notes on Blindness*, however, it seems that the editor gained power as the advisor on the grand idea, the balance of scenes and the groups of shots (the intershot space). A Ctrl-Z keyboard shortcut allowed editors to place a cut on a spot seen by the majority as 'good', with ease. The comparative advantage held by the editor was his vast experience of what worked and what did not, on levels above the cut. When a combination of shots became too intricate, he could try every possible alternative combination. This is when the editor's intuitive storytelling skills came to prominence.
As mentioned above, four people worked on the *Notes on Blindness* edit, simultaneously and in one space. Quantrill performed two tasks more frequently than the other editors – managing all creative inputs and keeping a perspective on the final film; everyone else dwelled on the particulars of specific shot changes.

Technical guidance

Although it is unfair to call an editor a button pusher, technology plays a vital role in an editor's mediation of creative space. Technology space has increased and is more complex than ever, and an editor's ability to control the relationship between the director and a machine is highly valued by the director.

The *Notes on Blindness* directors repeatedly described themselves as overwhelmed by the complexity of the modern editing process, and were more than happy to be granted an occasional meditative reprieve from the influence of the computer on the decision making process.

> It is very helpful to be able to step away, from the controls and just watch the things unfold. Sometimes we get so absorbed with trying to make something exactly how we envisioned it, but it just doesn't work, because of exhaustion or technical issues (Spinney 2015; interview with Petkovic).

Quantrill remedied these moments by allowing the thought process to continue without too much interference from the computer interface. Again, his role in doing so was slightly different than pure brokerage, as the director viewed the parameters of the computer as imposing, and did not need direct mediation but rather strong support and technical supervision.

THE EDITOR DISCUSSION

Space, craft anxiety and multitasking: The in-house experience

> By shrinking the editing task to desktop scale, Mac and personal computer based post-production workstations today allow and encourage the user to cross all sorts of previously sacred and welloguarded trade boundaries. AVID and Final cut editors today do not just cut shots together but also mix sound, cut dialogue, compose graphics, design and incorporate special effects… This constant multitasking contrasts with the highly segregated cutting and prepping tasks that once defined a Moviola based studio editing department. (Caldwell 2008, p. 166)

Previous sections in this chapter have revealed some of the main issues faced by editors in the modern independent production workflow. Contextualising these issues within existing perceptions of the individual editor and his or her editing performance paints a picture of a craft position in turbulent transition. The resulting image of the craftsperson moves even further away from Caldwell's depictions of the editor as an anxious male sweatshop worker (Caldwell 2008, pp. 160–167).

In the context of *Notes on Blindness*, the shift away from traditional depictions of editing occurred not through a transformation of the editor into an entirely different entity – albeit such a transformation was definitely visible – but predominantly through other (non-editor) craftspersons' hands-on collaboration in the editing process.

The exclusive space of the editor (described as a solitary man cave by Caldwell) has begun to take the shape of a workshop, as idealised by Sennett (Sennett 2008, pp. 53–81). Sennett

argues that the ancient workshop – the space in which craftsmen claim authority and assume autonomy – is disappearing in the modern production culture. Lack of motivation due to a lack of standards and tension between doing a good job and getting a job done both contribute to the distortion of the craft space. Sennett points to a lack of pride and belief in the product in the age of mass production as the culprit for this erosion of the craft space. He proposes collaboration, over independence and individuality, as the key to maintaining the craft pursuit of excellence in modern times.

The new editing space, which is saturated by a number of individuals of different craft backgrounds, might be the manifestation of the mature collaborative space Sennett points towards. In-house production has its boundaries, and this new space finds the editor's technical expertise important, but not crucial. The crucial element of the editing craft, it transpires, is the editor's capacity to listen, manage humans and machines and empathise with (sometimes competing) arguments.

In his latest work, Sennett covers exactly that as the motor for pursuing excellence in modern times (Sennett 2012, pp. 199–230). Quantrill seems to provide an archetypal example of the modern editor: anxious about his craft position, he maintains the posture of an avid listener, stating his differing views when necessary. This style of interaction is the opposite of a debate, wherein one or the other side attempts to ram an argument into the opposing ear. The literary critic Mikhail Bakhtin describes this type of communication as 'dialogic' (Bakhtin 2010). Two autonomous statements that differ, when exchanged between interlocutors, will create in each party an awareness and better understanding of the other's viewpoint. In this situation, people naturally adjust their stance to a subtle degree.

Such responsiveness to another party's input was seen regularly in the editing space of *Notes on Blindness*. The collaborative arrangement required a common denominator – a goal that bound the group. As mentioned in the discussion of the in-house production model, that common denominator was undoubtedly the idea of the film. More precisely, the collaborators needed to share the conviction that the idea of the film was excellent and one that should be nurtured, rather than argued into existence. As stated in the discussion section in Chapter 3, the principle that a strong idea needs protecting was the glue that kept the in-house team together. In the post-production phase of the in-house model, the editor facilitated this collaboration.

However, the intrusion of the director into the editing space raised an obvious question: Was the new role of the editor, as described above, enough to grant the editor sufficient autonomy as an indispensable individual in the filmmaking process? Should an *editor* edit?

The editing craft is somewhat immune to such existential questioning, as it is ontologically considered the foundation of filmic expression (Thompson & Bordwell 1994; Bordwell 2013; Dancyger 2014). But at no time has the academic discipline questioned the position of the editor. Dancyger makes a point about the intrinsic similarities between the roles of editor and director, and substantiates these similarities with a list of notable editors-cum-directors, such as Alfred Hitchcock, Robert Wise and David Lean (Dancyger 2014, pp. 71–85). However, this list of examples hardly constitutes an argument; after all, the same could be reasoned for DOP-cum-directors. Rather, turning the argument upside down presents an interesting picture. All of the editors-cum-directors mentioned by Dancyger edited the films they directed during the pre-celluloid era.[53]

So is the role of the editor falling off its pedestal? According to the observations of this thesis, the editor is still considered crucial and indispensable. On the set of *Notes on Blindness*, such sentiments were repeated in many interviews and evident in the longitudinal observation. However, the editor seemed to hold a new role – possibly a more social role than the stereotypical introvert it was previously thought to embody. In the choreographed network of constantly changing machines and anxious craftspersons, the editor was less of a broker (since the other craftspersons did not require as much technological brokerage) and more of a custodian of the creative and technical post-production process.

This does not mean that the editor's role is necessarily safe in the future. If one looks at the news industry, a trend can be observed: places that consider editing a technical craft only, are beginning to impose a multitasking burden on producers and researchers (Avilés & Leon 2002).

[53] A simple search on IMDB provides the necessary data to support this claim.

Film cannot be put in the same category as minute long news items. The length of the final output defines the technical difficulties of the project and a certain cut-off point for the prosumers, such as directors who are editing. Still, because editing software is practically free and the number of people who are capable of using editing software is constantly increasing, it is difficult not to draw parallels to Clayton Christensen's warning with respect to disruptive technologies (Christensen 2013). The pop music culture picked up on this, as well:

> To a degree, the MP3 follows the classic pattern of a disruptive technology, as outlined by Clayton Christensen in his 1997 book *The Innovator's Dilemma*. Disruptive technologies, Christensen explains, often enter at the bottom of the market, where they are ignored by established players. These technologies then grow in power and sophistication to the point where they eclipse the old systems. (Capps 2009)

Just like with MP3, when it comes to editing software it is less about the novelty and innovation and more about availability and friendliness of interface. Any software that seeks to appeal to a wider market must have a similar and recognisable user interface (based on older media associations, such as a scissors symbol to represent a cut command). These user interfaces keep more complex operations and settings in the background and leave space for less specialised users to easily access basic functions of the software (Manovich 2013, pp. 33–39).

In the in-house production context, the editor uses broader specialisations and multitasking to differentiate him/herself from the prosumer-director.

Editor survival kit

> The fact that you are editing in your production office is not the ideal. We would often find we would do the most in the evenings and weekends, when it was not so easy to be intruded upon with questions not relating to the edit. (Quantrill 2015; interview with Petkovic)

So how should an editor deal with the abovementioned anxieties? As we have seen, the interaction between editor and technology alternates between discomfort and subjugation, resulting in each side moulding to the requirements of the other. This human-machine interaction also influences the space surrounding it. Ellis calls the interaction and the space it creates an 'operating system' (Ellis 2015). It is essential to emphasise that this operating system encompasses both the interaction between actors and the space it appropriates.

> The human/machine interface is a complex site of negotiation between the potential of the machine, the bodies of the operators, and the requirements of the context of use. So the human/machine interface has to be a key part of media archaeology's project. (Ellis 2015, p. 24)

Similar to Ellis' research, the present study assigns significance to the interaction between human and machine as the actants in the post-production room. By examining the space in which negotiation occurs between the two units, one can generate insights into a number of questions that occupy modern academics and filmmakers. In his research, Ellis uses a specific method of simulation that befits his background as a historian of media archaeology.

When examining more recent affairs, direct participant observation of the operating system allows one to speculate on a number of burning questions.[54] In this thesis, several insights have already been shared with respect to changes in creative responsibility and how these changes affect the editor.

The editor generally reacts by employing his or her expertise in the operating system to regain the sense of control and stability that is necessary to exercise craft expertise in a less inhibited fashion. For this reason, it is important for editors to master the ever-expanding technology. Digital technology is the culprit behind the anxious mess the editors find themselves in, but it is also their only refuge.

During the participant observation, the editor was seen to customise the editing space and influence the relationship between the director(s) and other machines. He positioned the tools to suit his social priorities, noting the impact of this positioning on the process. He customised keyboards and software workspaces, and went further by creating uniform workspaces across competing software and devices in order to make software interchange less jarring. One of the crucial effects of user interface customisation was gatekeeping (Shoemaker & Riccio 1991), as the editor sieved the technological burden, exerting control on the parameters that were available to the director.

[54] Ellis names the following subjects of enquiry: gender relations, workplace hierarchies, the division of creative responsibility, management processes and expectations, attempts to innovate and/or subvert, ingrained professional norms and perceptions of social responsibility (Ellis 2015, p.25).

