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# ABSTRACT

Abstract

This thesis explores how the project charter development, project scope management, and project time management are executed in a Finnish movie production. The deviations and analogies between a case movie production and best practices suggested in PMBOK are presented. Empirical material from the case is gathered with two semi-structured interviews with a producer and a line producer. The interview data is categorized according to PMBOK knowledge areas. The analysis is complemented with movie industry specific norms found in popular movie production guides. The described and observed methods are linked together and the relationship between them is discussed. The project charter development, which is referred as a green light process in the movie industry, is mostly analogous between all areas. The deviations are in the level of formality. The green lighting in the case movie was accomplished without bureaucratic reports described in movie production guides. The empirical material shows that project management conventions and movie industry employ similar methods especially in scope management. Project management practices introduce a work breakdown structure (WBS) method, and movie production accomplishes the same task by developing a shooting script. Time management of the case movie deviates on most parts from the methods suggested in PMBOK. The major deviation is resource management. PMBOK suggests creating a resource breakdown structure. The case movie production accomplished this through budgeting process. Furthermore the popular movie production guides also disregard resource management as sovereign process. However the activity listing is quite analogous between the case movie and PMBOK. The final key observation is that although there is a broad set of effective and detailed movie industry specific methods, a comprehensive methodology that would cover the whole production process, such as Prince2 or Scrum, seems to be missing from the movie industry.

| Key words | Project management, movie production, movie industry, PMBOK |
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# PROJECT CHARTER, SCOPE, AND TIME MANAGEMENT IN THE MOVIE INDUSTRY

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# 1      INTRODUCTION

During the last few years the interest towards more sophisticated project management practices in movie production processes has increased. Movie industry has for long relied on conventional wisdom and traditions. But world is changing and digitalization provides new possibilities to improve old customs. Hollywood has already implemented some of these new practices. Latest research has provided a set of tools to the movie industry professionals to advance their operations. Such tools include more sophisticated scheduling practices to improve time management, and stock market simulations to evaluate market potential of the movie. If Hollywood is already making progress in their operations, what is the situation in Finland? The aim for this research is to describe through a single case ways, how movie production and project management are carried out in a real-life movie production process in Finland, and find out what are the deviations and analogies to best practices suggested in project management standards and movie production handbooks.

Movie production is not a simple issue from project management perspective. Since shootings often take place outside in the real world, they also have an endless amount of variables starting from weather. The number of workforce is also highly fluctuating. One day there might be a crew of 10 people and the next day there are 300 persons for a crowd scene. These aspects provide challenges for the project planning, but on the other hand provide interesting topic for project management research in the field. The movie industry has also an economical importance in the international markets, whereat the amount of movie production research has increased. Also the cultural impact is considered important.

Nowadays many organizations exercise the use of specific project management standards in their project to standardize terminology and the execution of processes and methods. There are multiple different standards to choose from. However, the major concern in project management research has been the connection between certified project managers and project success, or the lack of it. Are the project management standards really resulting in better project management? Entertainment industry has typically excelled in project management, although they have disregarded practices used in other fields. What are the reasons for this state of affairs?

The focus of the research is set on three knowledge areas: (1) project charter development, (2) project scope management, (3) project time management. The first knowledge area is commonly referred as green light process in the movie industry. The second knowledge area includes the previsualization of a movie script. This is the phase when majority of the technical and creative choices are made. The third knowledge area interlaces the processes of finding logical relationships between scenes and shots and sequencing the production of them to support efficient shooting schedule. The three

knowledge areas are addressed in separate sections, and each of them is divided further in to four subsections. The first subsection provides a project management perspective. The second subsection provides a perspective from movie production handbooks. The third subsection provides the real-life perspective through the case movie production. The fourth subsection engages a discussion about deviations and analogies between these perspectives.

The project management perspective was gathered from Project Management Institute's PMBOK standard, which has been an American National Standards Institute (ANSI) norm since 2004. This book of knowledge is used to describe how charter development, scope management, and time management are seen in the field of project management. The movie industry specific norms were gathered from a set of movie production handbooks and guides. Also some research from the field of movie production was incorporated to supplement this perspective. The data from real life movie productions was gathered with two interviews. The first interviewee is a producer in one of the major Finnish movie production companies. A case movie production, in which the interviewee operated as a producer, was chosen for the interview. The producer has also written the screenplay for the movie. The second interview was made with the line producer of the case movie. Line producer is movie industry's equivalent for project manager.

The findings from the empirical material indicate that project management conventions and movie industry share many aspects in scope management. Also part of the time management seems analogous between PMBOK and movie industry. The major deviation is found from the resource management, which is a part of the project time management. The scope management in movie industry is handled with clear and distinctive methods, which are found from both the case movie and handbooks. These methods also corresponded quite clearly with approaches suggested in PMBOK. Then again the resource management in the movie industry resembles more a custom used in Scrum methodology where team members are responsible for organizing their own resources, than a standardized resource breakdown structure suggested in PMBOK. Mostly common sense and Excel sheets were used to administrate the resources during the case movie production. Also the movie production handbooks addresses this topic, but they do not offer clear methods for complete resource management. However, movie production research has tackled the challenge of coping with the resources. The project charter development i.e. green light process portrays itself bit differently between the U.S based handbooks and the Finnish case movie. The handbooks introduce different analysis techniques for creating a set of reports to support the green light decision. Then again, in Finland the green light decision requires less bureaucracy, and it is based on conversations between the producer and the financiers.

## 2        THEORY AND LITERATURE

This chapter is an overview to the fundamentals of project management. The research concerning the PMBOK standard and other project management standards is discussed. Also some of the most famous methods and methodologies of project management, such as CPM, CCM, Prince2, and Scrum, are covered. The difference between a project management standard and project management methodology is discussed. In addition this chapter provides a look into the world of movie production management and cover some of the latest advances and ideas made specifically to address complexity of an automated movie schedule management in the movie production process. However, first it is important define what is meant with the term project and how is the term project management related to it. It is vital that the difference between these two terms is understood clearly.

## 2.1        What is project and what is project management – definitions

According to PMBOK (2013, 3) *"a project is a temporary endeavor undertaken to create unique product, service, or result"*. This means that project needs to have well-defined boundaries. The starting date has to be set, and project can only end when the objectives are met or if the project is terminated. Munns and Bjeirmi (1996, 81) points out that undertaking a project requires faster decision making techniques than ordinary day-to-day operations. They consider project to be an achievement of specific objective, and it involves undertaking a series of activities and tasks, which consumes resources.

Project management is defined in the PMBOK (5) standard as "applying knowledge, skills, tools and techniques to the project activities in order to meet the project's requirements". De Wit (1988, 165) points out that most project management literature favors a viewpoint that project management has three major objectives: timely delivery, within budget, and with appropriate quality. He also mentions that a success in these project-management-related objectives does not always correlate with the success of the whole project.

Also Munns and Bjeirmi (1996, 81-82) make a clear distinction between project success and project management success. They argue that the success of project is inherently long-term and measured not by only the project itself but with the total life span of the end product produced by the project. And in contrast the success of project management is inherently short-term and measured with "on-time delivery, within budget, and appropriate quality". With this definition they make an important notice: project can be successful in spite of project management success or failure and vice-versa. This means that although project management has an important role in project success, there

are many factors affecting the project success that are outside the control of project manager, such as market acceptance. A project that has been delivered on time and in budget can still fail to meet the market demand. This would be an example of successful project management in a failed project. Then again a project can be delayed and go over the budget, but still manage to generate enough added value to the company to be successful. Munns and Bjeirmi (1996, 84) stresses that it is important to avoid confusion between project success and project management success, and conclude that this confusion can arise through three factors:

1. **Time frame** – Long-term success indicators are not available when project is finished. This might lead to confusing the short-term project management indicators (i.e. in-time-delivery) to actual long-term project success. If this happens the project management success becomes synonymous to project success.

2. **Confusion of objectives** – Project has an objective to be profitable on certain measurements. Project management has an objective to stay within budget. Although these are intertwined, they should be identified as two separate groups. Confusion in these two might lead to mixing up budget expenditures in profitability of the project.

3. **Ease of measurement** – The success of project management is quite straightforward to measure quantitatively through budget and schedule. Whereas the success of project is more difficult, since most of the measures are qualitative or in the future. This might make it tempting to use the straightforward measures of project management to measure also the success of the whole project.

To avoid these confusions Munns and Bjeirmi (1996, 84) suggests that the role of project management is placed in the context of the whole project, which they describe having six different stages, and the project manager is part of only stages two, three and four:

1. Conception phase
2. **Planning phase** (project management)
3. **Production phase** (project management)
4. **Handover phase** (project management)
5. Utilization
6. Closedown

The success of project is measured in all of the stages, but the success of project management only in stages two, three and four. The conclusion Munns and Bjeirmi (1996, 86) make from this is that to make the project manager responsible for the suc-

cess of the total project would be unsuitable, and it is the project's customer's responsibility to take an enlarged interest in the development and use of the project.

## 2.2    Project management standards

According to CTE Solutions a project management standard describes *what* should be done during a project, whereas a project management methodology describes *how* things should be done (www.ctesolutions.com). According to International Organization for Standardization: *"a standard is a document, established by consensus that provides rules, guidelines or characteristics for activities or their results"*. Project management standards are nowadays regarded as an important part of modern organizations, and they are expected to harmonize terminology and understanding of different processes and methods (Ahleman, Teuteberg and Vogelsang, 2008, 292).

A number of different project management standards are available for managing projects. These standards are issued by diverse set of large national and international organizations including International Organization for Standardization (ISO) and American National Standards Institute ANSI. There are also industry-specific standards, which concentrate solely on one branch. In addition to these standard-giving organizations there are professional bodies for project management such as Project Management Institute (PMI), Association for Project Management (APM) and International Project Management Association (IPMA). This diversity can cause challenges when trying to select the most favorable PM standard, which should be widely used among project partners and stakeholders, be applicable for this type of project and organization, and realize benefits for the organization in effectiveness.  There might also be confusion when trying to distinguish what are classical standards and what are guidelines issued by professional bodies. A real standard is expected to be objective, definitive and robust, in contrast to guidelines that are open to interpretation. However, sometimes guidelines can become standards, and this is what happened with PMI's PMBOK standard, which has been an ANSI norm since 2004. (Ahlemann, Teuteberg, & Vogelsang 2008, 292.)

According to Morris (and Crawford, Hodgson, Shepherd, Thomas, 2006, 712) there are three formal "Bodies of Knowledge (BOK)" for project management, and they are promoted by Project Management Institute (PMI), Association for Project Management (APM), and Engineering Advancement Association of Japan (ENAA). Morris et al. (2006, 713) states that BOK's promoted by APM and ENAA are much broader in conceptual breadth and scope than PMI's PMBOK standard. They also point out that one difference between PMBOK and APM BOK is that the latter has been more directly informed by latest research, and then again the structure (and most of the content) of PMBOK has remained essentially unchanged since it was first introduced, and also

there is no formal research program to underlay the formation of PMBOK (Morris et al. 2006, 714). PMBOK sees projects consisting of nine knowledge areas, which are divided into five different stages in the project life cycle, and these stages are called process groups (Matos and Lopes 2013, 788). Then again APMBOK has its limitations also. A modest change in structure was recommended during the revision of the fourth edition of the APMBOK, but it was rejected because it would have caused dislocation in the certification infrastructure (Morris et al. 2006, 715).

The biggest question with the standards is that have certified project managers resulted in improved project success. According to Morris et al (2006, 713) there has not been much research in this area. They point out that PMBOK and other standards tend to leave out or ignore the front-end part of projects and concentrate on the executing phase, even though research considers front-end part as the most crucial part for the project success. The process of writing a standard typically reflects reality as it is, rather than an ideal situation suggested by research. (Morris et al. 2006, 717-718.)

## 2.3    Project management methodologies

There are many techniques available to achieve the project management purposes. In other words to get the job done on time and within cost estimates. The newest methodologies, such as Scrum, were introduced during the turn of the millennium, however the roots of modern project management methods are in the fifties. One of the most significant developments in project management history is the "network analysis". It presents project activities by utilizing arrow diagrams that illustrate relationships between project activities. This network can then be subject to different analysis techniques. Two most famous of these techniques are the critical path method (CPM) and program evaluation and review technique (PERT). They were both developed independently in the early 50's. PERT actually has its background in the military. The U.S. Navy developed it to manage a missile program. CPM has its background in the industry. It was developed by Remington Division of Sperry Rand Corporation and the E.I. DuPont de Nemours & Company. (Wolf & Hauck 1985, 22-23.)

It is worth mentioning that CPM and PERT methods unrealistically assume no limit on the availability of resources, which can cause ineffective resource usage or project delays. In real-life the number of resources and resource constraints limits the project scheduling possibilities. Thus, resource allocation has been a major issue in research since the introduction of CPM/PERT network techniques and many algorithms have been developed to cope with resource-constrained project scheduling. (Al-jibouri 2002, 271.)

Also Gordon and Tulip (1997, 359) points out that the problem of resource control became a major issue already in the late 1950s and early 1960s when the first software systems were developed. That time the project managers faced two alternative problems, which were resource-limited projects and time-limited projects.

Al-jibouri (2002, 272) identifies three different types of resource management methods (1) Central Management, (2) Independent Section Management, and (3) Section Management with Co-operation. In the central management regime the project manager is responsible for allocating all the resources to all the activities from a single resource pool. In the independent section management regime the project is divided in to section and each has its own resource pool. In the last Co-operation regime the movement of resources between sections is considered. In his study, Al-jibouri found out that the independent section management with no co-operation always resulted in longest project duration. The study also indicated that section management with co-operations results in shorter project duration than the central management regime, but Al-jibouri mentioned that this might not always be the case. The efficiency of resource usage is dependent on selected priorities and sections. (Al-jibouri 2002, 275-277.)

### 2.3.1 WBS, CPM, and CCM

Work Breakdown Structure (WBS) defines what work is needed to accomplish a project. In this structure the work is identified as "work packages", which is the smallest component of WBS and found at the lowest level of a hierarchical plan. The highest level refers to the actual project. Additional levels can be placed between these levels, such as geographical location where the work package is executed. However an excessive amount of levels complicates the project management. There are many possible ways that the WBS can be generated, and some structures function better with certain management styles than others. This means that the WBS design affects to how the project should be managed. This is one of the reasons it should be introduced in the early planning phase of the project. WBS also provides a good foundation for cost estimates for the budget. The work packages in the WBS have a special relationship to project activities. If for example a work package is defined as staging of a movie set, then the activities related to that work package include transportation of props, construction of the set. However these activities are interconnected to other activities. There might be activities that are under the lighting of the set work package, and these activities cannot proceed before the activities from staging of the set have been completed. These interconnections represent the network of the project activities. (Globerson 1994, 165–171.)

Critical Path Method (CPM) defines the "bottleneck" route for network analysis. Thus, only by decreasing the duration of activities on critical path can the total duration of the project be reduced. On the other hand this also means that the time needed to perform non-critical activities is seen as less important, at least to some extent. When applying CPM the first task is to make a list of all the activities required to complete the project. All of the activities are labeled with a unique letter or number. Then the activity duration and immediate prerequisite activity are added to each listed activity. After this a graph of the network analysis can be drawn. A circle, with id symbol and duration, represents each activity. Circles are connected with arrows that represent the sequence relationships. All the circles without predecessor should be connected to "Start". Similarly if a circle does not have a successor it should be connected to "Finish". The graph should then illustrate all possible "arrow paths from start to finish". Each path has duration, which is the sum of the activities on that path. The critical path has the highest sum, i.e. it requires highest amount of time to completion. In big projects usually only about 10 % of the activities are found on the critical path. (Levy, Thompson, & Weist 1963, 98–99.)

Professor Goldratt developed Critical Chain Method (CCM) in 1997. The method introduced buffers to the network analysis. The idea is to protect the critical chain against unnecessary delays. Steyn (2001, 367) and Zhao, You & Zuo (2010, 1056) points out that there are three types of buffers: (1) Feeding buffer that is placed where the non critical activities feed into the critical chain, (2) Project buffer that is at the end of the critical chain, and Resource buffer, which alerts if different resource is planned on critical chain than what was previously planned.

The reason for using these buffers is to address the aggregation of risk. This idea was first introduced by the insurance industry. The principle assumes that risks usually do not occur simultaneously, or this is at least very unlikely to happen. Therefore total reserve needed to provide protection against the possible losses is proportionally smaller, than if the risks where addressed individually. In critical chain method this principle is applied with the buffers. It is highly unlikely that all of the activities would need to use up buffers. The total amount of buffers used is proportionally smaller, than if each activity would be addressed individually. Thus, the aggregation reserves are introduced at project level and contingency reserves for individual activities are reduced. This also reduces the total duration of the project. It is important to encourage a corporate culture of "no-blame" for not finishing on the estimated date to reduce the risk of team members building the contingency reserves on their own. (Steyn 2001, 365.)

### 2.3.2    *Prince2*

Prince2, **Pr**ojects **in** **C**ontrolled **E**nvironments is a project management methodology, which was developed by the British Government. It was first introduced in 1989 with the name Prince, and the second edition Prince2 was released 1996. The name has since remained the same even though the methodology has been revised. Also the ownership of Prince2 is currently Axelos Ltd, although the British Government owns part of the company.

The key difference between PMBOK standard and Prince2 methodology is that the first is descriptive and latter is prescriptive. This means that PMBOK describes the project management techniques in detail, and then again Prince2 suggests how these techniques should be implemented. The key driver in Prince2 methodology is the project's business case, which gives validation to the existence of the project. The business case is reviewed constantly in accordance with the first principle of Prince2 methodology that is *continued business justification*. (Matos and Lopes 2013, 789.)

When the PMBOK standard identifies five process groups, the Prince2 has seven. Prince2 aims at more precise definition of how and when everything must be done, as PMBOK just states what must be done. Below is an illustration of processes from both systems to illustrate the differences in the approaches. For example in PMBOK the project scope and time management are part of planning process group and project charter is part of initiating process group.

Table 1        Process groups in PMBOK and Prince2
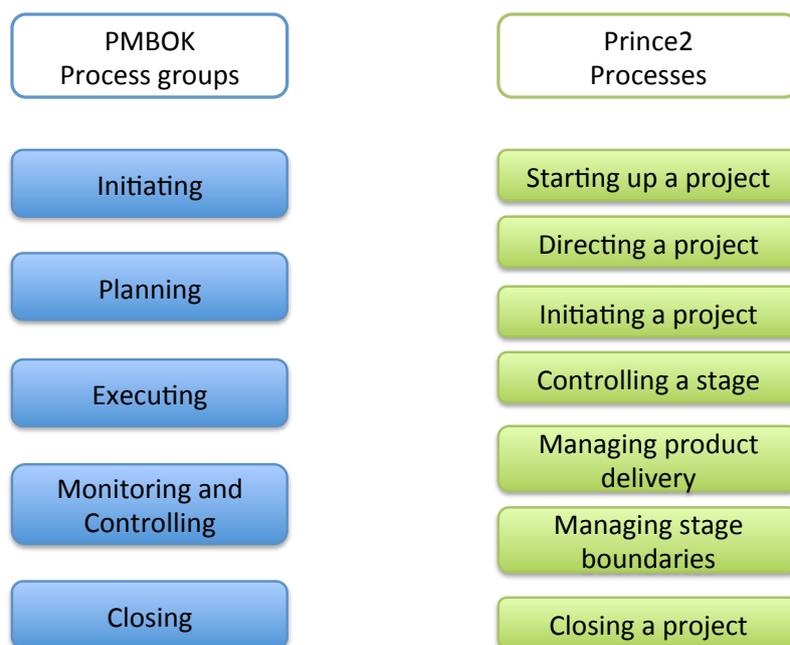
Prince2 methodology stresses the importance of product based planning. The focus is on delivering a product, not just planning activities. The methodology introduces a product breakdown structure (PBS) for scope management purposes. This is essentially same technique than work breakdown structure (WBS), although it is usually put to use on earlier phase to ensure that scope of the project is accurately defined. This is also seen crucial considering the allocation of resources. (Luqman, Hussain, and Tauseef-ur-Rehman 2005, 285-856.)

### 2.3.3    Scrum

Scrum is an agile project management methodology for software development. It is designed for rapidly changing and even chaotic conditions, where all of the requirements cannot be defined beforehand. The name Scrum comes from Rugby, where it refers to team of eight players focusing on a single goal, and each member has well specified role. Similarly, at the center of Scrum methodology is a small independent team of 3–10 members, which is believed to be able to work more effectively than a larger team. A project can consist of several individual Scrum teams. During the initiation phase of a Scrum process the project architecture is designed. The team chooses a chief architect, who then develops the project vision based on the project architecture. The team needs to be prepared to change the project architecture as the project proceeds and unexpected issues arise, and usually the original architecture functions only as a starting point. The actual project work consists of a series of *sprints*. A sprint is typically a 2–4 week working period with a well-defined goal. Before each sprint the project team need to identify all the tasks. These tasks are gathered in a backlog. From the backlog the team then defines the goal for the sprint, i.e. the tasks they believe they can execute during the sprint. The goal should be determined in a way that the outcome of a single sprint is a usable and deliverable product that already delivers valuable functionality. Each sprint then delivers a concrete result. The sprints build on previous results and improve them or fix issues. The deadline for sprints does not change, but the team can cut back the functionality of the sprint's goal, i.e. reduce tasks to meet the deadline. However during the sprint there should be no changes from outside the team. (Rising and Janoff 2000, 30.)

The day-to-day work in the Scrum process includes daily Scrum meetings, which are led by the Scrum master and involve all team members. These meetings last 15-30 minutes. The goal for the meeting is only to address obstacles, but not solve them. The obstacles are solved in different session that includes only those team members affected by the obstacle. During the actual Scrum meeting each team member answers three questions that are: "(1) What have you completed since last Scrum meeting, (2) What obstacles got in your way of completing this work, (3) What specific things do you plan

to achieve between now and the next Scrum meeting". The Scrum master measures the progress of the sprint and keeps record of the decisions made in the meeting. At the end of each sprint all project teams meet with stakeholders and the outcomes of the sprints are presented. This is the meeting where all of the major changes are made. The project can also be terminated between sprints. After each sprint the estimates are expected to become better when the planners receive information about teams' efforts. The final delivery of the product can be made after any sprint, but typically it happens after a specific wrap-up phase, which is the final sprint. (Rising and Janoff 2000, 30-32.)

When Scrum methodology is put in practice in companies, it usually does not follow this textbook ideal. Companies have many reasons to deviate from the proposed pattern. For example company might want to apply two week sprints, but the customer can only participate every four weeks, so they use overlapping sprints of two and four weeks. However, sometimes these deviations are made without fully understanding the consequences of them. This kind of "anti-patterns" can first seem convenient, but actually are in many cases harmful for the project management's success. Basically with Scrum there are two kinds of issues in the adaptation of the methodology: "(1) harmful deviations from recommended Scrum practices and (2) recommended Scrum practices that are for some reason unsuitable in a particular context". One example of a harmful deviation is when performing testing of a product after the sprint. This might lead to a situation where new functionalities are already added on top of the old part while it is still in the testing phase. So the testing results might be outdated even before they are finished. Also the product cannot be delivered after the sprint if it has not been tested. Regardless of this, some companies choose to carry out testing in a separate sprint with a different team. Another example of deviation is choosing a product owner, who is responsible for organizing the backlog and maximizing the value of the product. Some companies do not choose a product owner in the first place. Then again some choose a product owner that is a customer representative, which is somewhat peculiar since the product owner should make sure that the project's return on invest (ROI) is profitable. There is also a case of making one product owner liable for more than one product, but this might lead to a situation where the product owner runs out of time when creating specifications for multiple products. The issues with a product owner seem to have an effect on the ordering of the product backlog, or the lack of ordering it. Backlog is important tool when prioritizing the most valuable items to be executed first, and making sure the team does not avoid harder tasks. One potentially harmful deviation was also inaccurate work estimates, which were usually prepared by product owner. Scrum recommendation is that the whole team should prepare the estimates for resources usage, because this way they should be more accurate and the team should be more committed to them. The deviations are less common in smaller companies and they tend to follow the Scrum recommendations more precisely. The deviations also seem to be more common in companies

that have been using Scrum for a longer period of time. So more experienced Scrum users surprisingly deviate more often from the recommendations. (Eloranta, Koskimies, Mikkonen, and Vuorinen, 2013, 503-508.)


## 2.4   Movie production

Movie production is a complex topic from project management standpoint. According to Bomsdorf et al. (2006, 395) "even small productions have more than 50 activities, which require approximately 130 resources, such as actors, director, team, special effects and locations, and every activity has to be scheduled respecting constraints which may be imposed on single resource or even every activity". As production size grows, naturally the number of activities and resources grows and production becomes more complex.

Eliashberg et al. (2006, 638) points out that the amount of academic research has risen sharply over past decades. They argue that possible reasons for this are first that the industry has high economic impact on global economy and secondly that the high cultural importance attracts attention and thirdly there are rich data available from the industry. According to Hartman, Ashrafi, Jergeas (1998, 269) the overall commercial success of entertainment projects is better than some of the traditional project management oriented industries, however the entertainment industry rarely employs classical project management techniques. This raises the question that what are the reasons for project success in the entertainment industry.

According to Manning (2005, 410) creative projects seem to be embedded in project networks that stretch beyond the boundaries of the firm, but do not dissolve fully into the market. Project networks of this type are dynamic sets of project-based inter-organizational and inter-personal relationships that sustain beyond particular projects.

There are different software solutions available for more efficient movie production process. *"Schedule This"* is a decision supporting system (DSS) for scheduling movies and it aims at better and faster scheduling. It uses specific algorithms to automate the whole process of scheduling. The system also offers information to support the decision-making. During experiments made by the developers of Schedule This DSS, it drastically decreased the time needed to establish a schedule. After all the activities had been defined, it took only five to ten minutes to have a realistic schedule for a 146-page script with 30 locations and total of 190 different resources. (Bomsdorf et al. 2006, 400-401.)

A movie shooting scheduling problem (MSSP) has to be identified before applying a decision supporting system (DSS). A MSSP is related to RCPSP, which is a resource-constrained project-scheduling problem. According to Hartmann and Briskorn (2010, 1)

RCPSP is one of the most famous concepts and a major part of project scheduling research is concentrating on solving this particular problem. They summarize the RCPSP as following (Hartmann et al. 2010, 1):

> The RCPSP considers a project with J activities which are labeled $j=1,...,J$. The processing time (or duration) of an activity j is denoted as $p_j$. Once started, an activity may not be interrupted, i.e., preemption is not allowed. Due to technological requirements, there are precedence relations between some of the activities. They are given by sets of immediate predecessors $P_j$ indicating that an activity j may not be started before each of its predecessors $i \in P_j$ is completed. The precedence relations can be represented by an activity-on-node network, which is assumed to be acyclic. Each activity requires certain amounts of resources to be performed. The resources are called renewable because their full capacity is available in every period. We have K renewable resources labeled $k=1,...,K$. For each resource k the per-period availability is assumed to be constant over time, it is given by $R_k$. Activity j requires $r_{jk}$ units of resource k in each period it is in process. We consider two additional activities $j=0$ and $j=J+1$ representing the start and the completion of the project, respectively. Both are "dummy" activities with durations of 0 and no resource requests.

Hartmann et al. (2010, 2) points out that RCPSP is not applicable for all fields, and actually researchers often use it as a benchmark concept when building an industry specific scheduling problems. Also MSSP differs from RCPSP by some specific characteristics. First is that the resource environment is different. According to Bomsdorf et al. most of the resources come from outside the project organization by renting and outsourcing the work, and this affects heavily on the scheduling process. If for example some special effects equipment is rented for certain time period, it is then assigned to activities that are scheduled to that period. These resources cannot then be replaced easily. In contrast the RCPSP model makes an assumption that all of the resources should be available at all time. The schedule in MSSP again depends significantly on the availability of each individual resource. Second distinction is activity characteristics. Bomsdorf et al. points out MSSP offers more possibilities to plan for the order of activities, since there are only few precedence relations. This means that most of time shooting out of sequence is acceptable and the order in which the scenes are shot can be arranged to support more efficient project management. In contrast the RCPSP assumes that there is a large number precedence relations and this causes the number of acceptable schedules to decrease. The third specific characteristic is objective function.

Bomsdorf et al. suggests focusing on the number of location changes, since they affect on availability of resources and generates travels costs. (Bomsdorf et al. 2006, 398.)

Solving MSSP includes two phases. First is completing the work breakdown structure (WBS), and second is scheduling the items defined in WBS. The WBS is derived from the screenplay of the movie. Each scene and shot receives an item and these items are then the basis of the scheduling process. The items include information about each respective scene or shot, such as location, atmosphere, duration (refers to the duration in the finished movie), scene number, actors, and props. Also time estimates of the shooting duration are made. The scheduling process has to take account the certain constraints and objectives. These include such issues as each item has preferred execution period (day/night), the maximum available working period in a row, and shooting in continuity i.e. scenes in chronological order according to the screenplay. (Bomsdorf et al. 2006, 396–397.)