The concept of 'gatekeeping' nested itself in communication theory through the pioneering work of Shoemaker, but it initially came from Kurt Lewin, who explained how social change might occur in the food delivery value chain, through his theory of 'channels and gates' (Lewin 1947). Gatekeeping, as defined by Shoemaker, explains the hierarchical trickling down of new information; but her theory can also be appositely applied to software customisation (Sundar & Marathe 2010). Sunder and Marathe specify that the customisability of an interface profoundly alters the hierarchical nature of Shoemaker's gatekeeping by throwing it into the consumers' hands.

Sunder and Marathe differentiate between two types of interface personification: 'system-initiated personalization' (SIP) and 'user-initiated customization' (UIC). Users who perform UIC are known as 'power users'. Power users are highly motivated to discover the intricacies of a system and become frustrated when they lack learning autonomy. Power users are also multitaskers (Rideout et al. 2010), who are satisfied only when they understand multiple facets of the same process.

In the tight multitasking space of in-house production, the editor maintains a technological edge over the director by fulfilling the role of designated power user. However, this is not meant to stimulate a competitive environment between the director and the editor (although this is often an inevitable consequence); rather, it has a beneficial outcome for both parties. Power users tend to take on a moderating role between the technology and users (Sundar & Marathe 2010, p. 305), parsing the complexity and agency of the computer for others through a human gauze.

This scenario fits the new predicament of the editor, in line with the changing definition of the editing craft, as explored above. There is no guarantee for the editor, however, that the directors will not become power users. However, in the example of *Notes on Blindness*, one particular anecdotal dialogue between the directors and the editor revealed that the directors had not taken on this role.

> During the edit, the directors eavesdropped on me and Jules having a conversation about keyboard shortcuts. I was stating that mine resemble early AVID keyboards with my adjustments and Jules said that in all the editing software he tries to emulate the FCP7 factory settings. This was the first time directors heard something like this. They are both users of more than one editing software [PremierePro and FCP7], however as non-power users they see each software at face value and do not customise it, using the factory settings on both software. They saw our attempt to ease the stresses of muscle memory confusion, as conceding that one software is better than another. (Petkovic 2015; participant observation audio notes)[55]

Lastly, the mediation and gatekeeping had another effect that maintained the presence of the editor as a basic requirement. The directors mentioned the aspect of 'play', above, when quoting an editor speaking about post-production needs. As discussed before, play meant that, on the one hand, the editor lost some craft autonomy due to the directors' editing; however, on the other hand, the editor was able to facilitate the directors' need for 'play'.

Social scientists such as Freud, Vygotsky, Huizinga, Piaget, Winnicott and Turner (Freud 1908; Huizinga 1949; Vygotsky 1978; Turner 1982; Piaget 2013; Winnicott 1971; Turner 1982) have all portrayed play as a natural path to creativity. The concept of play as a catalyst for creativity has also been looked at in behavioural organisational science. Mainemelis and Ronson (2006) navigate the academic discourse about creativity and play and discuss the practical relevance of play in creative industries, concluding:

> By temporarily suspending functional pressures, structural obligations, and pressures for conformity and consistency, play delineates a transitional space, a between-and-betwixt world, in which organizational members explore and experiment with new variables, behaviors, or identities which may not seem immediately useful in generating products or solutions. By generating such variety in ideas and products, play leads to a more diverse set of options from which some get selected into our organizations and society (Campbell, 1960; Simonton, 1999). (Mainemelis & Ronson 2006, p. 121)

The modern gatekeeper-editor is expected to facilitate play and invite multiple players into the playground. The role of the editor should be protected in the maelstrom of digital

[55] Tangentially, the use of personalised workspaces and keyboards that resemble legacy software – such as the software Quantrill was most accustomed to – might indicate that editors are creatures of habit and not keen early adopters. However, it is also possible that technological turmoil has made it more difficult to cope with real disruptive innovation. Nevertheless, the effect of software legacy accumulation on the ability of craft professionals to deal with further innovation shocks would be a fruitful subject for future research.

workflows if he or she continues to befriend new technology, but on the individual level – and in the case of an independent film with a strong idea – an editor will only flourish if he or she manages to inject human values (e.g. the capacity to listen and empathise) into the working routine. This is possible only if – aside from gatekeeping and facilitating play – the editor 'plays'. Furthermore, anthropologists such as Huizinga and Turner posit that one of the main elements of play is its boundary between time and space. Play is a defined "time out of time" (Falassi 1987, p. 3), and while space is confined in the modern craft workshop (as defined in Chapter 3), an editor can serve as the custodian of time for play and creativity, steering and apportioning time according to the needs of the creative process. Finally, an editor must assume a somewhat psychoanalytical stance towards facilitating play. Positive affect is one of the main enabling pillars of creative play and is necessary for channelling frustrations and anxieties (Winnicott 1971; Locke 1996), even with talented, visionary directors.

The editor, even in the classic role, is one of the first persons the directors will share material with after the tribulations of the film set. Given that positive affect has a profound effect on setting the stage for the creative process, it is in the editor's interest to facilitate a sense of perspective and positivity.

The digital imaging technician (DIT)

Ever since the digital intermediate process ruptured the traditional film workflow, there has been a need for additional personnel to glue the fragile bridges between production steps.

> because digital imaging is now done on the set, a whole new type of production worker has appeared [to monitor, safeguard, and enhance the image on set]. Labelled by some "data wranglers," "digital imaging technicians" [DITs], or "digital technologists [...] these new authorities on set have usurped some of the tasks of the DP [DOP], the camera operator, and the assistant camera workers. (Caldwell 2008)

The DIT role in film production has a legacy around three decades long. It is the natural progression of the video engineering role from the early days of video tape. As video signal was technically more complex to handle on set, it required an engineer with a stronger technical background than held by the traditional film crew in order to manage the production workflow. As the signal turned from tape to data, the video engineer developed into a digital imaging technician (La Volpe 2015).

During the *Notes on Blindness* shoot, it was the presence of the DIT (rather than the role of the DIT) that was a source of contention. In the following sections, the main issues that arose will be discussed. Before this analysis, a short summary of the shooting formats will be useful as contextual material.

Camera format and pre-production workflow decisions

Archer's Mark owned two RED cameras that had recently been upgraded to the RED DRAGON chip. They were marked camera A and camera B, respectively, and each had its own crew. The cameras were capable of shooting a maximum of 6K, full frame. This was, in part, a strategy designed to attract the desired camera crew. The company had never before been capable of producing a 6K file. Post-production had been against it, arguing that 4.5K was adequate. The added file sizes of 6K shooting would put pressure on post-production to adequately manage the image and would create storage and backup issues.

After an argument between the camera and post-production departments, as described in Chapter 3, Archer's Mark agreed to shoot in 6K. Format-wise, post-production proposed a REDCODE 10:1 format.[56] The camera department opted first for a higher quality (5:1), then settled for 8:1. The level of compression had an influence on the file size, yet again.

The DIT station consisted of a laptop, two REDMAG card readers for file transfer to a set of hard drives. The laptop was at all times connected to two drives – one a larger RAID unit and the other a smaller, portable drive. Files from the camera card were instantly copied onto those drives and, at the end of the day, the smaller drive was shuttled to the post-production facility, where the third copy was made on a local RAID drive. This was also where the edit was made. This process was not the same as making three copies at the same time; rather, it involved an additional step. The software used for file copying and checksum was ShotPut.[57]

The A camera crew had four RED memory cards and the B crew had two. he RED cards were from different generations (camera A had an upgraded body, which also included an upgraded memory drive) and the two REDMAGS corresponded to the two different card types.

When a card got up to 100Gb (a quarter full), it was replaced. The 'hot' card (with data that had not yet been backed up) would be brought to the DIT by the second camera assistant. After off-loading the material to the drives, the 'cold' card would be returned to the camera crew.

Transcoding (converting card material into a different format to make it compatible with other parts of the workflow) did not happen automatically, but was done overnight,

[56] REDCODE RAW is a proprietary file format developed by RED Digital Cinema to maximise post-production capacity. It is similar to photographic RAW, in that it saves separate colour data before creating a complete image. It uses a compression method similar to that of JPEG2000 and has various levels of compression, depending on the production needs. The compression ratio is expressed in an x:1 format, which means the following: 3:1 is mathematically lossless; and 5:1 to 8:1 is visually lossless and the setting used most often in high-end productions. The compression and 'lossiness' of the image increases as the x value increases. The higher the compression, the smaller the file (RED Digital Cinema 2017).

[57] ShotPut Pro has been the de facto copy and verification program used by major movie studios for years. It supposedly minimises human error and streamlines the data replication workflow (Imagine Products 2016).

whenever possible. However, the idea was that overnight transcoding would only occur once the files had been copied onto the local RAID drive at the post-production facility.

Digital imaging technician versus the *Notes on Blindness* production

Technically, the DIT position is intended to serve as an assistant to the cameraperson, but – as supported by all of the interviewed individuals in this research and from the researcher's personal experience on *Notes on Blindness* and many other independent productions – it is often also perceived as an agent of post-production. A DIT is a data wrangler[58], and data is still synonymous with post-production.

During the production of *Notes on Blindness*, the role of the DIT was highly problematic, and mostly devalued to an afterthought. This was quite paradoxical given the tight budget, as ensuring a smooth workflow could diminish certain costs (and, more importantly, loss of data could mean the end of not only the film, but also bankruptcy of the production house).

The DIT role on *Notes of Blindness* did not live up to its potential. Such potential is often only fully employed on productions with the time and money to allow for extensive technological on-set readiness. Historically speaking, the presence of the DIT on the set of films, television and commercials is as young as the digital workflow it supports. To above-the-line creatives, the DIT has more or less established itself as a role that should be present during production, but one that the majority of the crew finds hard to practically consider. The examples taken from the shoot of *Notes on Blindness* are consistent with this perception. All parties to the shoot navigated around the formal representation/perception of the DIT and the lack of integration of this position into the production culture.

[58] There is a strong dislike towards the label 'data wrangler' in the high-end production DIT community. Some make an explicit distinction between the DIT and data wrangler roles, however they often fail to describe the basis of this distinction. A good example of this is the explanation provided by The Knowledge – one of the leading film information sites in the UK. Leaving aside this self-imagining by the DIT community, the DIT and data wrangler roles can be seen as synonymous. The main difference between them is in their utilisation of an extra computer unit and a technical person on set.