# 3 RESEARCH METHOD

## 3.1 Aim and scope

This thesis aims to describe how project management is carried out in a movie production. However the scope is set only on certain parts of a project management. These parts are outlined in accordance with the PMBOK standard and they include three knowledge areas: *Develop Project Charter, Project Scope Management, and Project Time Management*. The first knowledge area belongs to initiating process and latter two areas to planning process. This means that from chronological standpoint the scope is in the front-end part of project management, and focus is put on planning of the project, rather than executing the tasks of a project. From movie production perspective the thesis concentrates mostly on the pre-production phase and also touches the actual production phase. The post-production phase is out of the scope.

The outline is quite tight and it leaves many aspects of project management out of the scope of the thesis. But these categories still provide wide enough sampling for conducting an eligible study of project management related issues. Tight outline also reduces the risk of scope getting out of control. All of the empirical data used in the thesis falls under these project management categories and is analyzed by reflecting its' relation to the PMBOK standard.

The ultimate goal nevertheless is to gain understanding on how are the Finnish movie productions managed. The analysis aims to giving an answer to what are the chosen project management practices in Finnish movie industry, and what are the analogies and deviations to methods and techniques suggested in the literature and guides.

## 3.2 Research method

A case study method is implemented to conduct a qualitative business research. Case study research has ability to present complex and hard-to-grasp issues in an accessible way (Eriksson & Kovalainen 2008, 116). From the wide range of different case study approaches a classical intensive case is chosen. According to Eriksson & Kovalainen (2008, 119) a classic case used to study the event from inside through the perspectives of the persons involved. A single case is used in this thesis to describe how movie production and project management are carried out in a real-life movie production process.

The primary data is collected through semi-structure interviews. The interview type is positivist. Eriksson & Kovalainen (2008, 79) suggest using positivist interviews when interest is focused on facts. The interview questions should then include many "what"

and "how" questions. The semi-structured interview is chosen over structured and open interviews to employ a systematic structure but at the same time leave room for discussions. This is expected to create an outcome where all of the major topics are covered, but also some unexpected issues might emerge. Interviews are transcribed including all the words and the text is translated from Finnish to English. The reason for using Finnish language during the interviews is that it is the native language of the interviewees and this is expected to support more in-depth conversation.

Data is categorized by using the knowledge areas from PMBOK standard. Below is a figure, which shows the knowledge areas that are used in the analysis of interview data. These areas are marked with green color and excluded areas are left empty. Also the scope of the thesis is establishes visually in the Table 2. The project management process groups are the same as in Table 1 and they illustrate the chronological progress of a project from start to finish. The knowledge areas represent a set of concepts, terms and activities that have been established in project management field and are used in most projects most of the time (PMBOK, 60).

Table 2           Knowledge areas for categorization of interview data

| Knowledge areas | Project Management Process Groups | | | | |
|---|---|---|---|---|---|
| | Initiating | Planning | Executing | Monitoring | Closing |
| Integration | Charter | Project Plan | | | |
| Scope | | Scope, requirements, WBS | | | |
| Time | | Activities, sequencing, resources, durations, schedule | | | |
| Cost | | | | | |
| Quality | | | | | |
| HR | | | | | |
| Communication | | | | | |
| Risk | | | | | |
| Procurement | | | | | |
| Stakeholder | | | | | |

Modification from project management process group and knowledge are mapping figure (PMBOK, 61)

It should be mentioned that an intensive case study is not best suited for producing knowledge that could be generalized (Eriksson & Kovalainen 2008, 121). This is in accordance with the ultimate goal of the thesis, which was to study movie production through a single-case. Case studies have been criticized for sometimes being anecdotal descriptions without scientific rigor (Eriksson & Kovalainen 2008, 116). To tackle this risk the primary data from interviews is linked with a selection of secondary data available from movie industry handbooks and project management practices. This approach is expected to provide deeper understanding of the relation between the case movie production and the industry in general. Globally recognized project management standard will hopefully extend the relationship to the field of project management in general.

## 3.3 Empirical data and framework for analysis

Sets of different data sources are used to collect the research material. Primary data is collected from interviews and secondary textual data from movie production hand-books. PMBOK forms the framework for categorization of all empirical data. The diagram below describes the structure of the three different sources, where the research material is collected.
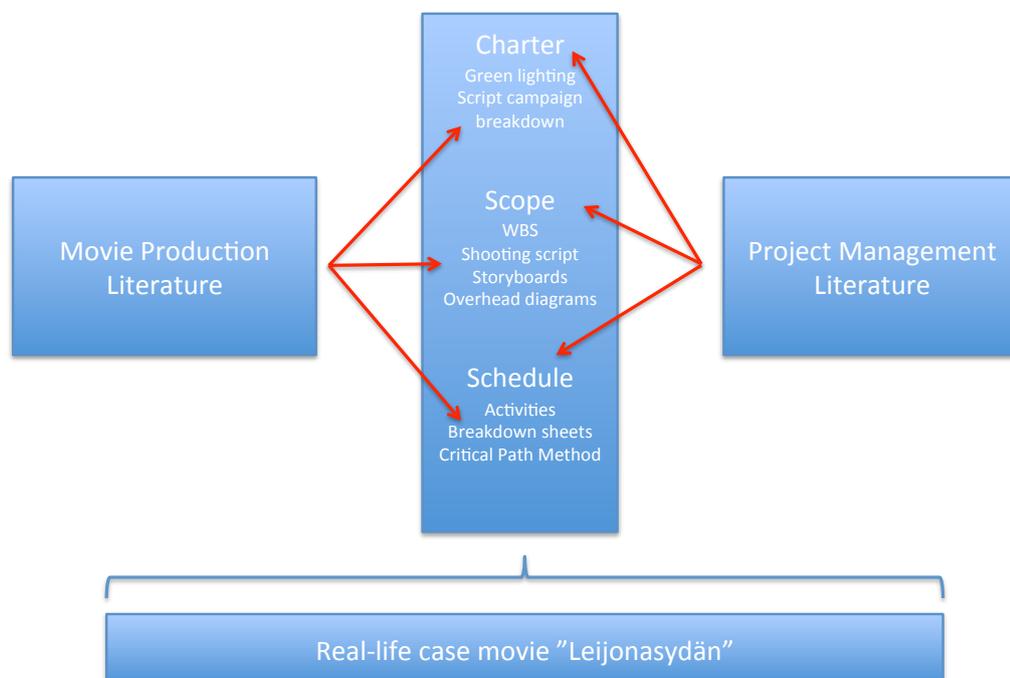


Figure 1        Structure of analysis

First source is the movie production handbooks, which illustrates the established norms in the movie industry. The second source is Project Management Institute's book: A Guide to the Project Management Body of Knowledge (PMBOK), which is expected to generate a project management perspective to the analysis. The third one is the interviews with a movie producer and a line producer of the case movie.

This approach is expected to uncover similarities between the movie production traditions and the best practices in project management. Hopefully it also enables the thesis to establish some common language between movie industry professionals and project management professionals.

### 3.3.1  Interviews

Two semi-structured interviews are the primary source of empirical data. These interviews are made with Helsinki Filmi's producer Aleksi Bardy and line producer Heidi Laitinen. The target production is Helsinki Filmi's movie "Leijonasydän", "Heart of a Lion" in English. The main focus of the interviews is to cover the green light process of the case movie and the pre-production phase where the project plan is made. However, the overall focus of the interviews exceeds the focus of the thesis and will cover parts of budgeting process, procurement management and risk management. This wider scope is necessary because the thesis scope is defined from project management perspective and the terminology might differ from movie production perspective. This might lead to exclusion of some important issues. This situation is managed by taking a wider scope for the interviews.

Helsinki Filmi is a small sized movie production company located in Finland, with turnover of $1 - 3$ million euros. As a typical Finnish production company they only employ a handful of people fulltime, but during a movie production the number of employees rises drastically. This provides an interesting target company from entrepreneurial standpoint. A small company that over goes high levels of growth and diminish repeatedly and has to adjust its' operations to drastic volatility is a fascinating object for a study. The case movie "Leijonasydän" was budgeted for 1 500 000 €, which is quite typical for a Finnish feature film. It was the third popular movie in Finland in 2013.

Aleksi Bardy wrote the screenplay for the movie and he was also the producer of the movie. This situation is expected to support the studying of the green light process, which is the process where the decision of taking a screenplay to production is made. Green light process might have overlapping functions from the production process and the writing process. A set-up where the writer and the producer are the same person provides a change to tackle this junction during a single interview and gain insight from the formulation of a movie production.

The line producer Heidi Laitinen was responsible for scheduling and budgeting of the movie. If a movie production would have someone working under the title "project manager" it probably would be the line producer. So a line producer is in fact the movie industry's equivalent for a project manager. The interview with Heidi is expected to shed light on the practical choices made when managing the project.

### 3.3.2   Handbooks and guides

A set of movie production handbooks is used to form an idea of the established industry specific norms and also to define terminology and techniques used by the movie industry professionals. These norms and techniques are compared to the production process of the case movie "Leijonasydän" alongside with the conventions provided by the PMBOK standard. The analogies and deviations are discussed.

*Voice and Vision: a creative approach to narrative film & DV production* is one of the movie production guides used in the analysis part. This book is widely used by film students across countries and it has also been part of the study material in ELO Helsinki Film School at the Aalto University. This gives reason to assume that practices provided in the book are also used in the industry. In this research the practices in this book are assumed as norms, in which the real-life case is compared to. Whether this assumption is fair or reflects reality is difficult to say. Further research is needed to find out what are the real-life norms among all of the Finnish movie industry professionals. But for the sake of this thesis some kind of baseline is needed for comparison between real-life production and assumed norms. This book provides the best estimate available.

Other movie production guides and handbooks used in the analysis part compliments or strengthen the assumptions made from the Voice and Vision book. A selection of production techniques provided in these guides have been chosen to closer examination to find out if some of these techniques were actually being used in the case movie "Leijonasydän". The deviations between case techniques and book techniques are also discussed.

### 3.3.3   PMBOK

PMBOK standard is used as a framework for categorizing the empirical data in the analysis part. All of the data is categorized in accordance with the standard. This choice was made to create a link between movie production tradition and best practices in project management. The standard provides means to organize the data in a way that is

understood globally among project management professionals regardless of industry, since the analysis is presented in a familiar and globally recognized way.

The PMBOK is also an ANSI standard and it has a strong foothold in US. As Hollywood tends to dominate movie production tradition, a US based standard seemed like appropriate choice. Also according to Garel (2012, 667) the Project Management Institute (PMI) considers differences between industry sectors to be less important from project management's standpoint. This is expected to support fusion between movie production tradition and project management standard.

# 4    ANALYSIS

## 4.1    Project Charter development

Project management research has pointed out that front-end part of the project has a disproportionately high impact on the whole project success (for example Morris et al, 2006, 717 and Munns and Bjeirmi 1996, 83). PMBOK uses the term charter for the initiation process, whereas movie industry is referring it as green-light process. A movie production project initiation typically requires a screenplay, budget, and confirmed finance in the movie industry.

### 4.1.1    Methods described in PMBOK

The PMOBOK standard states that there are two factors affecting to project initiation. Firstly there can be "an internal business need" or secondly "an external influence". When a project is established it also needs to be officially recognized by the liable organization. Developing of a project charter "is a process of creating a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities". Then again the PMBOK standard also assumes that inputs required in developing of the project charter are donated from outside the project. The most important of these inputs is the project's "business case", which is a document that is used to evaluate benefits and costs of the project to come up with a decision if the project is worth investing in. The document compares the benefits of business need to cost-benefit analysis to come up with accepted scope for the project. Persons who are not directly involved in the project work, such as financiers or project owners, also use this document in decision-making.  The key purpose for the project charter is to identify who is the requesting the project and who is responsible for executing the tasks related to the project. The charter is the foundation for the relationship between these two sides. (PMBOK p 54–69.)

### 4.1.2    Methods described in movie production literature

In movie industry the initiation phase is referred as "green light process". Eliasberg (2004, 641) has listed numerous ways how to support green light process. But he also points out: "it is staggering how little science usually goes into this process", even though using different research methods may improve the success rate of green-lighting,

and minor decrease in wrong green-lighting decisions could end up saving substantial amount of financiers money. Collyer, Warren, & Hemsley (2010) found out in their research that some movie executives might have over 20 scripts in development concurrently, but only 2 or 3 from them will make it in to actual production. The script development process usually employs a treatment, rather than a fully developed screenplay.

According to Hurbis-Cherrier (2013, 22) "a treatment is a prose description of the movie's plot written in present tense". With this he means that the treatment unfolds the story step by step in a chronological order, same fashion as a book or movie would appear on audience. The treatment is used to create different versions of the main story while keeping the writing process light and easy. The treatment does not necessarily include dialogue or all the actions, but only the most basic elements of the plot. Hurbis-Cherrier (2013, 22) compares a treatment to a painter's sketch, because "it can be reworked many times before committing to paint on canvas", and the same way treatment allows more convenient way of rearranging the scenes and editing of plot structure than screenplay.

There are different methods available to examining the prospects of a written screenplay before making the green light verdict. Eliashberg et al. (2004, 641) suggests that using stock markets simulations to estimate market potential of a film could provide valuable insights at very early stage of movie production process, and the reason for this could be that moviegoers appear to be influenced by others' opinions and choices much the same way than the stock markets are sensitive for trends and hype. However a stock market simulation is complex and wide topic and detailed analysis falls out of the scope of this thesis. Due to the importance and huge financial impact of the initiation phase it is however worth reviewing one more straightforward technique for systematic analysis for the green lighting. This technique will also provide baseline for comparison in the discussion. The example for green light analysis is found from the writings in popular movie production guide: Producer's Business Handbook by Lee jr. and Gillen.

According to Producer's Business Handbook the persons responsible for green light process needs certain information from the markets to support a rational decision. Firstly they need to identify the potential target audiences, which are divided into "primary" and "secondary" audiences. Then they need to distinguish other movies with similar target audiences and campaigns. With this information they need to come up with "an optimal season and release pattern for theatrical release". Additionally the green light process requires information about the financiers and different calculations from costs and income to determine an "earnings-to-costs ratio". (Lee jr. and Gillen 2011, 201.)