Example 1: Who wants to be the DIT?

Possibly the most serious issue facing the DIT role is that it is not rooted in the digital production context, even though this very context was the breeding ground for this role. There is a paradox here about how a new role could be so fiercely resisted when it arose from a workflow that showed an increasing need for such a role. This paradox is reminiscent of the above discussions about the conservatism and resistance to change in the larger film industry. This being said, it is worth understanding what the *Notes on Blindness* producer sought in the DIT process and her understanding of the DIT role. As producer, Ellison sought two things: having a full working computer unit on set and not paying for the workforce to operate it.

If this sounds cynical, it should be noted that many of Ellison's strategies were geared towards a similar outcome, given that she was trying to facilitate an ambitious production on a tight budget. Ultimately, however, the economies sought in this area were driven by a lack of understanding of the role (and therefore a low level of priority given to it). The DIT is a must on a data-driven film set, serving a core function in supporting and enabling the workflow. However, it is often perceived as a rag-bag of 'possibilities' that are perceived as added bonuses. Considering the already mentioned attenuation of the productivity triangle and the tightening of budgets, the core function of data wrangling was the DIT's most important task.

Ellison's thought process was simple: a computer unit with a backup system would be compulsory, while an educated and paid workforce would be optional. How could she secure the best DIT person for no money? As producers tend to do, she looked for help from already engaged personnel. Ellison wanted an in-house DIT – the researcher or Quantrill – full-time on the set. However, both declined, stating that they would have to start editing within a few days of the shoot starting, and this would make DIT engagement impossible. It is valuable to note that not one person from the camera department was considered or approached, which strengthens the argument that the DIT role was perceived as a post-production role that extended (or possibly invaded) the film set.

This is when the Creative Skillset scheme was contacted, in an attempt to secure young, technically capable intern-type labourers. The Creative Skillset Trainee Finder is a government and British Film Institute (BFI) scheme that connects high-end productions with skilled talent who are unable to break through the 'glass ceiling'.[59] After assessing and securing the individuals who would fill the DIT role, the gear was assembled and tested.

One thing should be noted from the profile of the DIT talent pool: all were very qualified for the level of data wrangling the production team was considering. This can be accounted for by the oversaturated media hub of London. In other words, through the scheme, Ellison's aims were achieved, despite the employment environment and the budgetary issues – an interesting dynamic that, extrapolating outwards, seems clearly favourable for producers in media-centric locations such as London.

Another insight is the following: all of the individuals who performed DIT duties on the *Notes of Blindness* set, as well as all of the individuals who were interviewed by the researcher during the intake conversations for the Trainee Finder talent pool, did not see the DIT role as their career goal. The largest proportion of DIT prospects were budding post-production professionals who were more or less interested in editing, though some were specifically interested in colour correction. A smaller proportion were interested in careers in the camera department.

According to most of these candidates, they were interested in becoming a DIT exactly because of the additional activities around data backup, such as grading on set and performing short edits. They were all disappointed after discovering that the position entailed mainly crude 'data wrangling'. As they spent most of their time on set waiting for memory cards to fill up, and were only busy when others were on break or finishing, many of them dropped out. The production rotated six DIT technicians over a seven-week period.

[59] The cooperation between Creative Skillset and *Notes on Blindness* resulted in the researcher's invitation to interview the new batch of talent for the Trainee Finder talent pool. Some of the chapter's insights about perceptions of DIT derived from these interviews, which are not on record and thus remain anecdotal.

Example 2: DIT potential versus DIT reality

In the pre-production stage, the DIT function and role was outlined in terms of its theoretical capacity: "We will have a laptop station with 3-level copy station, all the needed software to check the produced shots and potentially cut/grade as well." There was even talk about moving the main editing suite to the set for a period of time, so Quantrill could operate as the DIT.

When the actual logistics of an on set DIT station were considered, issues started arising. The first problem was that no one was clearly responsible for arranging the DIT unit. The producers were admittedly insufficiently tech-literate to assure quality control. The assumption was that a specific person would coordinate the assembly of all necessary components for a DIT 'cart' (the production was not inclined to hire someone for this task). This person could not be Quantrill, given that he needed to keep an eye on other projects that were running in parallel at the company, and he did not want to veer too far away from his core creative activity of editing. The person ultimately appointed as organisational supervisor for the DIT ended up being the researcher (which is relatively amusing, considering the argument this thesis brings forward).

At the beginning of the shoot, the assembled kit consisted of a laptop with checksum copying software, but no editing or grading software. The only other software that would have been useful was the RED Rocket – RED RAW management and grading software. In addition, three groups of hard drives were purchased but these held nowhere near the right capacity for the amount of data the crew was likely to produce.

Proposed set	**Acquired set**
Laptop with retina screen unit with the following software: - Shotput - Adobe PremierePro - DaVinci Resolve - Red Rocket 1 external REC 607 colour calibrated monitor	Laptop with retina screen unit with the following software: - Shotput - Red Rocket - DaVinci Resolve (added later in the shoot) 1 set of sturdier drives at a third of the predicted capacity

1 RAID unit with enough capacity for a full master footage 2 sets of shuttle drives for 2 more sets of copies One APC battery set in case of a lack of electricity	1 set of shuttle drives at half the predicted capacity

Again, budgetary pressures and the prioritisation of other parts of the workflow resulted in a stripped down DIT cart. This is inevitably where the DIT potential ended, as the size of the DIT cart defined (and limited) the possibilities of the role as much as the technical capacity of the person operating it (although this was not necessarily true on *Notes on Blindness*, as mentioned in the previous section). However, even in favourable circumstances, the nature of DIT work requires on set handling, and this creates friction with the ritualistic and rigid production culture.

Example 3: DIT versus the production culture

The nature of the DIT's function on set makes it the last active unit on the shoot. After a shooting day wraps, a memory card always needs to be backed up and reviewed by the directors. On almost all shooting days for *Notes on Blindness*, the logistic aspect of this was entirely overlooked by the crew or producer.

When filming was done on remote locations, for instance, transport back to the accommodation would be arranged for directly after the shoot. This transport, however, would not wait for the DIT. Even more damning, when a location was rented on an hourly basis, the shoot would go on until the last minute of the rental period, at which point no time would remain to back up the material on the spot; this meant that the DIT would have to move around with a hot memory card. During production, there were a few uncomfortable situations in which the crew had to hurriedly exit the rented premises as soon as possible in order to avoid fines, while the DIT technician was left with a file transfer only partially complete. The rest of the crew seemed to assume that the DIT would be able to move the working unit or stop the transfer and restart it outside the premises or overnight at the accommodation.

Such situations prevented one of the intended benefits of data back-up. In the standard workflow, mobile copies of data (non-RAID drives, called 'shuttles') are kept separate. Normally, one-day copies go with the producer and directors and the RAID stays with the DIT. On *Notes on Blindness*, however, this almost never happened, which meant that all copies remained in one spot.

The most extreme example of this occurred on day 9 of the shoot, in an abandoned college near Cambridge. The location was set to be locked after 7:00 in the evening and staying there past that time would result in an extra charge of one day. The shoot stretched until 7:00, at which point the security company in charge of evening surveillance started forcing people out of the building (in the same vain as a bouncer removing partygoers at the end of a night in a nightclub). A considerable amount of time had elapsed since the DIT had last received a card; thus, the final card was entirely full and would require a long time to transfer. The DIT had to rush to pack up the DIT unit (which was not mobile but packed into a carry-on suitcase).

The DIT had also arranged his own accommodation, which meant that he would not be staying with the rest of the crew. The producer had already left and the DIT was left with all of the drives and still needed to copy one card on all three drives. He did so overnight. In the morning, the production bus did not want to pick the DIT up at the exact location of his accommodation. Instead, the DIT was instructed to walk towards a nearby meeting on the highway so the transportation would not lose too much time. This resulted in the DIT walking a mile with all three film backups in his carry-on bag, containing footage from the four recent shooting days that had not yet been sent to the post-production unit (and therefore had not yet been backed up on the server).

Although this example is rather extreme, the overall sense is that there was no symbiosis between the DIT and the rest of the film crew. Most of the crew were aware of the critical importance of the DIT, but rather rigid in refusing to adjust their own production rituals to accommodate the new position.

Example 4: DIT versus the production culture – The DIT on set

The abovementioned issues could be considered circumstantial (as is often the nature in anthropological inquiry), but this particular production also had one more new position on set, and by the end of the shoot, that other position was reasonably well integrated

into the shooting ritual. The other position was the sound playback unit (often operated by the DIT), and the process of its integration was described in Chapter 3.

In comparison to the DIT, whose habitual spot was peripheral to the shoot, the playback unit was in the midst of the set, together with the DOP and directors. The unit operated at the same time as the leading departments and was visibly engaged in the process. The playback unit was considered a part of the DIT unit; it had its base at the DIT computer when idle, but most of the time it was on the 'hot' set, right in the middle of the action.

The playback unit consisted of a laptop with all of the audio files and audio software, and a small mobile Bluetooth mini speaker. The unit also had strict rules of engagement regarding its entrance onto the set: it had to seek permission from the first AD (later, the third AD just announced the entering of the playback unit on set) during scene blocking and prior to the scene rehearsals with actors. It was then up to the AD to find an appropriate space for the operator to sit or stand – close enough for the actors to hear the speaker well but far enough so as not to impede other functions. Getting this proximity right was important, as the playback person needed to take timing cues from the director and actors and edit the dialogue accordingly.

After the scene was shot, the sound files – if edited or changed in any way from the originals – were saved on a drive and sent to the post-production facility, where they served as the audio track for the video edit of the scene.

As the shoot progressed, a significant change developed in the assignment of roles. The producers, in a frenzy of work and an obsession to cut costs or simplify organisational logistics, could not tolerate a DIT apparently on standby and started pushing for the unification of the DIT and playback positions. The DIT and the playback person worked closely together and were able to change roles, when required, to give each other a break. However, the initial effort to have two people on set doing DIT and playback at all times was overlooked in favour of one person doing both jobs. This setup prevailed, which stripped down the possibilities of the DIT role even further.