To be able to collect all of this information a "campaign breakdown process" is needed. The process extracts certain data from the movie's screenplay and from the markets. This data is then used to analyze the market potential of the movie. The campaign breakdown process includes the following seven phases: (1) "Script campaign

breakdown", (2) "Campaign Creative", (3) "Campaign Beat Analysis", (4) "Campaign signature", (5) "Comparative Pictures Analysis", (6) "Global sales breakdown", and finally (7) "Comparative campaign strategy and spending breakdown". The process begins with identifying the most crucial scenes in the movie. These are scenes that correspond emotionally to target audience's life style or issues. If for example target audience consists of single moms, then these scenes would be the ones that deal with challenges of raising a child alone or introducing a step-parent into a family. Then again if the target audience is teenagers, the important scenes concerning this process would be the ones that deal with issues relating to growing up, dating, and finding out who you are. These scenes are gathered in to a "Script campaign breakdown" document (appendixes). This breakdown form is then used in designing a script for a 30-second TV commercial for the movie (appendixes). From this TV commercial script the "emotional beats" are identified. Screenwriter-to-screenwriter.com defines an emotional beat "as the physical action of story that creates an emotional reaction within a character in the film". The number of these emotional beats is calculated and they are categorized to 11 categories: "Romance, Drama, Comedy, Action, Risqué, Supernatural, Horror, Men, Women, Youth, and Kids". This categorization is the "campaign beat analysis" (appendixes) and it allows more systematic examination of the movie's prospects among different target audiences. The examination of the prospects is made with "target audience analysis" (appendixes), which determines the expected success percentage between audience segments according to the emotional beats. This analysis is then complemented with "comparative pictures analysis", which consists of similar movies. The analysis then leads to estimating the global sales and reviewing different strategies for the movie's campaign. (Lee jr. and Gillen 2011, 201-205.)

### 4.1.3 Methods observed in the case movie production

The screenwriter/producer Aleksi Bardy initiated the case movie project "Leijonasydän". He got the idea for the theme when he was in a movie-theater in Lappeenranta and saw a something that caught his attention. This observation then generated into a story idea.

> The producer:
> Project originated from my idea. The background was a moment when I was in a movie theater in Lappeenranta with my children. We went to watch a movie, probably Shrek 3, if I recall. In the same screening there was a sinister looking skinhead man with three children; two of them were typical Finnish looking blond boys and one was Asian. The man

*was really friendly towards all of the boys and was asking "how did like the movie" and "do you want ice cream". After they left I started wondering that what might be the story behind them. Why is a skinhead guy fostering an immigrant boy? And that is how the idea for the movie was born.*

This was beginning of the project, but a mere idea is not a movie nor it is a story. It has to be written down first. And usually it is advisable to ask for a second opinion before pursuing head first to production. This time the second (and third) opinion came from the director Dome Karukoski.

*Producer:*
*I first wrote a treatment about the idea and I sent it to Dome, who rejected the idea completely. He did not like it at all. So I deserted the idea for while, a couple of months. But I revisited the idea afterwards and wrote a new treatment. I sent it to Dome again, not remembering his earlier rejection. Suddenly this time he got exited about the idea. After that it was quite fast process to create a decent screenplay for acquiring funding for the movie.*

When proceeding from a written story to real-life production planning thing get more complex. You can control every aspect of screenplay and shape it to your desire. But the audience is unpredictable and foreseeing how the people will react and affiliate with your creation is close to impossible. However, there are methods to rationalize and support well justifiable estimates for market potential.

*Producer:*
*It is a hazy logic, and we don't get exact information about these things. We use reference movies, most importantly Dome's previous movies and other movies with similar themes. We also consider how the Finnish audience might react to certain actors and the theme of the movie. That is the basis for the estimation.*

*We address the risk of market acceptance by not counting solely on it. We consider it as a bonus. One could say that the business ideology of Helsinki Filmi is that producing movies as itself is already profitable. If we manage to get enough productions financed then our overall result breaks even. But the profitability comes from market acceptance.*

*When we set a goal for "Leijonasydän", for instance 120 000 – 150 000 viewers to be profitable, that is probably the most difficult risk to cope with. And we use some rules of thumb to address that risk. The first is that we don't count basically anything on market acceptance. So that a total market rejection does not result in too difficult situation for us. It is too unpredictable element. Secondly, we stick to our original estimates, which have been made well before the production starts. It is typical that when making a movie, the commitment of the production team becomes so deep during the process that realistic view about market value of the movie disappears.*

So, it seems like a good practice to make the profitability estimates well before committing emotionally to the project. But how are these estimates then prepared and what is the source of profitability expressly for a Finnish production company?

*Producer:*
*Profitability comes from three different sections. First is the profitability of the actual production. We approach and estimate it by breaking down the screenplay into elements and the line producer makes a budget based on this. Then we compare it to financing plan and different versions of financing plan. What if Nordic Film & TV Fund withdraws from the project? How this would affects us? An ideal situation, which "Leijonsydän" reminded, is when the available finance is bigger than the costs. This is the first moment when the marginal is there.*

*The second analysis is a speculation of the profitability in the domestic market. We utilized our own expertize and we also discussed with the Film Foundation. After that we speculated the possible box office success with the distributor and also tried to make estimates about domestic DVD sales. And this is not just an absolute number. It also has a relationship to the size of finance the distributor is willing to invest in advance. In our case this finance was 300 000 €, which is a rather large sum. This means that in order to the movie to generate more profit for us, it should succeed exceptionally well in distribution phase. We established the economical breakeven to be around 120 000 – 150 000 viewers, but we believed that achieving that is realistic. Dome's previous movie "Napapiirin Sankarit" got 390 000 viewers and strengthened his brand value. On the other hand we knew that neo-Nazism and skinheads aren't particularly really commercial subject. Not even after our decision to*

*acquire well-established actors to send a message to the audience that although this is an unconventional theme, we address it in popular matter and you will be entertained. These reasons led us to believe that this could be profitable product in domestic distribution.*

*The third section is international sales, which is very difficult to predict. But Dome's previous movie had some kind of sales, so we thought that we might achieve something with this also. And that's what happened. Actually also the domestic box office was higher than we estimated. It was way over the breakeven with over 200 000 viewers and a good DVD-sales.*

Some movie production handbooks and guides advise creating long reports to investigate the profitability of the movie. In a typical Finnish movie production company the bureaucracy is lighter, and the profitability estimates are made interactively in discussions.

*Researcher:*
*Now, when you have this estimation about profitability, do you document it in some specific way, so that you might utilize these estimates in later productions?*

*Producer:*
*Not actually. They were informal discussions with the distributor and Finnish Film Foundation. Of course the fact that the distributor is willing to put 300 000 € minimum guarantee and commits to cover over 100 000 € of distribution costs is an indication of the success rate they are expecting. And of course the application form of the Finnish Film Foundation holds a section about preliminary marketing and distribution plan with an estimate about expected number of movie viewers. But maybe it cannot be considered a fairly demonstrative figure; it perhaps is not an actual record of our expectations. It is a good question, that should we document the estimates more precisely.*

### *4.1.4* *Discussion of deviations and analogies*

According to the PMOBOK standard (68) "a project can be initiated due to an internal business need or external influence". Although every movie production company has naturally an internal need to produce movies, the case movie could be seen initiated through an external influence, since the main theme of the movie (i.e. prejudices, racism and conflicting feelings in reconstituted families) emerged from an observation made outside of project organization. The practice of concept development through treatment elaboration was found both the case movie production and movie production literature. In the case movie's green light process the decision to pursue this project was then made by having both the producer and director agree on the concept.

The PMBOK standard uses the term business case for a document that is used to determine if it makes sense investing in a project. The movie production literature offers many methods that could easily be considered as legitimate business case analysis. The "campaign breakdown process" method described in Producer's Business Handbook provides clear evidence that the movie production literature recognizes the same process than the PMBOK standard, even though the terminology between them differs somewhat. The same process was also observed to be present during the case movie production. They did use reference movies and made target audience analysis to estimate the success, which is analogous to some suggested methods in the movie production handbooks. And although the actual analysis execution deviated from the method described in the literature, it still can be considered to resemble a business case analysis described in the PMBOK.

The first step in profitability analysis of the case movie was preparing a budget projection, which was based on the screenplay. This projection was then compared to different versions of the financing plan. They were aiming to have total amount of finance that is bigger than the expenditures, and also manage to achieve it. Another part of the profitability evaluation was making estimation about the domestic market success. The estimation was made with the financiers, and the outcome affected the size of the finance. At this point it is important to keep in mind that different financiers have different terms for the finance. Finnish Film Foundation grants productions support for professional productions, which is based on the "Act on the Promotion of Film Art" (28/2000) and it can cover a maximum of 50% of the film's production costs (ses.fi). A distributor gives minimum guarantee (MG), which is the amount of costs covered by distributor irrespective of how the movie performs. A higher MG means higher risk for distributor and lower risk for the production company. In other words higher MG results in lower profits for a production company if the movie is a success, but at the same time gives shelter against market risk. The case movie received quite large MG and they estimated that the financial break-even point was approximately 120 000 – 150 000 view-

ers in movie-theaters, and they believed that they have realistic possibilities to achieve this. They based this evaluation in the success to some of the previous movies made by the director Dome Karukoski. The viewer ratings for these movies were:

- Tyttö Sinä Olet Tähti – 130 000 viewers
- Tummien Perhosten Koti – 110 000 viewers
- Kielletty Hedelmä – 115 000 viewers
- Napapiirin Sankarit – 390 000 viewers

They didn't expect to have as big success as with "Napapiirin Sankarit", mainly because the theme of the movie was challenging. They tried to soften this by choosing well-known and famous actors to give a message to audience that even though the theme is unconventional the movie will be entertaining. But even with the famous actors, they decided to aim at the success level of the first three movies. The case movie ended up exceeding these expectations with close to 200 000 viewers and good DVD sales.

The deviations between case movie and literature were most obvious in the level of formality. Actually the profitability analysis made during the case movie production was almost an opposite of the formal reporting methods suggested in the literature. During the case movie the profitability analysis took place in an informal discussions between financiers, distributor and the production company. The business case in way constructed itself in the meetings and discussions and it was not distinctly documented, although the calculations about profitability were made. PMBOK (121) also points out that not all organizations prepare an official charter, but rather employ informal analyses.

According to Swami (2006, 671) the uncertainty in foreseeing the success of a movie appears to affect the whole industry and there is a general impression that the scientific approaches are less relevant in movie industry, because every production is unique. Also Eliashberg et al. (2006, 638) points out "the movie industry relies heavily on traditions, conventional wisdom and rules of thumb". These impressions were also observed in the case movie production. As the producer mentioned: they use some rules of thumb to address the market risk. They also see the movie audience as highly unpredictable element and they have organized their operations so that one failed movie project does not result in too severe situation.

## 4.2    Scope Management

The purpose of this process is "to ensure that the project includes all the work required and only the work required to complete the project" (PMBOK, 105). In movie industry this is done by deciding how many and what kind of shots is needed to form each scene.

### 4.2.1    Methods described in PMBOK

PMBOK identifies a set of processes to manage the scope of the project. The core planning process of scope management includes the following processes: "plan scope management", "collect requirements", "define scope", and "create work breakdown structure (WBS)". Additionally also two other processes are employed to define; firstly how are the deliverables formally accepted during the execution phase, and secondly how the scope can be changed during different phases of the project if needed. (PMBOK, 105.)

So, the target of scope management is of course to define the scope, but also to describe how the scope is controlled in different phases of the project and to point out who is responsible for making a change request to the scope if needed and what is the appropriate way to do this (PMBOK, 110). In movie industry a change request could refer to pointing out what are the required procedures needed if a certain scene is left out during production or additional scene or location is needed. A good scope management plan also supports the development of the work breakdown structure (PMBOK, 110).

The actual scope definition begins with the process called "collect requirements", which is a process of collecting all of the requirements needed to fulfill the projects original goals (PMBOK 2013, 110). These requirements are then used to determine what kind of deliverables can actualize each requirement. Requirements plan intends to state how the gathering of requirements is managed. In movie industry the requirements are naturally derived from the screenplay. These requirements can be defined as scenes from the screenplay. Movie industry has also created very sophisticated methods to collect these requirements, which will be presented in the next subsection. Additionally there might be other requirements for a movie project such as famous leading actors, product placement or specific locations from sponsors. PMBOK (112) uses the term "stakeholder requirements" for these kinds of needs. Other requirement categories include "business requirements" that are organizational needs or demand, "project requirements" that could be seen as the requirements detailed in the screenplay, and "quality requirements" that are used to define certain criteria (e.g. 4K/8K resolution) the project has to meet (PMBOK, 112). After the gathering of requirements it is time to choose which requirements are included in the project work and which are left out, and

this in done in the "define scope" process (PMBOK 120). The chosen requirements are then employed in the process of creating the work breakdown structure (WBS).

The PMBOK uses the term "work packages" to describe the WBS components, and these packages are then used to schedule activities. In movie industry these work packages can be seen as single shots or scenes. Activities, such as set decoration, lighting, shooting, acting, or make-up, can then be grouped with each respective work package (i.e. shot or scene). The PMBOK standard determines that "in the context of WBS, work refers to deliverables that are the result of activity (i.e. finished shot), and not to the activity (i.e. set decoration or lighting) itself". (PMBOK, 126.)

In movie industry the scope affects to the amount of shooting days required completing each scene and also equipment needed to successfully capture the artistic message of each scene. Without a detailed scope statement the project team wouldn't have the means to prepare properly to the shootings. Defining the scope is an iterative process during the planning stage of a movie production. The WBS provides a good overview of the deliverables (PMBOK, 125).

### 4.2.2    *Methods described in movie production literature*

According to Hurbis-Cherrier (2013, 99) previsualization is needed when transforming a written screenplay into a visual plan including all the images and sounds needed to constitute a film. The manifestation of visual plan is the Shooting Script, which is "the director's visual strategy for every scene in the film". It clearly defines what shots are needed to form a scene and provides detailed technical information about the coverage required for each scene. The idea is to clearly illustrate how the shots are intertwined together to form a scene. This information is also used in scheduling process to create a Shot List, which describes the order in which shots are to be executed. Significant effort is needed to create the shooting script along with collaboration between different departments. "The shooting script functions as both the creative and the technical blueprint for the entire shoot". It is one of the most important documents when making sure that nothing is left out from the plan and also that no unnecessary work is being performed. (Hurbis-Cherrier 2013, 99–100.)