The result of this role convergence was that quality control and supervision to prevent mistakes – the main aims of the DIT role – were difficult to perform. Fortunately, no grand mistakes occurred. However, the pressure still agitated the on set DITs, even though they managed to fulfil both roles. They considered the new aspect of their role a challenge, no matter how simple it was, and thus they took it on enthusiastically.

Unfortunately, however, this did not improve their status on set, and given that the role had also been stripped to its bare basics, the general lack of passion for the DIT role described in the first example continued. The production went through six DIT persons during the entire course of the shoot.

The convergence described above led to an issue that concerned the researcher. Due to organisational pressures, the researcher, who was supervising the DIT role, spent a large proportion of the shoot doing DIT, himself. As the role became increasingly chaotic and incorporated playback, as well, the researcher had to balance filling the gaps for absent DITs after they left (some disillusioned by their experience on set) and looking for new DIT talent. Eventually, the researcher contacted a person he knew personally outside the Archer's Mark context and entrusted the supervisory task to her for the rest of the shoot. This solution is identical to that of Ellison, when building the production team for *Notes on Blindness* – drawing on previous work history, personal rapport and trust. Such an approach enabled the otherwise financially unfeasible and technologically unpredictable production to continue.

THE DIT DISCUSSION

> Undoubtedly with workflow management, certainly there is space for creativity. But whether or not we're just getting in semantics, because you could apply that to a caterer that has to make his ingredients to take care of 40 crew. There are other, many aspects, which involve creativity in everyday life. Whether that makes you an artisan, or just, there is a terminology – you're a technological expert. Is that not, enough? (Middleton 2014; interview with Petkovic)

Digital technology has blurred the distinctions between the historically segregated steps of film production. At face value, the digital acquisition of moving images seems to be smoothing the transition between production and post-production simply by making binary code a common denominator in both processes (Bordwell 2013, pp. 31–32; Murch 1999). The new technology dissipates existing production structures (Mayer et al. 2010; Bordwell 2013; Eriksson 2013) but, combined with the effects of the market-driven economy, it also bombards the previously consolidated workflows with new systems designed to cut costs and maximise profits and new products that are – most often – not interoperable (Lanier 2014; Sporton 2015).

The lack of interoperability between machines and software is exactly the problem that the DIT is meant to alleviate. The DIT, both in this research example and in general, acts first and foremost as an engineer, bridging the gaps in workflows that often manifest as

a patchwork of cost efficient technologies. The issue the DIT faces in the independent film context is fundamental to the existence of the DIT position, in general. Ellison, the producer, would not ask "Do we need it?" but "Can we do without it?" The answer to this question may well be "Yes" with respect to all of aspects of the DIT role except for data backup. In the words of a senior DIT technician: "It's a job a monkey can do" (Brown 2014, p. 219). However, more purely technical positions exist on the film set, such as electricians, 2nd or 3rd camera assistants and so forth. It seems the difference in perception comes from a consensus that all other technical positions have a crucial enabling effect on one of the creative roles in the production process. The DIT, on the other hand, is perceived as giving everyone "peace of mind" (this phrase came up twelve times in interviews about the DIT). Clearly, "peace of mind" did not provide enough of a justification to consolidate acceptance of the DIT role in the *Notes on Blindness* in-house workflow.

Backing up and transcoding – the most basic activities done by the DIT – caused frustration among the departments on set. Did awareness of interoperability issues stifle the production process or is it a reminder of the slightly broken promise of the digital camera? Digital cameras promise a theoretically unlimited ability to shoot high quality and high resolution material. However, in reality, shooting at the highest possible quality at an indiscriminate rate exponentially raises the costs and technical complexity of all other production processes (Bloom 2013). Sporton and Lanier press the point that concentrating on interoperability suppresses the potential of new technology (Sporton 2015, pp. 115–119).

❖

The spatial remoteness of the DIT from the crew and set presented a further obstacle to the crew's acceptance of the DIT role in the production culture. The DIT unit was often tucked away at a safe distance from the active set, even though – theoretically – the camera crew depended on it. In addition to the lack of physical proximity to the image recording ritual, the rest of the crew does not appreciate the apparent idleness of the DIT. In essence, the DIT's role was often to jump into intense activity only once the rest of the crew was done with certain actions (Brown 2014). These two factors made the DIT an outsider to the already close and intimate team.

The inability of the DIT to "keep busy" throughout the shoot resulted in the removal of one person from the two-person team. Rather than reducing the playback elements in the DIT remit, the DIT role was stripped even further from its original expectations. The priority given to playback derived solely from appearances; in this regard, the playback role looked more like a normal crew function than the DIT role. This reflects a culture where there is huge emphasis equating activity with contribution. In this regard, it is more important for a crew member to look efficient than to actually ensure a key function is correctly undertaken to guard the very substance of the film, itself. If it is impossible for the producer of a feature film to acknowledge the importance of protecting the labour of the entire crew, then it seems unlikely that the DIT role will have much of a future. This prediction is reinforced by the half-hearted commitment of the DITs who were recruited for *Notes on Blindness*. Despite the importance of the opportunity, the task was never executed to its fullest potential due to its perceived limitations. The consequence of this was that the DIT inevitably failed to become socialised as a close member of a team. The senior DIT cited above emphasised helping others out during the shoot purely for the sake of team building:

> I strive to work in concert with the camera department, offering them whatever assistance they may need. For a 1st AC it might be giving feedback on focus. For the second AC that means helping set up focus monitors. (Van Hove 2013)

In the manufacturing ecosystem on a traditional film set, the role of the DIT remains unclear. This gives producers the scope to break down the role to the bare minimum needed to push the production into the next step in the process (post-production). But ambivalence regarding this role is evident and possibly the most damning factor in the DIT's weak claim to the organisational space. The lack of clarity of the function and importance of the role can be reduced to the most elementary question about the DIT: Do we know what the DIT does?

Do we know what the DIT does?

The academic literature is complicit in this lack of understanding of the DIT role:

> Since many of the digital parameters that have to be set in the camera belong within the scope of the digital world, not many cinematographers master this job; hence a technician is needed. Digital Image Technician (DIT) is a new work-role being established. The DIT has responsibility for the camera settings, takes care of the image files after recordings, makes the backup copies, and transfers the files to wherever they are to be distributed. Also preliminary grading, for image quality evaluation, may be taken care of by the DIT. (Eriksson 2013, p. 55)

The above definition is illustrative of the confusion between the notion of the DIT and the reality of it, as underutilised. On face value, the statement demotes the DIT to a data wrangler, first and foremost. However, the DIT, if utilised to its fullest potential, is much more than a copy-paste administrator of digital data. On high-end sets, the DIT controls aspects of the camera operation and can grade and edit an image on the spot (as mentioned above). However, the above quote is, in reality, much less ignorant than an industry practitioner would appreciate it to be. Although the description is incomplete, it is much closer to reality for a vast majority of DITs, particularly in the pressed-for-budget independent cinema context.

The German Society of Cinematographers (BVK) recently published a description of the duties and prerequisites for a DIT position on a professional film set. What transpires from this document is that the DIT should supervise the workflow, protecting the integrity of the visual signal from its conception to final delivery. The DIT should be the technical complement to the DOP, relieving his or her concerns about the diversity of camera options and competing signals and enabling him or her to concentrate on creative input into the film. The DIT should primarily control camera exposure and check/adjust the focus set by the second AC (Brown 2014; German Society Of Cinematographers 2016).

However, this more complete description is idealised, for two reasons:

First, no matter how much the practice assumes a symbiosis between the technical and creative roles in the camera unit (specifically the DIT and the DOP), the reality is more contentious. Lucas describes the stance of DOPs towards the emergence of the DIT position in a set of interviews around the production of Michael Mann's film *Collateral*:

> The digital imaging technician [DIT] on *Collateral*, Dave Canning, was another new collaborator for the cinematographers. While his role was not as threatening as that of the colourist, the DIT was emerging as a significant player. Canning has worked with Mann on each of his films since Ali, under various titles [...] this story, those of Sonnenfeld and Canning and the craft interest in these negotiations reveals the dilemma that the new imaging technologies created for cinematographers. Roles and lines of authority were becoming complicated and open to trespassers. (Lucas 2011, pp. 291–292)

Secondly, and reinforcing the original point about friction within the camera department, the DIT position has already created a significant paradigm shift in the production workflow, even though it is only two decades old.

Historically, the DIT role has had two incarnations: tape DIT and data file DIT. These roles differ considerably in both function and craft. The period between 2007 and 2009 saw the arrival of the two most dominant high-end cameras, RED ONE and ARRI Alexa, which inaugurated the shift to RAW data image acquisition. In a short period of time, the DIT role shifted from using tape recording and colour boxes (with very strong authority over dailies colour) to using software-based computing, managing data and prepping colour for post-production (Korosi 2012; Van Hove 2013). A number of momentous shifts resulted in the DIT position becoming difficult to define for less technology literate practitioners (due to technological turmoil) and craftspersons who were meant to work closely with the DIT (due to cultural and political friction).

Possibly the most damning illustration of the uncertainty of the DIT position on set is provided by institutions that have taken up the task of advocating for the DIT craft. DITs are formally integrated into the International Cinematographers Guild Local 600 in the United States and the Guild Of British Camera Technicians in the United Kingdom.[60]

Although the British guild incorporates the role of the DIT clearly into its mission statement and has DIT technicians sitting on its board, and although the DIT position is more generally settled in the Unites States – the cultural, creative and craft position of the DIT is uncertain. The text that follows is a petition posted by the Local 600 on online DIT community forums, and provides unambiguous proof of the uncertainty faced by contemporary DITs:

> To our Brothers and Sisters of the IATSE,
>
> This letter is written on behalf of the Local 600 Digital Imaging Technicians (DITs) in our Union nationwide. The security of the DIT position is under threat as a growing number of digital productions are shooting without a DIT.
>
> Many productions are eliminating the dedicated DIT position as a cost-cutting measure while still utilizing equipment traditionally maintained by DITs. That equipment is instead being monitored and manipulated by other camera department personnel, often in addition to their already considerable workloads. Without a dedicated DIT to oversee the

[60] More information about these organisations can be found on their respective sites: https://www.icg600.com and http://www.gbct.org/.

implementation of the cinematographer's intent, quality control suffers and the digital negative is often in the hands of crewmembers whose primary focus is on other tasks.