Below is a page from typical shooting script (full page in appendixes). Scenes are numbered from first to last one and shots are marked inside the scenes with vertical blue lines. For example the scene 17 consists of five shots that are labeled with letters A, B, C, D, E and also with some additional information. The first shot for example includes letters MCU and it means that the shot shows the target in "close up" but leaves still a little room between camera and the target. Whereas the shot E includes letters CU that refers to an actual "close up" shot. Then again the shot B includes the letters LS and that

refers to a "long shot" (sometimes the term "wide shot" is used instead) meaning that you can see the whole set and surroundings and actors are shown fully from tip to toe. The text "pan with" refers to horizontal camera movement. Other possibilities for camera instructions include such terms as "handheld", "crane", and "tilt". In the scene 18 shot C there are letters ECU and it refers to "extreme close up" from the character Vogler's lips without any visible surroundings. In the D shot the term POV means the character's (actor's) "point of view" so that the audience can see the surroundings and action through the character's eyes. The long (wide) shots are typically more resource intensives, as they need to cover a whole scene with everything from props to whole crowds. Then again smaller shots can be made with rather small crew.



Figure 2    Shooting script[1]

[1] Voice and Vision: A Creative Approach to Narrative Film and DV Production by Hurbis-Cherrier. Reproduced with permission of Focal Press in the format Republish in a thesis/dissertation via Copyright Clearance Center.

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The list of these images and sounds then form the requirements of the project. When a single shot is filmed during the film shoot, it constitutes as one deliverable. Nowadays deliverable is usually digital data in a memory card, whereas in the past it used to be a slice of film reel. As stated in the previous subsection, the requirements indicate what constitutes as an acceptable deliverable. In movie industry there are methods to detail these requirements even more precisely. Two other important methods for previsualization are Overhead Diagrams and Storyboards. "An overhead diagram is a drawing made separately for each scene from a bird's eye perspective of the location (or movie-studio)", and they are used to plan camera placement and movement of the actors (or any other objects) in the set (Hurbis-Cherrier 2013, 102).
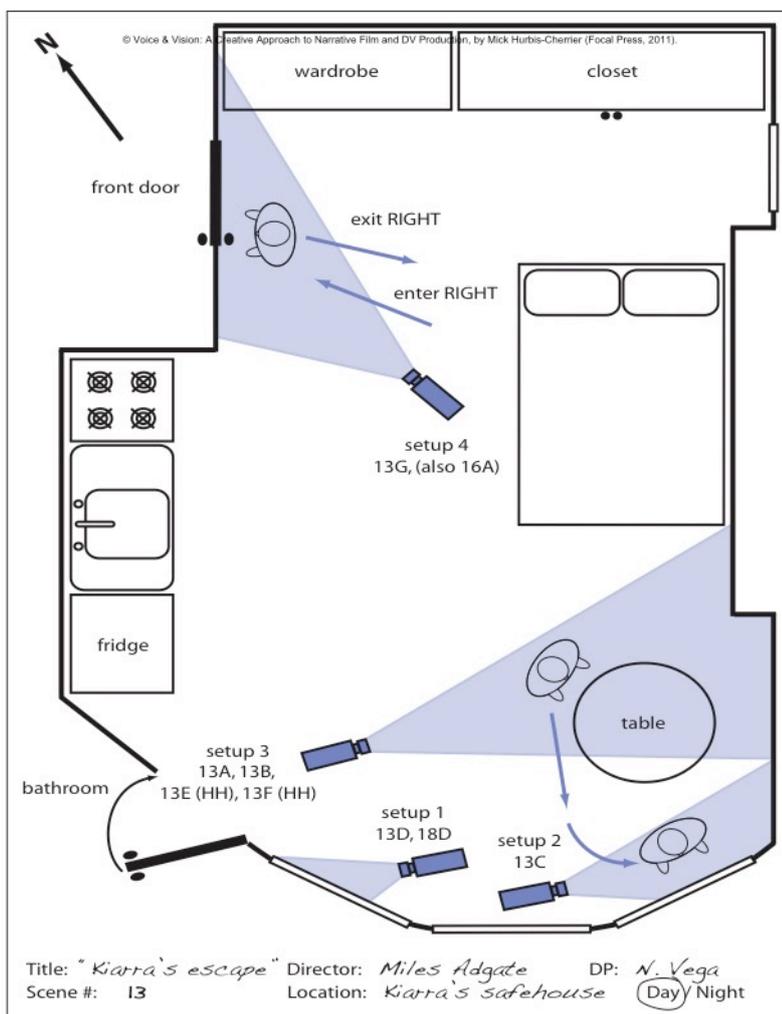


Figure 3        Overhead diagram[2]

Storyboards are also drawings made separately for each scene. They illustrate the action of the scene and resemble a comic strip. Each frame embodies the principal action for a single shot. Storyboards are usually not used for all scenes and the practices vary among movie productions. But certain types of scenes, which require "movement matches" between shots, tend to benefit from the use of storyboards. (Hurbis-Cherrier 2013, 106.)

Below is an illustration of a typical scene where the use of a storyboard is beneficial. The numbering ID of scenes and shots is the same as in shooting script. This storyboards covers the scenes 14 and 15. The arrows illustrates where the action is moving from shot to shot.
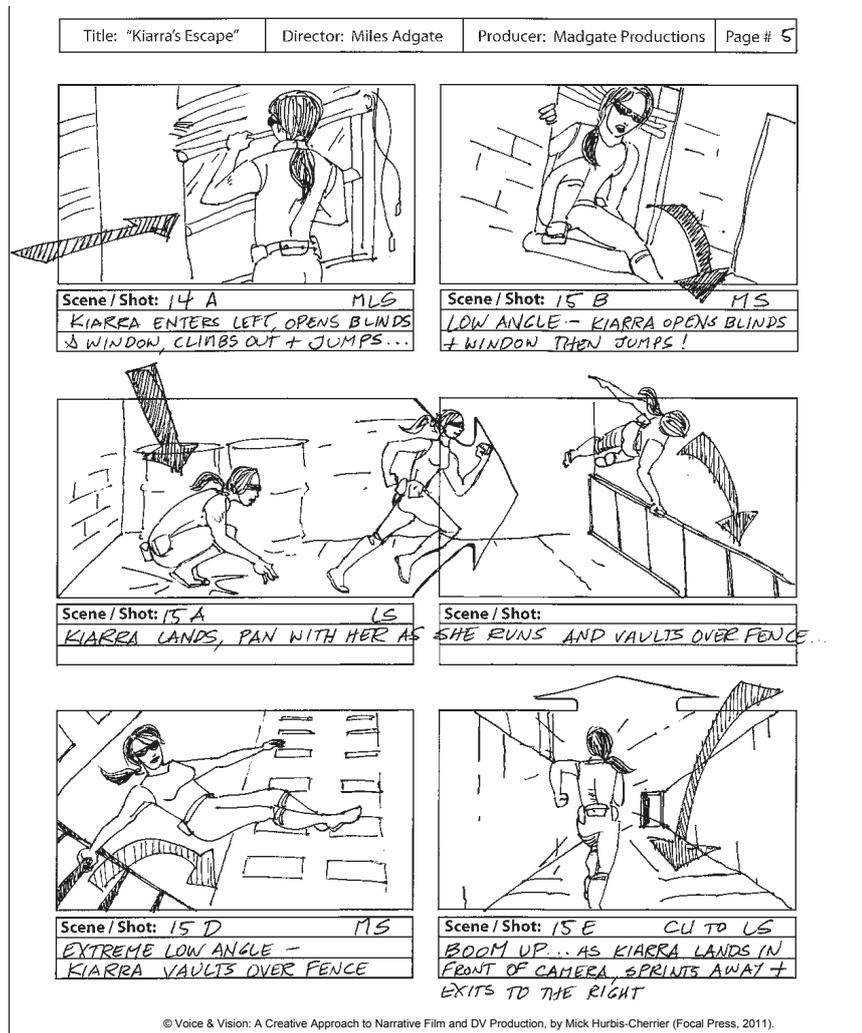


Title: "Kiarra's Escape"  Director: Miles Adgate  Producer: Madgate Productions  Page # 5

Scene / Shot: 14 A  MLS
KIARRA ENTERS LEFT, OPENS BLINDS
& WINDOW, CLIMBS OUT + JUMPS...

Scene / Shot: 15 B  MS
LOW ANGLE – KIARRA OPENS BLINDS
+ WINDOW THEN JUMPS!

Scene / Shot: 15 A  LS
KIARRA LANDS, PAN WITH HER AS SHE RUNS AND VAULTS OVER FENCE...

Scene / Shot:

Scene / Shot: 15 D  MS
EXTREME LOW ANGLE –
KIARRA VAULTS OVER FENCE

Scene / Shot: 15 E  CU TO LS
BOOM UP... AS KIARRA LANDS IN
FRONT OF CAMERA, SPRINTS AWAY +
EXITS TO THE RIGHT

Figure 4  Storyboard[3]

---

### *4.2.3    Methods observed in the case movie production*

The project team of the case movie used Movie Magic Scheduling software to create WBS and define activities. The software is widespread among movie professionals and also movie production students in the Aalto University are trained with this particular software. According to the manufacturer Entertainment Partners the software is an industry standard. The software is used to breakdown the screenplay into elements by preparing an individual breakdown sheet for each scene or shot. A set of information can then be inserted into each breakdown sheet, including data from cast members, background actors, props, camera, lighting, wardrobe and basically anything that is needed in production of the scene.

> *Line producer:*
>
> *During the preproduction phase we insert the screenplay into Movie Magic Scheduling. That is the basis. So all of the scenes from the screenplay are moved there and all the roles and extras and role cars and this kind of basics that can be found from the screenplay. In addition during the preproduction we begin to feed more detailed information there, such as two cameras in this scene and a special lens for this scene for example, or this scene requires rain in it so we need special effects men and this scene will include VFX (visual effects i.e. image manipulation) and what kind of VFX. And then we include the year of the movie. Is it 2012 or is it 1947, and so on. All of this information is included with as much detail as possible.*

The number of shots needed to establish a scene is a creative decision with technical dimension. Any particular scene can be made with few or even with one shot. On the other hand the visual strategy may require even dozens of shots for a scene to meet the quality objectives.

> *Line producer:*
>
> *And of course we need to know the shots, so we know how much time we need in the location. Are we going to take five shots or fifteen for this scene? Are they all shot in the same direction or are they opposite directions? And are there dynamic moves (i.e. the camera itself moves through space)? Do we need to re-arrange lighting between shots, and these kinds of things? All these then affect the planning of the shooting schedule.*

It is not just the number of shots that affects the efficiency of the production. Different shots require different amount of preparations. Shot sizes should be optimized to support a good cost-benefit ratio. Long (wide) shots consume more resources than close-ups.

> *Line producer:*
>
> *And preparing 360 degrees of the locations is not possible with our resources, and probably not with anyone else's, but especially with these domestic resources. So we have to think carefully about the area that scenographer stages.*

Storyboards were not employed in this planning process, but otherwise the planning was very detailed.

> *Line producer:*
>
> *When the previsualization proceeds, we begin feeding the number of shots in the software. It depends on the A.D. (assistant director) how he is using the (Movie Magic) Scheduling and how many details are included. You could insert even storyboards, but we haven't had them yet, and didn't have in "Leijonasydän" either. But with "Leijonasydän" we included the number of shots really carefully. The A.D. made this quite precisely. Our A.D. Antti Lahtinen makes very detailed cost estimates about all the things. He carries lots of data along. We have agreed on work distribution about equipment that during pre-production phase the information about equipment is also inserted in the software.*

### 4.2.4    Discussion of deviations and analogies

Some of the processes introduced in PMBOK correspond agreeably to methods provided in movie production literature. For instance "collect requirements" and "create WBS" processes describe procedures that are very similar to preparing process of a shooting script. The shooting script clearly specifies each required shot and presents an exact description of what kind of deliverable can actualize each of the required shots. PMBOK states that the work in the WBS refers to deliverables, so the shooting script can be seen as the WBS for a movie production, since it specifies the deliverables i.e. shots and scenes.

This process of preparing the shooting script is used in the same manner globally. But the process only applies to part of the requirements that exists in a movie production. When managing other requirements, such as product placement or famous leading actors, there might not be such wide spread and standardized methods available, although it might be useful to employ overhead diagram or storyboard methods also in product placement design. And product placement is a requirement that could be included already in the writing process of the original screenplay, and thus it would be part of the normal script breakdown process.

The preproduction phase of the case movie employed dedicated software to breakdown the screenplay into elements. The software was also used to manage quality requirements for specific scenes, such as special lenses or multiple cameras. The main goal for this planning process was to ensure that required amount of shots and also the characteristics of each shot are decided. This information was seen critical considering not only the success of the scheduling process, but also the efficient use of resources. The line producer of the case movie emphasized that planning the shot sizes carefully is a major factor that affects the work of the scenographer, which was seen as particularly resource-intensive sector. The area that the scenographer has to stage was considered as one of the critical decisions regarding the scope of the case movie production.

Other factors affecting the scope included naturally the number of shots, but also things like the number of cameras needed for any specific scene, dynamic camera moves, re-arranging of lighting between shots, visual effects, special effects, number of actors in scenes, and also role cars. These factors determine how much resources are needed in production. These decisions made in the preproduction phase are then the foundation for the scope statement of a movie production.

If you look at high-budget Hollywood productions, you will probably find out that each scene consists of multiple shots, which engage carefully designed (and expensive) camera movements. And then again smaller budget movies might settle for smaller number of shots to form each scene and perhaps employ less dramatic camera movements. It is important to keep in mind that there are many ways to produce a screenplay, and also each scene in that screenplay.

Storyboards were not used during the preproduction of the case movie, although the possibility to use them was identified. Movie production literature points out that there are many kinds of practices to employ storyboards and not every production requires them. Also some scenes benefit more from the use of storyboards than other scenes. Storyboards are not usually prepared for every scene in the screenplay, but only those that require "movement-matches". Also, when the line producer of the case movie was talking about storyboards, she used a phrase: *we have not used them yet*. So, perhaps they are going use them in future production if the occasion presents itself in the form of rapid action scenes.

## 4.3    Time Management

In addition to scheduling, time management also refers to defining the components of schedule, such as activities and resources. During the process of time management the activities are identified and the relationships between them are recognized to support sequencing of activities. After sequencing is done the resources are pointed to each activity and the durations are estimated. All of this is part of the project time management. (PMBOK, 141.)

### 4.3.1    Methods described in PMBOK

PMBOK identifies a set of processes relating to time management of a project. The core planning process of time management includes the following processes: "plan schedule management", "define activities", "sequence activities", "estimate activity resources", "estimate activity durations", "develop schedule", "control schedule" (PMBOK, 141).