This workflow not only puts our craft in jeopardy, it also harms the Union, camera departments and productions alike. Adding responsibilities outside of a discipline's job description is a step towards eliminating the focus and expertise of the entire craft system on which our Union is based.

There are many examples of how the responsibilities of a DIT are currently performed without a qualified technician. One Union brother in New York City has built a business renting fully assembled video carts, many capable of live image manipulation, to television productions which typically man them with Loaders, Utilities, or ACs. Another well-known production uses a program called "Foolcontrol" to remotely manipulate the image metadata live on set. Numerous others perform live image manipulation via external devices and computers, all without a DIT on set. There is also a trend of hiring a DIT for the first few episodes of a show, to set up equipment and develop creative look up tables (LUTs), then releasing the DIT and placing the responsibility of maintaining and loading the equipment and LUTs onto other members of the camera department. Instances like these, where a DIT is not used and should be, are what we would like to correct.

While we recognize that every digital shoot cannot be required to use the services of a DIT, it is unacceptable to delegate responsibilities to other members of the camera department which are traditionally performed by a DIT. This scenario echoes the playback issues Local 52 Video Assist Operators fought against years ago. There, the solution was to prohibit productions from offering playback unless there is a qualified individual on set.

Crew members from all unions and crafts need to be protected. As members of the IATSE, the undersigned ask for our Union leadership to acknowledge this issue and work with representative Local 600 DITs in advance of the April 2015 contract negotiations to ensure that our DITs have a voice in clearly delineating and preserving their responsibilities on set.

Please stand with us in defining the role of a Digital Imaging Technician, thereby protecting the future of our positions and the on-going enhancement of our craft. Thank you for your time and consideration of this matter. (Armour-Tejada 2014)

This short and turbulent history of the DIT portrays it as an outsider on set, with poorly defined duties (often stripped to the bare minimum) and colleagues who lack understanding of the DIT role. These things make the DIT position more difficult to define than filmmaking practitioners would like to admit. Given the drive to save money and the imagination used to do so, it is difficult to consider the DIT a fixed position on film sets in the future. However, such predictions have been made previously, and the role still remains, twenty years on (Van Hove 2012; 2013).

The DIT position has shown resilience amidst a filmmaking culture with strong economic imperatives and competing technological innovations. Thus, it is realistic to expect that the role will survive as long as filmmaking technology remains in its current unregulated state.

With the forthcoming cloud-based cinema solutions (Fleming 2013; Ricca 2014), some of the basic justifications for the DIT role on set might become obsolete; at least, this is the prediction of some major protagonists in digital imaging technology solutions (Ochiva 2013).

Another dynamic that threatens the potential future existence of the DIT is the growing obsolescence of engineering in the technologies used in filmmaking. Increasingly, the complicated concepts of video signal engineering are retreating into the background due to software with user friendly menu interfaces that enable non-engineers to control all important aspects of the video signal without deep technological knowledge (La Volpe 2015). An extreme example of such software is Apple's FCPX, which conceals and simplifies the description or many technical features, including the time code (which the software initially hid).[61] Such developments reinforce the prevalent belief – held by the *Notes on Blindness* producers – that all basic DIT tasks can be completed by untrained persons.

Still, if we interpret technological organisation and engineering on set as an impediment to the creative conduct, maybe the disappearance of the DIT is something to strive for. The difficulty is that the kind of activity expressed by (and through) the DIT is not the sort film makers are used to: it is essentially seen as a technological process without a

[61] Another example is a command called 'repair audio'. This feature is standard in consumer video software but, prior to FCPX, was alien to the professional paradigm.

craft, somewhat akin to Brian Arthur's notion of 'technological grammar' (Arthur 2009, p.79). This is a knowledge base that 'deepens as the base knowledge that comprises them grows; and they evolve as new combinations that work well are discovered.' Their daily use value is determined on a case by case basis, and is always contingent, noting that a knowledge grammar in itself never closes nor can it be completed. Within the in-house film production context, the DIT is stripped to bare minimum already because their discipline does not look like those of others. Possibly the time when the DIT is obsolete on a film set, might be a sign of the maturing of the digital technology paradigm.

'Peace of mind' refers to relief from stress or anxiety. Once filmmakers become less stressed by the new digital paradigm, they will have less need for the relief offered by DITs.

Conclusion

> Technical progress inevitably comes alongside worker anxiety and trade power struggles, usually under a cloud of intense critical reconceptualization of the production process itself. (Caldwell 2008, p.184)

This thesis has tackled a number of critical questions related to the study of media and production culture. The acuity of the research lies not only in the need for answers to the questions posed, but also in another dynamic, which is relevant to both academia and filmmaking practice. To repeat Caldwell's reflections on the relationship between film theory and filmmaking practice, included at the beginning of this study:

> This scepticism and oversight is mutual – sometimes bordering on contempt. Academic theory has had a historical relationship with contemporary film production and industrial practice that may best be described as problematic (largely impressionistic, disconnected or irrelevant from industry's point of view). (2008, p. 376)

By shifting interest towards the lived experience and ordeals of craftspersons, academia is claiming a voice inside the film production culture, filling a gap created by the sales-orientated self-promotional patter between industry insiders, tech manufacturers and distributors. The incestuous cross-promotion between stakeholders in the film industry has created industry identities that are sometimes quite removed from the reality of the filmmaking process. Academic researchers can comfortably tuck into that critical niche by assuming the role of informed observers who are immune to the industry entanglement, but aware of the intricacies operating within. This can be a productive stance, assuming the researchers emphasise being informed: having in-depth knowledge of film production processes and a full understanding of film production culture, including its values and norms. This research claims that 'wearing both hats' (Chapter 2) offers more benefits and insights than disadvantages. The questions posed regarding the workflow in independent cinema, preferred organisational structures and craft anxiety, are on filmmakers' agenda, as well (as demonstrated by the large number of industry blog posts and interviews on this theme). However, the industry's self-reflection is rarely informative: it elicits more heat than light and frequently slips into prosaic spiels and romanticising platitudes.

The key inquiries for this research were presented in the Introduction. In responding to these inquiries, the thesis has taken a process- and workflow-orientated approach to the discussion of digital film practice, attempting to respond to the need to examine shifts in authority over image creation in digital film production (in particular, changes in post-production). Further, the research has emphasised the need to conduct production culture research with an expert level of technological literacy and an insider knowledge of production culture. Finally, the thesis has examined filmmaking professionals' shift towards multitasking and the effect of this shift on organisational structures on the film set. The effect of multitasking on individual roles – in particular the editor and the DIT – has also come under scrutiny. The Introduction further stressed that the primary aims of the thesis were to gain a better understanding of the way in which particular technological production processes and workflows facilitate shifts in the craftpersons' 'locus of control', and how craftpersons mobilise to cope with the effects of new processes. Chapter 1 reviewed a wide range of literature to delineate the aforementioned knowledge gaps before finally focussing on the burgeoning field of production culture. Drawing on interviews and – more importantly – almost a year of participant observation of craft performances, the remainder of the thesis built a framework of deep texts grouped around the thesis questions, with results presented in Chapters 3 and 4. These results chapters dealt with two distinct aspects of *Notes on Blindness*: Chapter 3 dealt with the collective response to new workflows and Chapter 4 focussed on the individual life cycle experience of particular production members.

In the workflow chapter, examples from observation were bundled around the most prominent finding, namely a revival of craft workshop, as described by Richard Sennett (Sennett 2008). Due to the dynamic and erratic nature of contemporary innovation, independent creative professionals tend to gather in small collectives around an idea or concept they deem valuable, in order to shield themselves (and the idea) from the negative craft anxieties caused by competitive production practices. They create strong bonds based on the shared experience of the on-going project and their previous working history. These historical bonds and the individual capacity to multitask create a hierarchical rationality within the workshop that is uncommon in traditional cinema, and which should not be underestimated. Clarke aptly describes the tension between traditional production hierarchies – reflecting claims over authorship, royalties and rewards – and the notions introduced by digital technologies and distorted workflows, which are characterised by a missionary zeal of global collaboration in the 'hipster

economy' (Clarke 2017, pp.115–121). Indeed, independent film crews are caught between two damaging trends. On the one hand, they are necessarily part of the traditional high-end industry ethos that aggressively seeks affirmation of above-the-line hierarchies. On the other hand, the new digital sweatshop-like economies (Caldwell 2008) that are best illustrated by the deregulated and unstable VFX industry. The result is that independent film production has cocooned into a 'craft workshop'.

This research suggests that such collectives show increased tolerance of porous craft delineations and greater resilience to the effects thereof. Understandably, however, the lack of linearity in craft roles makes these units difficult to manage. The craft workshop bridges the efficiency gap by eliminating distance in mutual communication and shrinking the physical space of activity (ensuring that craftspersons work closely together, in a literal sense). This collective organisation minimises the use of additional management input by outsiders or by additional technological means, to further gain in efficiency. These groups are highly reflective in nature and are bonded by a mutual belief in the idea of the product they are producing. Without this strong conviction in the value of the final product, the organisational construct would be impossible. Their motivation is not only highly ideological, but also filled with non-financial gratifications usually found in film production, such as the promise of a highly-placed credit in the title roll (Caldwell 2008). In the case of *Notes on Blindness*, the lack of real managerial roles opened up opportunities to promise these unutilised positions in return for services.

The negative effect of the 'workshop' organisation is its inability to strike constructive dialogue with the inevitable collaborations with those outside the base collective. The shrunken physical production space in *Notes on Blindness* created an inward-looking culture that was unenthusiastic towards the differing views on the creative process, whether these were general out-of-house specialists (e.g. for VFX work) or highly experienced and sought-after industry practitioners (e.g. for sound design).