Define activities process aims at defining what kind of work each activity includes. The main objective is to make sure that the activities are resulting in deliverables defined in the project management plan. A "deliverable" represents a work result and an "activity" represents work effort needed to achieve that result. The shooting script represents WBS and "it identifies the deliverables at the lowest level", i.e. one finished shot is one deliverable. Naturally there is much work effort needed to complete a shot, such as activities from scenographer, lighting designer, costume designer, and sound designer. In addition transportation, accommodation, and catering services are needed. Activities represent all the working effort needed to complete each shot and scene. A script breakdown sheet is a document, which is used in the movie industry to represent work effort needed to achieve a work result, e.g. activities needed to achieve a deliverable (shot or scene). The activity list is made for each respective department as an output of this process. This list should include guidelines for crewmembers to point out what it actually takes to complete each activity. (PMBOK, 149–152.)

Sequence activities process identifies and documents the relationships that the activities have to other activities. PMBOK standard suggest examining logical relationships between activities. Precedence Diagramming Method (PDM) is one suggested method for planning the project schedule. It illustrates the order in which the activities are performed and thus reveals the relationships between each activity. The logical relationships or dependencies include four types: (1) "Finish-to-Start (FS) successor cannot start until predecessor has finished, (2) "Finish-to-Finish (FF): successor cannot finish until predecessor has finished", (3) "Start-to-Start (SS): successor cannot start until predecessor has started", (4) "Start-to-Finish (SF): successor cannot finish until predeces-

sor has started". Many of the camera setup angle constraints might fall under FS relationship, e.g. cameras cannot be moved before particular shots are finished. Then again lighting crew and scenography might have FF relationship, e.g. lighting cannot finish until set decoration has finished in order to avoid unwanted shadows or reflections of light from props. "All of the activities expect the first and last are connected with logical relationships to at least one predecessor (finish-to-start or start-to-start) and one successor (finish-to- start or finish-to-finish)". Lag time between activities should be defined to avoid cumulative delay from occurring". (PMBOK, 153–156.)

In addition to logical relationships, there are also dependencies affecting the process of sequencing activities. PMBOK (157) states that an activity can have internal or external dependencies and mandatory or discretional dependencies. These dependencies have the following characteristics: (PMBOK, 157–158):

- *Mandatory dependencies*
  - *Also referred as hard logic or hard dependencies. E.g. set decoration cannot begin until there is an access to the set.*
- *Discretionary dependencies*
  - *Also referred as soft logic or preferred logic. E.g. the director might prefer shooting scenes in chorological order.*
- *External dependencies*
  - *Relationship between project activities and non-project activities. E.g. an actor might have other overlapping activities with other projects.*
- *Internal dependencies*
  - *Relationship between activities, which are generally inside project team's control. E.g. sequencing activities and developing activity list relationship (FS) has internal dependency.*

The sequencing process aims at developing a "project schedule network diagram" that embodies the listed dependencies and relationships between activities. Sometimes it is advisable to do this graphically so it is easier to get a general view of the relationships and dependencies. (PMBOK, 159.)

"The estimate activity resources process identifies the available resources and addresses them to activities in order to find out how much material, human resources and equipment is required to complete each activity". PMBOK standard suggest developing a resource breakdown structure that categorizes resources in different types. Dedicated project management software may facilitate this process. However, there might be variation in how thoroughly this is made between different sectors. As an output for this

process a resource breakdown structure should be developed. It documents each resource and categorizes them in different types such as labor, material, equipment, and supplies. (PMBOK, 160–165.)

"Estimate activity durations" process prepares an estimate how much work each activity requires if it is executed with the particular resources addressed to it" (PMBOK, p 165). There are different kinds of techniques available for estimating the amount of work or duration of each activity. Most used techniques are Analogous (historical) estimating, Parametric estimating and Three-Point estimating (PMBOK, p 169).

Analogous estimating uses information from previous projects, in this case previous movie productions. The upside for analogous estimation is that it is probably one of the fastest estimation techniques. The downside is that it might not be the most reliable technique if the previous projects or activities used in these projects are not similar to the current one. (PMBOK, 169–170.)

Parametric estimation is a bit more advanced technique than Analogous. It also uses historical data, but refines it further with a selection of algorithms. The idea is to calculate "a statistical relationship between historical data and some other variables" (PMBOK, p 170). For example if 60-page screenplay took 50 shooting days, a 90-page screenplay would take 75 shooting days.

$$60 \text{ page} / 50 \text{ day} = (1{,}2 \text{ page} / \text{day})$$
$$90 \text{ page} / (1{,}2 \text{ page} / \text{day}) = 75 \text{ day}$$

Three-point estimating is even more advanced than the previous two "single-point estimations". The technique was introduced by the program evaluation and review technique (PERT). It takes into consideration the uncertainty and risk involved in the estimations by estimating the range of an activity with three possible outcomes (PMBOK, 170.):

1. *Most likely outcome (E.g. parametric estimation)*
2. *Optimistic outcome (best-case scenario)*
3. *Pessimistic outcome (worst-case scenario)*

In our example for estimating the amount of the shooting days the values could be:

1. *Most likely (tM) = 75*
2. *Optimistic (tO) = 70*
3. *Pessimistic (tP) = 95*

The expected duration (tE) can be calculated from these three estimates using a formula. Two of the most used formulas according to Project Management Institute (PMBOK, 171) are:

- *Triangular Distribution*
  - *tE = (tO + tM + tP) / 3*
  - *tE = (70 + 75 + 95) / 3 = 80 (shooting days)*
- *Beta Distribution (from the PERT tradition)*
  - *tE = (tO + 4tM + tP) / 6*
  - *tE = (70 + 4\*75 + 95) / 6 = 77,5 (shooting days)*

All of the estimation techniques can be used to estimate duration for a single activity or for a certain part of a project or the whole project. It should be pointed out that the example used above does not estimate a single activity but the duration for the shooting, which is a collection of many different activities. The same logic nevertheless applies when estimating a single activity. Project team has to evaluate which estimation technique is best fit for each activity when documenting durations for every activity.

In addition to duration estimation techniques there might be need for time reserves to address risks in schedule management. These risks can be "known-unknowns", such as weather when shooting takes place outside, or "unknown-unknown", which refers to work caused by unexpected incidents that cannot be known beforehand. Known-unknown risks are addressed with contingency reserves. This reserve can include a percentage of duration, such as 5 % for each activity. Or it can be a number of work periods agreed beforehand, such as seven shooting days to address the risk of unsuitable weather. Quantitative analysis techniques, such as Monte Carlo simulation, are also available if more accurate estimation of the required reserves is needed. Contingency reserves should be clearly identified in the documentation of the schedule. Unknown-unknown risks are addressed with management reserves, which are specified amount of the project resources intended solely to the project management team's authority. (PMBOK, p 171.)

"Develop schedule is a process that requires analysis of activity sequences, durations, resource requirements, and schedule constraints". A schedule network analysis can be used to help develop the project schedule model. "The analysis uses various techniques to calculate early and late start and finish dates for the project activities". The most used techniques according to Project Management Institute are "Critical Path Method, Critical Chain Method, Resource leveling, Resource smoothing, What-If Scenario analysis, and Scheduling tool software". (PMBOK, 172–176.)

Critical Path Method (CPM) is used to find out what is the shortest possible execution time for the whole project. "This technique calculates the dates for early start, early

finish, late start, and late finish for all of the activities, but it does not take into consideration the resource limitations, such as a shooting location that might only be available during certain period of time". As shown in the Figure 5 below the critical path takes the longest route possible in the network. Non-Critical path in the network might include float, which is the time the activity start can be delayed without violating schedule constraints. The example is made for illustrative purpose and it does not represent a whole movie production schedule network. (PMBOK, p 176.)
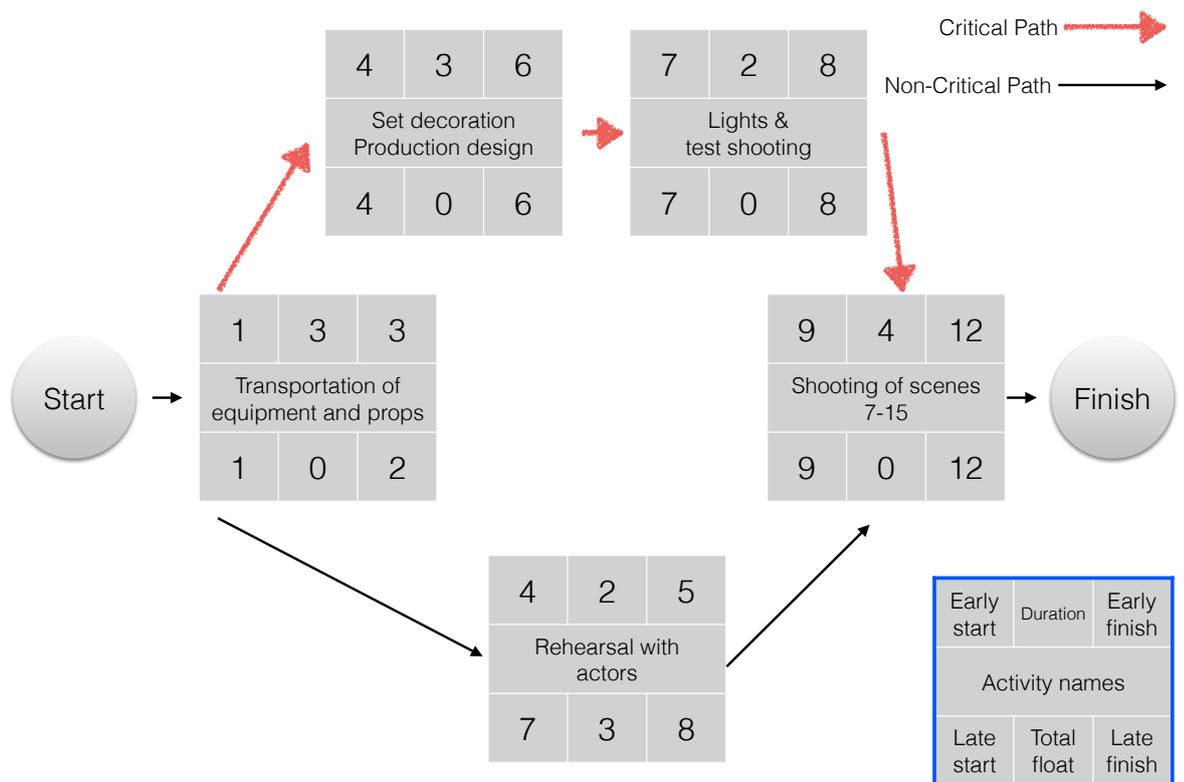


Figure 5        Critical Path Method in movie shooting

Critical Chain Method (CCM) introduces time buffers on the network paths of the project. These buffers are used to protect the critical path against unexpected incidents and delays occurring in non-critical paths. The main idea is that non-critical paths should not be able to affect the timely exaction of the critical path. Buffers are placed in crossroads where non-critical path crosses with critical path. This prevents the activities that are on non-critical path from causing delays to the critical path, which account for the whole project duration. CCM was developed from CPM approach. In CPM example above a buffer would then be placed just before "shooting of scenes" box. An additional

buffer would then placed just before the finish address the risk of delay in the whole project. What-If Scenario Analysis examines questions, such as "what if scenario X happens", e.g. what if leading actor gets injured or what if it rains. This analysis is beneficial when preparing for unfavorable circumstances. It is indented to trigger the preparation of different response plans to address these situations. Resource Leveling is a process of allocating the resources with the goal of balancing supply and demand of resources, and this usually results in longer but more realistic critical path. Control Schedule process monitors the progress of a project with performance reviews, manages change requests, and prepares schedule forecasts. (PMBOK, 178–185.)

### 4.3.2 *Methods described in movie production literature*

In the movie industry the use of industry-specific scheduling software usually dominates the time management of a movie production. The industry has well-established methods and policies for utilizing software such as Movie Magic Scheduling, which is described as one of the industry standards in schedule management. According to Bomsdorf et al. (2007, 365) there are two software systems being used in the movie industry: Movie Magic Scheduling and SESAM Drehplan (only known in Germany). They point out that these software systems are not capable of processing all of the data needed to complete a movie production. According to Honthaner (2010, 82) the most widespread software being used at this time is Entertainment Partner's Movie Magic Scheduling.

The order in which scenes and shots are completed during shooting usually differs from the order they are written in the screenplay. Rather, "when organizing scenes and shots the focus is on maximizing efficiency of time and resources". This means that the shooting order of the scenes might be completely different from the original sequence. Movie industry uses a specific document to determine the sequence of shots and scenes. This document is called a Shot List, and it includes the actual shooting order. The shots in the shot list are same shots you see in the screenplay, and only the order of the shots is different. There are different constraints that need to be accounted when creating a shot list, and they include: "(1) major location and time of the day, (2) camera setup angle, (3) shot size, (4) on-set logistics, (5) pickups, (6) exceptional factors". Scheduling process of a movie production usually begins by preparing a shot list. (Hurbis-Cherrier 2013, 114.)

Below is an extract from a typical shot list (full page is in the appendixes), which includes the specified information. Scenes hold the same numbering than in shooting script, but the order has changed. This part of the shot list covers the shoot date 7/11. First shot to be made is the shot A from the scene 17, and after that four shots (A, B, C,

D) from scene 15 and finally the shot A from scene 14. It can be seen from the full page shot list (in the appendixes) that the rest of the shots in the scene 17 are scheduled for a different day. This kind of breakdown structure allows more flexibility in scheduling process, as each scene can be divided between different work periods, when necessary. For example it can be seen that all of the shots require daylight. But because it is quite easy to fake the daylight atmosphere for interior shots the scene 14 is the last shot to be made. The critical exterior shots in scenes 17 and 15 are made first to ensure sufficient amount of light during the shooting, and then if a delay occurs the interior shot can still be accomplished even after the sun has gone down.

---

**SHOT LIST** (7/11/10)

| **TITLE:** Kiarra's Escape | **Dir.** Miles Adgate | **Scenes:** #14, #15, #17 | **Shoot Date:** 7/11 |
|---|---|---|---|

**SCENE: #17 EXT. CITY STREET – DAY**
*SET-UP 1*: Angle on front gate to street
      1) 17A: MCU K. enters checks if coast is clear, exits left.

**SCENE: #15 EXT. BACK ALLEY – DAY**
*SET-UP 1*: Angle on window (low angle)
      1) 15A: MS K. opens blind, window and leaps out.
*SET-UP 2*: Angle on Kiarra
      2) 15B: / PAN WITH K. lands, recovers runs and leaps over fence.
*SET-UP 3*: Extreme Low angle from ramp
      3) 15C: MS X-TREME LOW ANGLE K. leaps over fence (and over camera)
*SET-UP 4*: Angle down alley
      4) 15D: CU – LS/BOOM UP K. lands in front of camera. BOOM as she sprints away.

**SCENE: #14 INT. KIARRA'S SAFEHOUSE / BACK ROOM – DAY**
*SET-UP 1*: Angle on window
      1) 14A: MLS K. enters left, open blind, window and leaps out.

---

Figure 6        Shot list[4]

The responsibility of creating a shot list falls for director and production manager. Shot list should take into account the relationships between shots. For example good camera setup planning allows clustering of multiple shots to be made with a single camera placement. Naturally also the locations can be used to cluster shots, but the atmosphere (DAY/NIGHT) has to be kept in mind. The execution order for shots usually goes from wide shots to close-ups, since wide shots are resource intensive and then again reshooting a close-up is less troublesome. Also shots including lots of crew-members and actors are clustered to avoid idleness. (Hurbis-Cherrier 2013, 115-117.)

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[4] Voice and Vision: A Creative Approach to Narrative Film and DV Production by Hurbis-Cherrier. Reproduced with permission of Focal Press in the format Republish in a thesis/dissertation via Copyright Clearance Center.

The shot list is the beginning of scheduling process, and after the order of shots is set to support the specific relationships between shots, it is time to introduce the resources to the scheduling process. The movie industry has developed a procedure (or method) of collecting certain information on script breakdown sheets. According to Honthaner (2010, 82) same sheets were used even before any software solutions were available.

The script breakdown sheet consists of "mise-en-scène details", which refers to every detail, which is visible for camera, such as "set dressing, props, costumes, make-up, and atmosphere". Breakdown sheets are made for each scene and the process of preparing them requires collaboration between departments to ensure that the information they contain is adequate, and each department is aware of their responsibilities concerning the necessary details (Hurbis-Cherrier 2013, 133.)

Bomsdorf et al. (2007, 396) suggest creating an item for each individual shot (or scene) by following a certain procedure: "for each scene or shot the headline in capital letters donates the following: location, atmosphere, duration of the scene in the final movie, and scene number", and also other information from the scene is gathered, such as actors, props, vehicles, make-up, wardrobe, special effects, set dressing, sound, and stunts. All of this information collected then constitutes as a script breakdown sheet. In the appendixes is an empty layout of a breakdown sheet, which is printed from Movie Magic Scheduling software.

The resources related to each activity can be identified with each department separately. Hurbis-Cherrier (2013, 141-142) identifies the principal production team consisting on those HODs' (head of departments) that "have substantial responsibility and direct creative input to the project", and divides theses tasks in the following departments: producing team, director (and assistant director), camera and electric department, sound department, and art department. Hurbis-Cherrier (2013, 141) further concludes that the producing team is responsible for production resources. According to Honthaner (2010, 106-109) most common departments in a movie production include:

- *Camera and lighting*
- *Production sound*
- *Art department*
    - *Set decoration*
    - *Costume Design*
    - *Hair and make-up*
- *Location Scouting*
- *Special effects and stunts*
- *Catering*
- *Transportation*
- *Accommodation*

According to Bomsdorf et al. (2007, 397) from different constraints the working time has the highest effect on scheduling of resources. They specify working time constraints by three different characteristics: "Maximum available working hours in a row, Daily earliest start and latest end, Minimum idleness". The goal is to manage the resource availability performance (RAP), which is a component that combines resource availability quality (RAQ) and renting costs (RAC). The term RAQ refers to "length and number of gaps and the amount of days involved in the movie shooting for each individual resource". Also shooting the scenes in the order given by the movie script is a factor that affects quality and performance. They state that the scheduling process in movie industry should be based on the items in the Work Breakdown Structure (WBS) and suggest that the items should be scheduled with respect to following constraints and objectives. (Bomsdorf et al. 2007, 397.)

- *Properties and Constraints of the WBS Items*
    - *Duration of related activity*
    - *Required resources (actors, location, props etc.)*
    - *Atmosphere (DAY/NIGHT, INTERIOR/EXTERIOR)*
- *Constraints of Resources*
    - *Working time (max hours, earliest start, latest finish)*
    - *Blocked times*
- *Objective Function*
    - *The length and number of gaps and the amount of days involved in the movie shooting for each individual resource.*
    - *Shoot in continuity (chronologically)*
    - *Rule of thumb: do not change locations*
- *Critical Factors*
    - *Shooting according to atmosphere, e.g. an exterior night scene (E/N) must be shot during night, but an interior night scene (I/N) can be "faked" by darkening a room and so it can be shot at any time of day.*

Bomsdorf et al. (2007, 397) points out that this process can be performed either manually, automated or by interactive (re-) scheduling. They suggest using their *Schedule This* – software to ease the scheduling process, and stress further that the software supports a development of WBS including all of the resources and constraints present in a movie production. The software also checks for overlapping work and other issues to make sure the schedule is realistic. This together with automated schedule development minimizes mechanical working hours. The system also provides information to support

decision making during manual scheduling or re-scheduling to simplify and accelerate these processes. (Bomsdorf et al. 2007, 400.)

When the script breakdown sheet identifies resources needed for a certain scene, the call sheet does the same with a shooting day. It specifies the objective for each individual shooting day and points out which crew members are needed, what time, and where. Call sheet is the timetable for a shooting day. (Hurbis-Cherrier 2013, 118–119.)

Below is an example of typical call sheet:

## PRODUCTION CALL SHEET

| Title: *KIARRA'S ESCAPE* | | | Shooting Date: 7/20 |
|---|---|---|---|
| Producer: Madgate Productions | | | PM: Sharine M. |
| Director: Miles Adgate | | | AD: Michelle H. |
| SET | SCENES | PAGES | LOCATION |
| EXT. CITY STREET | #17 | pg. 6 | 867 Riverside Dr., Apt 3-G. NYC |
| INT. KIARRA'S SAFEHOUSE | #13, #16, #18 | pp. 6, 7 | |
| | | | |

### CAST CALL TIMES

| CAST MEMBER | ROLE | MAKEUP | SET CALL |
|---|---|---|---|
| Jessica Krueger | Kiarra | 8:30 am | 9:30 am |
| Victor Varela | Driver | 8:30 am | 9:30 am |
| Robert Youngren | Vogler | 10:30 am | 11:00 am |
| Rick Varela | Smith | 10:30 am | 11:00 am |
| | | | |

| EXTRAS & STAND INS | MISC. INSTRUCTIONS |
|---|---|
| N/A | Victor is also bringing car @ 8am |

### CREW CALL TIMES

| CREW TITLE | NAME (S) | SET CALL |
|---|---|---|
| Director | Miles A. | 7:30 am |
| P.M. | Sharine M. | 7:30 am |
| A.D. | Michelle H. | 7:30 am |
| Art Dept. | Gus M., Jenni P., Michael C. | 7:30 am |
| Makeup & Wardr. | Michael C. | 7:30 am |
| D.P. | Nick V. | 8:00 am |
| A.C. | Richie U. | 8:00 am |
| Elec. & Grips | Nico P., Jenni P. | 8:00 am |
| Sound Dept. | Tristan A. (sound mixer), Eric S. (boom op.) | 8:00 am |
| Other: P.A. | Donna C. | 7:30 am |

**NOTES & DIRECTONS:**
Location is between 158th & 159th streets. (take the 1 or 9 train) Very important: the building is not facing the water (west), it is facing east, on the other side of the complex.

Victor is bringing car @ 8am, must be done by 1 pm.

Figure 7     Call sheet[5]

During the production process of a movie a selection of reports is needed for controlling the schedule. Most important report is daily production report. According to Honthaner (2010, 160) the daily production report is used to help evaluate the overall progress of the movie and the report should include the information about "what was shot that day in terms of scene numbers, setups, minutes, film footage, sound rolls, who worked and the hours they worked, the locations shot at (actual and scripted), how many meals were served, vehicles, equipment that were used, and delays".

The schedule management plan should point out who is responsible for preparing the daily production report and also who is responsible for approving the information listed in the report. According to Honthaner (2010, 160) the person in charge is the 2nd assistant director. In addition to daily report, the production crew needs to provide camera report, sound report, and Script Supervisor's report in daily basis to the project management office. These reports are used in the post-production phase of the movie production process. Honthaner (2010, 162), suggest that the script supervisor should keep track of: "scenes, pages, setups and minutes shot, which scenes are shot and which are deleted, setups filmed by all cameras, deviations from scripted dialogue, and set times".

### 4.3.3   Methods observed in case movie production

In movie industry the use of Movie Magic Scheduling software supports the process of sequencing scenes into shooting days. But is should be kept in the software does not include all of the scheduling data and the project team also had to resort to other solutions to cope with all of the scheduling activities and resources. The software choices for the project team were Microsoft Excel for the overall project time management and Movie Magic Scheduling software for screenplay related activities. They have afterwards adapted new tools to complement their schedule management, such as Apple iCal and Google Calendar. Nevertheless, Microsoft Excel seems to have a strong foothold in the production processes of the Finnish movie industry.

> *Line Producer:*
> *We update (Movie Magic) Scheduling mostly in the planning phase. We collect plenty of information and run it in the software, because it is a convenient way to produce reports about different elements. We can include music there, and we aim to include everything as detailed as possible. We can for example export the things that sound designer needs to do in the postproduction and this sort of things. But mostly it is a tool for the planning and preparing phase. When we go into the production we*

*update mainly the shooting schedule. And the actualized shooting schedule is preserved for the future generations, maybe not with 100 % accuracy, because some scene might have moved and been shot during the last day and this might not be updated in the schedule. I don't recall we having these iCal or Google calendars still in this production. These web calendars that we share only with small preparation group. But later we have employed these shared web calendars in many productions. But I still do the basic planning for the overall schedule with (Microsoft) Excel to a calendar template. It has usually a year and a half divided in months. And it has three columns for each day so that I can have parallel data there, so that one column could hold sound related issues and another has visual aspects and then it has meetings. This might depend on… And the last column has blocked times for cast and crew. This means the times that these persons are not available for the production. Of course I collect the times when director is somewhere and producer is somewhere or cinematographer is somewhere and so on.*

*Excel is more of an overall calendar. During preproduction it holds all the events, such as meetings with the director, producer, or make-up and costume designers. The major breakdown meetings are also there and rehearsal days, location scouting days, and test shoot. Then when we go into production I tend to use color codes to mark the shooting days. Of course we have holidays marked also. Then we put travelling days there. It is an all-around tool for planning and it includes the whole project.*

Tasks in a movie production are connected to each other and cannot be accomplished without active co-operation. Understanding the connections and relationships between tasks is important for a successful project.

*Researcher:*
*What kind of dependencies there are between activities? We can start from the beginning and proceed there to the end.*

*Line producer:*
*Well for example the costume designer and make-up artist can begin planning the overall aesthetics of the movie as soon as they receive the screenplay and have processed it with the director, to get an idea of director's vision. Meaning how the movie should present itself. But in reality they cannot progress very far with the planning before they know the*

*main cast. They need to know that. And especially the costume designer cannot make any purchases before she has measured the main cast. This is of course obvious. And it is the reason the casting has to be completed. Of course the director cannot rehearse with the actors before that, and he cannot proceed with his creative work, because actors influence heavily to their roles and to the content with their appearance and also with conversations. Even though typically in Finland the rehearsals between the director and cast take place closer to the actual shootings. So from the director's point of view the decision could be made closer to the actual shooting, but the costume designer sets the deadline. Well, then the location scouting and so-called "locking in" is a choice that happens before visual planning. Of course we can plan about the types of shot and camerawork and so on. But the actual shots cannot be planned before we know what kind of space we are shooting. Are out side, and are there trees or a wasteland? This causes that the scenographer cannot do his work. Well he can do color and style designing, but cannot make any purchases before locations have been locked in. We have to know them. This affects also the sound designers work. He has to know how to plan his work. And this depends on the locations. Are there any challenges related to recording sound: echoes or street-noise. Are we going to record long dialogues on the spot or... is there a need to adjust acoustics or does he need to do something in the postproduction.*

*The A.D does not really have tools if we don't know what kinds of shots are required. If we just storm there with camera and spent eight hours there, it is not possible to plan for that kind of work.*

Planning of resources is studied in the context of budget. This approach reveals the structure of resource management, which is heavily concentrated on different production departments.

*Researcher:*
*What kind of department budgets did you have? For example budget for scenography or sound? Were the departments in fact camera, sound, scenography, and costume design? Or did you have some other?*

*Line producer:*

*Those are the main departments. Of course each department has its own budget, and this is also the structure of our budgeting process. But in addition the production has some of its own budgets, there is car budget, rental car budget separately. There is catering budget, transportation budget. There is effects budget and sound budget; well these are related to the departments. But camera side has been divided so that they have a separate effects budget. And then there is the postproduction and transportation budget.*

The key personnel in charge of the resource usage is found through these departments, which each has its own head of department (HOD). Each of them had more or less peculiar methods to cope with the resources. Also the level of independence varied between HODs.

*Researcher:*

*Who are the key persons in charge of the budgets of each department?*

*Line producer:*

*They are of course the HODs. Each of them manages their own department's budgeting. Although, in the technical side, I mean the camera budget includes light and grip and camera. So cinematographers or lighting engineers usually aren't directly in charge of the overall budget in the way that I would have just given them the money and said go buy this. Instead we talk about directions and I'm tightly involved in the process and in the end I carry the responsibility that we stay in budget limits. Unlike scenographer, costume designer and make-up artist, and even location manager have their own budgets and they control them independently. Of course we discuss frequently about it. I consider my self as a practical nurse or support person and we discuss together how to do it. I help and I feel that it is my job. I help them to stay in the budget limits.*

*Producer:*

*There are a whole bunch of people and sectors designing the budget. For example cinematographer and lighting designer control the camera and light budget, but if they have certain amount of budgeted funds and the bill from the renting store looks rather large, we might have conversation about the situation. Very difficult budget to manage is the scenographer's budget. The scenographer monitors it and participates on the*

*planning of it and makes own decisions also depending on the needs of the movie.*

*Researcher:*
*Do you know if the scenographer has his own Excel charts to keep up with his expenses? Or how he does this?*

*Producer:*
*There are as many methods as there are scenographers. Some employ business-like Excel charts and handle the monitoring them selves. Others might ask that how much money they still have left, and in a way out-source it to the line producer or coordinator. Some have pen-and-paper approach or post-it notes and everything in between these.*

They did not utilize standardized procedures to support the controlling of resources, but the line producer was tightly involved in the preparation of each separate department budget. The key thing in planning was teamwork and the line producer utilized the expertise of the project team members.