Chapter 4 dissected the *Notes on Blindness* case further by singling out two particular roles within the craft workshop. It further details and describes the individual experience in the context of disintegrating craft boundaries. While the position of the cinematographer is a common denominator in depictions of the authority shifts (Lucas 2011; Clarke 2017), this research concentrated on post-production roles. Chapter 4 showed that the role of the editor has shifted from its traditional scope to one exhibiting less authority over the editing process. Although it is still firmly secure within the film

production workflow, editors must now acknowledge their lack of exclusivity over the editing process and find a new comparative advantage as custodian of the creative process, enabling the director and other post-production crew to maximise their creative input in the project. The research shows that it is advisable for editors to re-assert the command over the editing technology by becoming power users. One way to do this is to personalise user interfaces, enabling the smooth transfer of data and creative work between different software solutions. Although the added pressure of having to master an increasing amount of software creates anxiety, editors can strike a balance between brokering the creative process and gatekeeping the technology. In contrast to the days of analogue film, in the digital era, having one of these two skills is not sufficient. Within the craft workshop, editor is enabled to cope with the anxieties of adapting to the new role, while maintaining the traditional façade of editing authority towards external industry factors.

The DIT is the other position in the post-production realm that was examined in detail. Chapter 4 presented the DIT as a transitory position and speculated about its likely disappearance. Not only is the DIT position difficult to maintain from a technological perspective, but it is also not welcomed in the prevailing production culture, which is still ruled by out-dated hierarchical perceptions on the film set. Indeed, the DIT's activity on set is out of sync with the rest of the production. However, aside of production culture compatibility, this thesis has posited that the lack of regulation and the economic upheaval brought about by new technologies justify the existence of the DIT. It is perfectly possible that if the production of visual imagery were to consolidate and mature into a less haphazard technological situation than the current one, this might lead to the end of the DIT role; therefore, it is reasonable to anticipate that the role will ultimately become redundant. The DIT section of this thesis drew less certain conclusions than the section on the editor, given the paucity of academic literature on the subject. This thesis has sought to redress this gap in the literature, but to do so simply, due to the fact that the DIT position has emerged relatively recently.

Notes on Blindness demonstrates an example of a craft hub capable of highly innovative creative output and innovative use of old technologies in new ways. The production failed, however, to fully adopt new technologies into the film workflow, due to material pressures that strongly preferred tangible activity as a value. Nevertheless, in the larger realm of independent filmmaking, innovation is crucial – whether this is technical

innovation in production or innovation in enhancing the creative process and filmic narrative. Independent production is intrinsically pushed to innovate, due to economic pressures, but also to elevate itself from the saturation of the traditional narrative that has higher production value. The success of a highly unusual concept like *Notes on Blindness* suggests that innovation is critical to the realisation of independent productions.

Caldwell is sceptical of the organisational capacity of craft professionals, and warns industry practitioners of the manifold forces that threaten to destabilise and unnerve craft positions. Missing from his accounts are examples of reactive agency among craftspersons who find themselves in the vacuum of various industry pressures. This research has demonstrated that at this point in time, independent filmmakers are capable of negotiating a fertile creative space. They do so through the innovative use of technology that has by now advanced to a point where a small group can actually claim creative ownership over most of the production workflow, even when making a high-end cinema product.

In addition, this research has drawn a parallel between the mid-twenty century studios and today's in-house craft units. Although these differ hugely in scale, both organisational structures share the following impulses: 1) the desire to own and maintain control over both horizontal and vertical aspects of the filmmaking workflow; and 2) a need to preserve a sense of inter-personal cohesion in a close-knit commune.

"The sense of in-house technical accomplishment" is used by Caldwell when describing the nostalgic image of the early studio system (2008, p.155), but it can equally describe the role that technical innovation has played in maintaining the sense of cohesion within today's compressed craft space. The motivation for both closed systems is a promise of creative control. In relation to the golden age institutions, a question arises whether a craft workshop in-house system is a model that can be scaled-up. Surprisingly, the world's oldest studio, the Babelsberg studio in Germany and the production ground for some of the most significant productions in film history, is a fertile ground to examine that question in the future. It has recently seen a renaissance with many international productions being made solely on its premises. The reason for this reinvigorated activity might be their *modus operandi:*

> Indeed, Babelsberg is going the opposite way of fragmentation by consolidating all feature film services on one accessible site and keeping hold of its traditional departmental structure … This model of business allows the studio to promote its greatest selling point as that of 'quality control' as filmmakers can oversee all aspects of production on site at Babelsberg instead of having to farm out aspects to external companies and risk losing creative control. (Sergi 2012, pp.18–19)

In reality, the Babelsberg studio site seems more like an up-scaled version of the dynamic, overlapping and flexible networked space – another similarity with the model described in this thesis:

> There is an implied topography of the studio that has nothing to do with the real estate property we are standing on or with "Studio Babelsberg" as a branded historical site. Babelsberg appears as a bricolage, ad hoc and fractured, a shape shifting ensemble of companies, financing plans and contracts worked out elsewhere. (Vonderau 2015, p.28)

It is evident that in the studio era, 'quality control' meant something entirely different than it does now. The grand achievement of the golden studio era was a yet-to-be-equalled productivity, in terms of volume of films made (Nelmes 2012; Dirks 2015). Now, however, in times often described as 'post-post-Fordist' – when direct socialisation between labour forces has been inhibited by subcontracting, automating, engaging in remote partnerships and moving production (Goffey 2015, p. 199) – small hubs of artistic activity seeking innovative, original creative concepts see quality control as a matter of survival. In a time of waning direct communication, it is possible that the in-house model can preserve the intimacy of a collective, which can be conducive to the creation of intimate and highly individual ideas, like *Notes on Blindness*.

Finally, this thesis falls neatly into the discussion about the future of human labour in relation to the developments in automation and artificial intelligence, although the author of this research does not claim authority over the subject or the literature. These findings can be viewed as a natural repositioning of human organisation in production, towards roles and team structures that are less prone to be replaced by artificial intelligence. The figures of displacement of human roles in the future by artificial intelligence and automation vary considerably, from 9 per cent (Arntz et al. 2016; Atkinson 2016) to 47 per cent (Frey & Osborne 2017). One reason for this variation is the difference in definitions and approaches, i.e. the higher estimates consider job roles in their entirety, while lower estimates assume every job consists of a number of tasks that vary in their susceptibility to automation. This task-based approach appears to better capture the impact of automation, as some roles will still need human supervision, even

with the majority of their tasks being automated. The roles of the Editor and the DIT in *Notes on Blindness* could be seen as early examples of the two opposing accounts: one role that succeeds in renegotiating its tasks into ones difficult to replace by artificial intelligence, while the other one fails. A parallel conclusion can be drawn for team organisation and leadership models: the creative teams in filmmaking, emancipated from processual linearity of the analogue film, naturally step away from task-centred role distinction and organisation, as a reaction to the increasing task automation in all labour, including creative labour. This divergent paragraph is an indicator of an academic area of interest to the researcher in further research.

When comparing the actions of large studios with those of in-house craft workshops, we can comfortably assert that innovation in the organisation of film production is not characteristic of large studios. Observing the adaptive capacity of filmmakers as craft professionals requires looking beyond the conservative high-end industry. It is smaller independent cinema units such as Archer's Mark and projects like *Notes on Blindness* that inform us of the shape of film production organisation in the future. Although this thesis is anthropological in nature and the single case study as a unit of analysis can be considered an evident weakness (as is always the case with an anthropological approach), there should be more than enough room to consider *Notes on Blindness* as having relevance in a wider context. Any independent film production with a strong individual vision, operating as a small to medium production enterprise, will be able to tap from the deep text presented in this thesis to weigh options when deciding whether to adopt an in-house workflow. Further research into workflow and process-driven changes in film production and craft identity would help to shape a more robust vision on the future of cinema and the people who make it.

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Appendix I

Example of consolidated text notes at the end of each day during the Participant observation

Jottings for 13.08.2015 (consolidated - 9pm same day)

Editing/Jules, Craig/Archer's Mark offices

Home from a frustrating day. Potentially interesting.

Jules got, as we were editing – normally I have one scene, Jules had two scenes. I had difficult scene with, in the bookstore when john was getting a new cane for blind people. Really difficult to edit.

Jules had one difficult scene as well, out of the two. In the beginning of the day I was doing quite a lot of administration. I needed to sort out the signatures for Craig (DIT) cause now I am supposed to be the head of department. So for the skillset, then we needed to think about the transportation, to the studio.

We edited a bit till the lunch, but after lunch it started getting a tiring. Suddenly things started coming up. First of all Jules needed to go down and help the guys editing the Darkes universe, again. Cause they we're having conforming issues. They had loads of legacy issues. Actually these legacy issues just keep popping up. Jules finds it is really ridiculous. So the darkest universe guys, the same thing – editing on FCP7, mess of a project, now conforming. Load of issues with time codes, absolutely impossible to reconnect. They've been doing it or like 3 days already, and each time they need Jules' help.

Suddenly Jules gets a call from Lauren Dark, the one of producers. She asks if he could prep and send the expedia project which is quite complicated, to the colourist for grading in the evening and tomorrow morning. Without really any understanding of the fact how long conforming might take.

Jules by now really annoyed. But much more frustrating was how the project was made:

So this is the third project in a series. First two projects we're edited and organised by Jules himself. And because Jules' strong technical knowledge there was a lot of order in it. The project themselves are really not difficult to cut, it was much more a technically demanding. You had to make 200 different cuts because it was an interactive thing that eventually had to be put in code and on YouTube where you can click buttons and have different scenarios play out. You had to edit load of these versions, but most important is the bookkeeping of the interactive side.

So now they made this third project simpler, because the first time it was quite difficult. This third project is now done without Jules. And because Jules is now on NOB.

Interesting to note, the project was edited by a female editor, quite old for someone to do such a small commercial job, was pretty surprising to me.

But, the surprising was, we just found accidentally she charges 600 pounds a day for editing. Also surprising they accepted that.

Anyways, she did not do a good job, so the edit was finished by someone else. Also strangely the whole thing was edited on FCP7 which again created other problems because the film was shot on a new special camera called CODEX. Which is like a super high end version of GoPro. That actually can shoot in many different formats. And this is actually how the whole can of worms opened.

The DOP having choice between 20 formats, decides to use the most complicated one – the RAW dpx sequence. And very strangely, probably out of ignorance, chooses, out of 3 dpx formats, the only one that is incompatible with all the software we have here. That is the 12 bit dpx sequence. Just For info - there are 3 dpx sequence types that can be created with this cam. 10,12 and 16 bit. 10 and 16 are actually quite widely available, readable. But 12 bit is a rare one. And strangely the DOP chose that one. Ignorance.

What is more strange is that person had choice to shoot in prores, DNxHD, all post-production friendly context. And clearly chose not to. This of course created, also due to being edited on FCP7 - which is now a dinosaur – a lot of problems.

Jules got really frustrated, calling he's stuck between an ignorant producer and hot-headed DOP. Needing to conform something that needs 2 days to be done, having 2 hours left. Cause the producer does not even know what conform means.

I think it is the first time I saw Jules visibly irritated. He even sent pissy email to Adam the boss. He tried to hurry up things, but we really did not know what was wrong, the whole sequence could not relink, and eventually, again by going through fora and asking Google on previous experience, we did find the way.

I called Jules 8:30 and he is still in the office trying to export the sequence.

Jules also said, he had trouble with keyboard shortcuts of FCP7, although this is kind of his specialism. He didn't use it for a long period now since the step to premiere pro.

Appendix II

UNIVERSITY of GREENWICH

Participant Information Sheet and Consent Form

About the research

How has the availability of digital technology changed the processes and ultimately the products of film production?

Digital technology has been an integral part of film production for more than two decades now, asserting an incrementally more powerful influence on production, distribution and audiences, increasing output volumes and expanding the expertise base.
Despite the now significant role of the digital in cinematographic production, it is remarkable that academic research has adopted an ambiguous stance towards the phenomenon. Film theory seems reluctant to engage in the technical discourse as it interprets the changes brought by technological transformations as merely aesthetic. This begs the question of whether this stance suffices in a time when new technology is transforming processes to such an extent that basic notions such as reality, acting or authorship are being reshaped, and the traditional balance of economic authority is being put into question.

The aim of this investigation is to map the changes these new technologies have brought to the processes involved in filmmaking, informing the decision making of individuals and determining new workflows. Only by understanding the impact of these new practices will we be able to utilise the new medium to the fullest.

Who will be involved and how?

Key informant interviews

During the fieldwork phase of the research, several interviews will be conducted with professionals in the field of film production and post-production. Specifically, these are professionals who experience the ever-changing scope of digital technologies first hand, and whose craft has changed the most since the penetration of 'the digital' in film production. The aim is mainly on Digital Imaging Technicians (DITs), Editors, Cinematographers and Color graders. These individuals will be interviewed about their experiences involving film/video production and digital workflows.

Participant observation

One or two individuals with a specific experience in a line of job directly created as a consequence of digital filmmaking – the DITs (Digital Imaging Technicians) – will be surveyed during their work activities for a longer period of time.

What would be needed from you by the research project?

Interviews

Interviews will be conducted as a combination of structured and semi-structured interviews. You will be interviewed twice for a duration of approximately one hour.

The location of the interviews will be determined by you and will most likely be at the premises of the companies you are employed by. The interviews will be recorded and verbatim transcripts will be produced from the recordings. As a participant of this research project copies of your recordings and transcripts will be available to yourself if you would like to read and review them. However, to respect the privacy of other research participants you will not be allowed copies of other participants' interview data.

Participant Observation

If you are approached for Participant Observation, you are expected to disclose this to your production company. Together with your employee, an agreement will be made on when and how the researcher can observe your activities. It is of utmost importance for the researcher not to obstruct your activities in any way.

During the participant observation, the researcher will take notes based on your interactions, opinions and reflections on the work you are doing. These notes will be consolidated in a document that will be presented to you for approval. Thereafter the same documents will be presented to the production company during whose production the observation took place.

Other questions?

What is expected from you?

Involvement in the project is entirely voluntary and if you do not wish to be a part of the research project you can opt out whenever you want. Furthermore, you are entitled to withdraw any statements captured by the researcher prior to the finalization of the research thesis. You are expected to answer all enquiries in a truthful manner.

What will be done with the data?

The data from this project will be used in the above described research. The anonymity of participants will be maintained where possible, and if not, consent will be sought to disclose any details of the informants.

Will you contribution to the research project be anonymous?

Whilst your data will be treated confidentially, it is not possible to guarantee you anonymity. That being said, all information gathered will be treated confidentially and transcripts will be identified by a participant number and not

participants' names. As mentioned before, you always have the option to opt out of the research prior to the finalisation of the research thesis.

Any further questions?

Please feel free to contact me at d.petkovic@greenwich.ac.uk

Or alternatively, any questions may be directed to the supervisors of this project:

Prof. Gregory Sporton g.sporton@gre.ac.uk

Dr Christopher Brown c.brown@greenwich.ac.uk

PARTICIPANT CONSENT FORM

To be completed by the participant. If the participant is under 18, to be completed by the parent / guardian / person acting in loco parentis.

- I have read the information sheet about this study
- I have had an opportunity to ask questions and discuss this study
- I have received satisfactory answers to all my questions
- I have received enough information about this study
- I understand that I am / the participant is free to withdraw from this study:
    - At any time (until such date as this will no longer be possible, which I have been told)
    - Without giving a reason for withdrawing
    - (If I am / the participant is, or intends to become, a student at the University of Greenwich) without affecting my / the participant's future with the University
    - Without affecting any medical or nursing care I / the participant may be receiving.
- I understand that my research data may be used for a further project in anonymous form, but I am able to opt out of this if I so wish, by ticking here. ☐
- I give permission for the recording of interviews and agree to be quoted.
- I agree to take part in this study

Signed (participant)	Date
Name in block letters	
Signed (parent / guardian / other) (if under 18)	Date
Name in block letters	
Signature of researcher	Date 09/12/13
This project is supervised by: Prof. Gregory Sporton g.sporton@gre.ac.uk and Dr. Christopher Brown c.brown@greenwich.ac.uk Any questions may be directed to the supervisors of this project.	
Researcher's contact details (including telephone number and e-mail address): Dusan Petkovic d.petkovic@greenwich.ac.uk	

Appendix III

List of transcribed interviews

1. **Adam Booth** – head of Production Archer's Mark – interview June 2015

2. **Mike Brett** – owner at Archer's Mark – interview June 2015

3. **Steve Jamisson** – owner Archer's Mark – interview August 2015

4. **Jules Quantrill** – editor Notes on Blindness – interview June 2015

5. **Jules Quantrill** – editor Notes on Blindness – interview January 2016

6. **Jo-jo Ellison** – producer Notes on blindness – interview January 2016

7. **James Spinney and Peter Middleton** – directors Notes on Blindness – interview November 2015

8. **James Spinney and Peter Middleton** – directors Notes on Blindness – interview February 2016

The interview transcriptions can be found on:
https://www.dropbox.com/sh/uul0qmkm8rvcnnm/AABOW35VUXbQCIsmPq9FWfg3a?dl=0
Password: workflow

Appendix IV

University Research Ethics Committee Application Form

APPLICATION REFERENCE:
for office use only

Checklist

Name of applicant: Dusan Petkovic	
School/Office: CMS	
Title of research: Surviving the digital maelstrom: Film in the time of digital	
These papers must be attached to this application form (please tick):	
• Participant information sheet	✓
• Participant consent form	✓
These papers may be required (tick if included):	
• Letters (to participants, parents/guardians, participating institutions etc)	
• Questionnaire(s) or indicative questions for interviews	✓
• Advertisement /flyer/copy of message inviting participation	
• Annex I - Drugs and medical devices	
• Annex II - Research involving the storage of human tissue	
• Annex III - Ionising radiation	

Has the form been signed? **YES**

Have any annexes been signed where necessary? **YES**

SECTION 1: APPLICANT DETAILS

1.1 Surname **Petkovic**	Forename **Dusan**		Title **Mr**
School/Department: **School of Computing and Mathematical Sciences**			
University address **University of Greenwich** **Old Royal Naval College** **London SE10 9LS**			
University Tel	Fax	E-mail	pd14@gre.ac.uk
1.2 Are you a student? **Student** A member of staff? A member of staff applying as a student? Other?			
Programme of study (if applicable) **MPhil/PhD**			
If you are a higher degree student, has your research project been approved by the University Research Degrees Committee? YES			
If YES, when**?** **27.11.2013**	What is the RDC reference number? **FDRCACH/13/M-2/4**		
If NO, why not?			
1.3 What is the primary purpose of the research? (Please indicate YES or NO) • Educational qualification • Internally funded research **YES** • Externally funded research • Other (please specify).....			
1.4 Project supervision – give the name of the research supervisor(s) and their contact information Prof. Gregory Sporton g.sporton@greenwich.ac.uk Dr. Chris Brown c.brown@greenwich.ac.uk			
1.5 Details of any other co-researchers within the university None			
1.6 Details of any other co-researchers external to the university None			

1.7 Experience and qualifications – include brief experience and qualifications, only where it is relevant to this study, of:

2011 – MA with distinction in Visual and Media Anthropology – Freie Universitat Berlin, Germany
2005 – BA in Film and Television (specialisation Post Production) – Netherlands Film & Television Academy, Amsterdam, The Netherlands

The applicant also has relevant teaching experience, having recently been a guest lecturer in 'Editing from a practitioner's perspective' at the University of Greenwich (2012-2013) and having previously provided lectures in editing techniques and editing theory at Shrishty School of Film and Design in Bangalore, India (2006).

Furthermore, the applicant has over eight years of professional experience in audio-visual content production on four continents. The most notable positions he has held, include being senior editor for prime-time television drama, feature films and international brand commercials in the Netherlands (2005-2007); producer, director and owner of a production company based in Lilongwe, Malawi (2008-2010); and post production coordinator and workflow manager at White Lantern, Bournemouth, UK (2012-2013).

Prof. Gregory Sporton has a PhD, 5 complete supervisions (4 PhD, 1 MPhil) and 3 current supervisions.

Dr. Christopher Brown has PhD in film studies, and has published articles in journals including the *Quarterly Review of Film & Video* and *Film Criticism*. At Greenwich, he co-ordinates two BA filmmaking courses and one screenwriting course. He previously taught two BA film courses and MPhil filmmaking workshops at the University of Cambridge. His screenplay *Knock-Out* has won three awards and was entered into REF 2014 as an art and design group output.

1.8 Membership of professional bodies - are you or any co-researcher(s) a member of any professional, or other, bodies which set (i.e. require compliance with) ethical standards of behaviour or practice such as the British Psychological Society, Nursing and Midwifery Council, medical Royal Colleges etc.? If so, please specify.
None

SECTION 2: PROJECT DETAILS

2.1 What are the principal research questions posed by this research? Describe briefly, in lay terms, the proposed research project including step by step methodology, and its potential outcomes and benefits (no more than 250 words).

How has the availability of digital technology changed the processes and ultimately the products of film production?

Digital technology has been an integral part of film production for more than two decades now, asserting an incrementally more powerful influence on production, distribution and audiences, increasing output volumes and expanding the expertise base.

Despite the now significant role of the digital in cinematographic production, it is remarkable that

academic research has adopted an ambiguous stance towards the phenomenon.
Film theory seems reluctant to engage in the technical discourse as it interprets the changes brought by technological transformations as merely aesthetic. This begs the question of whether this stance suffices in a time when new technology is transforming processes to such an extent that basic notions such as reality, acting or authorship are being reshaped, and the traditional balance of economic authority is being put into question.

The aim of this investigation is to map the changes these new technologies have brought to the processes involved in filmmaking, informing the decision-making of individuals and determining new workflows. Only by understanding the impact of these new practices will we be able to utilise the new medium to the fullest.

Relevant Methodologies

Ethnographic research will be conducted into the job roles that have been created as a consequence of the introduction of new technologies. The ethnography will be combined with periodic key informant interviews with prominent digital imaging professionals.

Systematic and Participant observation

1. Suitable subjects will be identified
2. The type of observation will be established in agreement with the subjects
3. Consent form will be presented, including the confidentiality clause
4. In case of systematic observation - measurable indicators will be created (Quantifiable or reoccurring events like - Digital Imaging Technician hours on set, amount of shot material, DIT creative involvement in percentages of time spent)
5. At the end of the fieldwork, the field notes will be presented to the subjects and the agreed consent revisited.

Interviews

1. Prior to field work, an interview (combination of structured and semi-structured) will take place with key informants and subject(s) of the ethnographic inquiry (find attached 001 + 002), in order to establish a baseline
2. After field work an interview (combination of structured and semi-structured) will take place with key informants and subjects of the ethnographic inquiry (find attached 003)
3. The interviews will be transcribed and presented to informants for verification
4. The structured aspect of interviews will be coded
5. The semi-structured aspect of the interview will be analysed for differences and similarities
6. Each of the interviews will be recorded and a verbatim transcript produced
7. Each participant will have access to their individual transcripts to check that they are satisfied with it and any issues will be addressed. This will be done promptly after each interview so that it is fresh in the minds of participants and details will be easier to remember.

- The research findings will be disseminated and research participants will receive the findings.
- Once participants are satisfied with the transcripts of their interviews and the research project has been completed, the recordings will be securely destroyed.

2.2 Are any of the following involved? (Please indicate YES or NO)

- Intrusive procedure e.g. questionnaire, interview, focus group, diary (attach a copy of your questionnaire or indicative questions) **YES**

- Invasive procedure e.g. venepuncture, tissue sampling NO
- Physical contact NO
- Covert observation or covert filming / recording NO
- Children / young people (under 18) NO
- Vulnerable people (elderly, physically or mentally ill, people with learning difficulties, in care, bereaved, prisoners, other) NO
- Drugs, medicinal products or medical devices (if YES, complete Annex I) NO
- Storing human tissue (if YES, complete Annex II) NO
- Working with sources of ionising radiation (if YES, complete Annex III) NO

2.3 Has there been a pilot study for this research? (If YES, please give details)
NO

2.4 What is the proposed start date (i) of the project and (ii) of the fieldwork (if different)?
Project start: January 2014
Fieldwork start April 2014
What is the proposed end date (i) of the project and (ii) of the fieldwork (if different)?
Project end: October 2016
Fieldwork end: April 2015

SECTION 3: PARTICIPATION AND CONSENT

3.1 What are the selection criteria for the proposed participants in the study?

Participant observation subject criteria:

- **Has a set of skills and experience relevant to the research**
- **Works in an organisation with which the examiner has an established rapport**
- **Is fully aware of research aims and has consented to be a part of the research**
- **Not considered to be a vulnerable person (based on this form's criteria)**

Key interview informant criteria:

- **Experience relevant to this research**
- **Involved full-time in an activity covered by the research**
- **Not considered to be a vulnerable person (based on this form's criteria)**

Initially, the researcher will discuss the research in person with potential candidates. Thereafter, a formal written recruitment request will be sent to the willing candidates and their employers. Potential candidates are the editors and Digital Technicians working in companies that have created a rapport with the researcher through past work experience. Examples of those companies are:

- **White Lantern Film**
- **Archers Mark**
- **Sixteen Film**
- **Maverick TV**

3.2 How many participants are to take part?

One for the participant observation (or two, observed simultaneously).
5-10 for key informant interviews

3.3 How will prospective participants be recruited / contacted and informed about their role in the project? (Give details and attach your participant information sheet, advertisement, email etc.)
The prospective participants will be directly contacted by the researcher and should have first-hand experience of working together with the researcher or should know of the researcher's work through a network contact person who will act as a gatekeeper.

3.4 Where will the interaction with participants take place? E.g. online, classroom, public facility, laboratory, office, home etc.
The interaction with the participant observation subject(s) will take place at the work place of the production company they are employed by.

The key informant interviews will be conducted at their employers' offices. If the informants are not able to participate in person, the interview will be conducted over the internet.

3.5 Are any external bodies' premises or resources to be used? Please indicate YES or NO and give details of permission sought.
YES
The interviews will in all probability be conducted at the production company premises, and observation will take place at the working location of the production. The permissions will be sought to conduct the interviews and observation in both instances.

3.6 What is the expected total duration of participation in the study for each participant? E.g. 20 minutes to complete a questionnaire, an hour for an interview, etc.
Each informant will be interviewed twice, with a duration of one hour per interview.

The participatory observation subject(s) will be monitored in intermittent blocks of 2-3 hours during the selected production activities, over a period of six months.

3.7 Is consent to be obtained using the UREC consent template? (Please indicate YES or NO and attach your consent form). If NO please indicate how consent is to be obtained, and attach a copy.
YES

3.8 If children or young people (under 18) are involved, please say how consent will be sought, from both the children / young people and their parents, guardians or those acting *in loco parentis* (e.g. school).

3.9 Will any payment, incentive or reimbursement of expenses be made? (Please indicate YES or NO and give details, including amount)

NO

SECTION 4: ETHICAL CONSIDERATIONS

4.1 What do you consider are the main ethical issues and risks that may arise in this research? (Refer to the Guidance on Ethical Approval for Research, point 3.1). What steps will be taken to address each issue?

Participant Observation

ISSUE: Data might be disclosed that is deemed confidential by the company conducting the film production.

SOLUTION:

- **All coded and ethnographic data will first be shared with the informant and his/her consent will be sought to present them to the company conducting the production.**
- **Once consent is obtained by the informant, the information will be shared with the production company without disclosing the informant identity, and consent will be sought to use the information. Data will be stored on a password protected hard drive.**

ISSUE: The observation will often be conducted during actual film production and post-production.

SOLUTION:

- **Permission will be sought from the production company to conduct the observation during a specific production.**

Interviews

ISSUE: Collecting personal data about a participant's experience during a certain production.

SOLUTION:

- **The information will be gathered through recorded interviews. These recordings will be used to create verbatim transcripts. Both the transcripts and recordings will be kept encrypted and coded. The participant reference key will be kept as a separately encrypted document. Participants will only have access to their own transcripts and recordings. Once participants are satisfied with the transcripts of their interviews and the project has been completed, the recordings will be securely destroyed.**

4.2 Will personal data, as defined by the Data Protection Act 1998, be collected during the research (Refer to the Guidance on Ethical Approval for Research, point 3.2)? Indicate YES or NO. If YES, give details of how you will deal with that data.

YES

Participant observation is intrinsically intended to record a personal account on a specific topic, no matter how non-obtrusive it might seem.

- **The researcher will comply with the requirements of the University's data protection policies**
- **Personal data will be collected in the form of recorded semi-structured interviews. These recordings will be used to produce verbatim transcripts, which will then be coded with a participant reference.**
- **The participant reference key will be kept as a separate securely encrypted document. The recordings will not be made public and will also be kept encrypted.**
- **Once participants are satisfied with the transcripts of their interviews and the project has been completed, the recordings will be securely destroyed.**
- **Personal contact information will be kept separate from transcripts and will only be retained until the conclusion of the research project. This is to ensure participants are able to be contacted in relation to their role in the project and to share findings with them.**

SECTION 5: INSURANCE AND FINANCIAL INTERESTS

5.1 Will this research be covered by an insurance policy (such as your own professional indemnity insurance) other than the University of Greenwich public liability policy? If so, give details.

NO

5.2 Indicate by "YES" or by ticking one of the statements below:

- I declare there is no financial or other direct interest to me or my School or Faculty arising from

this study **YES**

- I declare there is a financial or other direct interest to me or my School or Faculty arising from this study (supply details)

Signatures

I undertake to carry out research in accordance with the University's Research Ethics Policy. In the case of a higher degree, I confirm that approval has been given by the Research Degrees Committee.

Signature of applicant **Date**

I have discussed the project with the applicant, I confirm that all participants are suitably qualified to undertake this research and I approve it.

Signature of supervisor (to be signed if applicant is a student) **Date**

I have reviewed the project with the applicant, or applicant's supervisor, and I confirm that all participants are suitably qualified to undertake this research and I approve it.

Signature of UREC representative or Director of Research **Date**