*Researcher:*
*What kind of instruction these key persons received for planning and managing the budget?*

*Line producer:*
*Well, the instructions were that this is your budget. Don't exceed it.*

*Researcher:*
*Did you prepare all the budgets by your self?*

*Line producer:*
*Yes. This might be a personal preference, but in a way it is easier for me to comprehend the overall budget if I break it down. For example I break down the location manager's budget. Of course the locations are their own part. Then we have traffic control and cranes. It is kind of a process of thinking about every aspect and demand we might face during the production. Well, and he also takes care of the role vehicles, cars and bikes and all the animals that are larger than a sheep. By the time I hand over the budget, all these things are included. But I give also the overall sum of the budget. It depends of the location manager and it might be*

*that he wants to know how I originally thought the budget. What goes where? This also supports his thinking process. It is teamwork: ok, I would do this differently or I can get the cars cheaper. Or something like I know I can't get that horse with the price I had in mind. These are the conversations we have had. But in the end I give the overall sum and he makes the decision whether to invest more in the location or in the horse or in the crane.*

*Researcher:*
*Is the interaction with scenographer and costume designer of the same type?*

*Line producer:*
*Yes.*

*Researcher:*
*So you give the framework for costume designer?*

*Line producer:*
*Yes, that's right.*

*Researcher:*
*Does these key persons employ any software solutions to monitor their budgets. Or did you perhaps offer some software solution? For example that here is an Excel chart and I recommend using it.*

*Line producer:*
*Actually, I never offered them any software. And nobody has ever requested anything. Excel is quite popular among them.*

*Researcher:*
*One more question about department budgets. Did the HODs receive any documented instructions related to controlling the budget?*

*Line Producer:*
*We have general guidelines about reporting advance payments and expenses. And some other similar guidelines, but not they are not overly detailed. And we give the HODs instructions about ordering additional equipment. These purchase orders have to be approved by the producer.*

*We have made an agreement with the subcontractors about who are authorized to place an order. If I recall, we had authorized cinematographer and camera assistant in this production. I know them well and this arrangement has worked with us.*

The production call sheets were made with Microsoft Excel. This was the part of the schedule management when it was obvious that Movie Magic Scheduling lacks features and other solutions are needed for comprehensive schedule management.

*Line producer:*
*Then the actual shooting schedule is made in the software system. We use Movie Magic Scheduling.*

*We share strips from the schedule with the crew before we hand out call sheets, which happens a week before each beginning shooting week. We use Microsoft Excel to form the call sheets, and they hold the same information as the strips from (Movie Magic) Scheduling, but with some additional details. And when we are shooting, call sheet is the document we use when we are proceeding to each shooting day. And the call sheet holds all the necessary information. It has arrival times for actors and information about transportation, and who is picking everyone up and when are the background actors needed. And if there is something special, like daily equipment or camera devices that are used only on that day, or something specific about the location, or preferences for make-up or special effects. All of this information is catalogued in the call sheet. The (Movie Magic) Scheduling might not include this information with this much detail, especially about locations. So the call sheet is one step more detailed.*

The shooting schedule for a movie production is super tight. Overtime can only occur on individual sectors. However, internal movement between shooting days might happen.

*Producer:*
*The basis for the shooting schedule is that shooting days do not stretch and extra days are not available. That is the starting point for it. We have prepared for overtime work in the budget. But the sizing of it includes an assumption that overtime occurs only in separate sectors. The whole group does not work overtime. The experience from the work with our di-*

*rector supports this. He is not in the habit of going overtime. But what might happen is that location related challenges causes set decoration to go overtime and they have to prepare for the following day shooting doing overtime work. It might also happen that the lighting team goes overtime due difficult circumstances in the location or if some device breaks up. And we have prepared for these, but not for the prolonging of the overall schedule. That we don't prepare for at all. But there is flexibility in the working times. If on Monday we go fifteen minutes overtime, then we make it up on Tuesday. And this has been fine with the crew. For these reasons the precise control of schedule is very important during the shootings. And this is the reason we have separate schedule for shooting period and it is super tight.*

So, reserves for shooting period were not exercised. However, backup plans for rainy days were prepared.

*Producer:*
*But for example uncertainties related to weather are something that we prepare. For example we might have a scene that cannot be shot in certain weather, or a scene that absolutely requires certain type of weather. In these situations we have backup plan for the shooting day.*

Then again, management reserves for the overall project schedule were available. For some reason only a handful of persons engaging editing phase tends to miss deadlines much more often than the exceptionally complex production phase.

*Producer:*
*We have created secret backup weeks, because if for example the editor misses his deadlines, which happens every time and it also happened in this production. Then we have flexibility in the phases that require edited material. This is not frankly expressed in the schedule. But it is composed in a manner that every sector knows its deadlines and respects them. Certain critical tasks are prepared so that if schedule delay occurs, we can cope with it. Editing is probably the most critical content-related task and we consider it to be meaningful and fundamental enough to justify schedule delays.*

The controlling of the schedule was done pretty much in the fashion suggested in the movie production literature. They utilized shot-logs and daily reports. Again, Microsoft Excel proved to be a good tool also for controlling purposes.

> *Line producer:*
> *After we have finished shooting, the script supervisor in addition to updating his daily shot-log, which is for editor and the technical side for the DIT, digital image technician, who takes care of organizing the digital shooting material and syncing sound and picture and organizing material for editor. That is the report that goes to them, and it is very detailed catalog for each shot, what lens and camera preferences, what happened in the scene, is the take good or bad, and so on, how long the take was and all kind of finesses. Script supervisor keeps this log, but in addition he makes a daily report. And the daily report includes all the scenes that have been shot, and the duration of scenes, and things that are left out. Also how much material was spent? Nowadays days it means how many gigabytes was produced. Although the information is received after the DIT has reviewed the material and sees it. This information is not accessible for the script supervisor during the shooting day. And then we monitor the cumulative amount of material here in the office.*

> *Researcher:*
> *Ok, do you have it in Excel?*

> *Line producer:*
> *It is in Excel.*

> *Researcher:*
> *So you receive always at the end of the day?*

> *Line producer:*
> *We receive it so that the script supervisor hands them over to runner and then we scan them here and share them. We have been sharing them with e-mail, but this morning we had a meeting, where we agreed on using Dropbox to send them to the editor.*

### 4.3.4  *Discussion of deviations and analogies*

Bomsdorf et al. (2007, 396) suggest creating an item for each individual shot (or scene) already in the process of creating the WBS. They see the movie shoot scheduling problem having two steps: first the creation of WBS and secondly scheduling the items of the WBS. Conversely according to PMBOK (126) standard "the work in WBS refers to deliverables (e.g. shots and scenes), and not the activity itself". The PMBOK standard divides the first step suggested by Bomsdorf et al. further into two steps: defining the deliverables (WBS/shooting script) and defining activities (script breakdown sheet). The Create WBS process identifies the deliverables and the Define Activities process subdivides them into an actual work, which is called an activity (PMBOK, 150). For example preparing an actor with right make-up, hair and costume is a set of activities, but does not constitute as a deliverable. A finished shot is a deliverable.

Therefore these items, which Bomsdorf et al. refers to, are addressed in the Time Management part, not in the Scope Management / WBS part of the thesis. Thus, if the PMBOK perspective is endorsed, then in the movie industry the WBS takes a form of a shooting script, and process of defining activities and resources takes a form of a script breakdown sheet. However, in real-life these two processes will most likely overlap each other. It should be mentioned that script breakdown sheet only includes mise-en-scène activities (Hurbis-Cherrier 2013, 133). This means that some resources, such as transportation, accommodation and catering, are not included in script breakdown sheets and require their own plan.

The movie production handbooks do not introduce network analysis based techniques, and it seems that the Finnish movie industry does not use them either in the scheduling process. The scheduling process of the case movie was mainly handled with methods suggested in movie production literature. This supports a view that the industry-specific production processes prevail also in Finland. The reason why network analysis seems to absent from movie industry is difficult to answers. One factor affecting this might the fact that there usually aren't many overlapping phases. Though inside a single phase, such as shooting, there are many overlapping activities with dependencies. These dependencies however did not cause any major issues for the production of the case-movie.

The level of independence in HODs' operations brings forth an interesting debate about project boundaries. An example of this could be the resources related to costume designer's work. The line producer stated the budget limit for costumes, and costume designer was responsible for keeping that budget. But she could decide independently about most of the resources related to respective activities within budget limit. How does this affect the project boundaries: are the costume designers activities a part of project activities and if they are, to what extent? Or are these activities simply an out-

sourced part of project work and not part of project management team's concern? It could be argued that for example the activities related to catering, such as preparing the food, are not part of project work and can be safely outsourced to suitable service provider.

During the case movie production the management reserves for the overall project schedule were available. This procedure is analogous with the PMBOK standard. One reason for having these reserves was the post-production phase, which tends to go overtime in almost every production. The deviation between the case and PMBOK standard is that according to the PMBOK standard the management reserves should address the unknown-unknown risks, but the case production used these reserves to address a known-unknown risks and did not prepare for unknown unexpected incidents. The project team of the case movie prepared for the impact that weather could have on exterior shooting days by creating a possibility to shoot indoors if needed. This procedure is analogous with the "what-if scenario analysis" from PMBOK.

The reporting methods of the case-movie where quite analogous with the literature. It seems that new communication technologies are also making their way to the operations of Finnish production companies. Dropbox certainly might be faster and more efficient way to handle report deliveries than using a physical delivery system, such as runner. Digitalization brings new possibilities also to this industry, but it is difficult to predict what are the ultimate effects that new ICT will have. However, the industry seems to be willing to adopt new technologies.

# 5    REFLECTION

The reflection part concentrates on analyzing how the research question was answered and evaluates how the chosen research methods supported the research. The findings are compared to the theory. This research was set to produce understanding from movie production on project management perspective. To achieve this goal a project management standard was applied in the comparison between the case movie production and established norms in popular movie production handbooks. The goal of the analysis was to find analogies and deviations between all these three areas: (1) procedures suggested by a project management standard, (2) established movie production conventions, and (3) production process of real-life case movie.

The scope of the thesis was restricted in accordance with the PMBOK standard to three knowledge areas: *Develop Project Charter, Project Scope Management, and Project Time Management*. From movie production's perspective this refers to the green light process of a movie and pre-production/scheduling process of a movie. The empirical interview data also covered topics outside the scope including budgeting process, procurement management and risk management. Most of this data was excluded from the analysis. Only some of the interview data considering the budgeting process was used to examine the management of resources, which is a subtopic of time management. This decision was made, because the interview data from time management did not cover resource management with sufficient level of detail, but data from other parts of the interviews addressed the same topic. Resource management is also closely tied to budgeting process and it would be difficult to examine them separately. However the budgeting process as a whole was not covered. Tight outline of the thesis was important considering that the semi-structured interviews covered rather broad area. The choice of interviewees supported the studying of the case. As expected the green light process was covered from the early stage to the actual green light decision with a sufficient amount of detail. The fact that the interviewee operated as both the writer and the producer was an important factor of the successful analysis this process. The second interview with the line producer provided practical information to complement the high-level topics covered in the first interview with the producer.

The categorization and presentation of the interview data employed the knowledge areas from PMBOK standard. This approach proved to be a systematic and clear method for addressing the goal of the research. The conventions and techniques used in movie productions matched the categories of the standard for most parts. The approach also supported the comparison of views in the both fields. However, this kind of categorization required extensive amount of pondering. The challenge was to find out how the movie production techniques can be matched with corresponding project management knowledge areas to create a heuristic fusion of these two. The process of matching was

not always straightforward and clear. Many techniques seemed to fit in many knowledge areas at first. As the analysis proceeded, the matches and relationships slowly became more obvious. The process of the analysis actually reminded the writing process of a movie script; it is often said that writing is re-writing. When you begin, things seem chaotic. But after many hours of writing and re-writing the chaos disappears. This categorization supported the presentation of the complex case structure.

After the categories between the standard and movie production had been integrated, the empirical interview data was introduced to each corresponding category. This revealed the relationship between real-life production and movie production framework. It also further explained what is happening in the situations where the standard and movie production practices deviate from each other. One of these situations was the resource management. The standard and movie production handbook did not seem to communicate with any distinguishable similarities, and actually the movie production handbooks did not identify resource management as a sovereign process. The interview data provided means to analyze this situation. The standard suggests that project management team should employ methods, such as resource breakdown structure, to manage resources. In the real-life movie production the project team is not the only authority managing resources, but there is a whole set of different persons, most importantly head of departments (HODs), involved in this process. These HODs include main creative persons in charge, such as cinematographer, sound designer, scenographer, and dress designer. This seems like a case of independent section management, which could lead to longer project duration, than co-operation or central management regime for allocating resources. It also shares a view with the Scrum methodology, which recommends that the whole team should prepare the estimates for resources usage, because this way the estimates should be more accurate and the team should be more committed to them. However, the procedures used by HODs in resource management varied greatly, as did their level of independence and size of budget. There were no official guidelines for these HODs to support their planning and use of resources, but the line producer supervised the planning and use of resources with each HOD. The budget limit functioned as a tool for the project team to control the utilization of resources in different sections. Movie production research has provided a software solution to resource-constrained project-scheduling problem in movie industry called *Schedule This*. However, the software still requires a complete list of all the resources to fully functional. It could also be that the less advanced systems without automation force people to work harder and think more ahead, and this way actually lead to better project management. *Schedule This* software apparently might save many hours of work for the scheduler, but it is dangerous to assume that these hours would be a complete waste of time. When managing a large-scale movie production, it might be good to know the screenplay and breakdown structure by heart, or at least most of it. A complete automation of this process

might lead to less conscious management team. The time spent with the screenplay is also time spent studying and preparing for the production. Undertaking a project requires faster decision-making techniques than ordinary day-to-day operations. It might help if the line producer (or project team) has deep knowledge about every aspect of screenplay, and is capable of responding quickly to any issues that might emerge. This view could be supported by the fact that the commercial success of entertainment projects is usually higher than the traditional project management oriented industries, regardless of absent project management techniques.

Still, the industry seems willing to learn and adopt new practices. However the positivist descriptive research was not always able to find out reasoning behind the choices made by industry practitioners. The focus was on describing the facts. This causes some challenges when interpreting the findings. This research can point out quite well how the project management was carried out on most parts included in the analysis, but does not provide comprehensive insight for the reasons behind project-management-related choices.

The table below provides an overall view of the methods present in the analysis part. These methods are divided between PMBOK, movie production literature and the Case. The table also illustrates the knowledge area that each method belongs to

Table 3        Essential methods

| Essential methods | PMBOK standard | Movie production guides | Case |
|---|---|---|---|
| **Charter & Green Lighting** | Business case<br>Cost-benefit analysis<br>Internal or external influence | Treatment elaboration<br>Earnings-cost-ratio<br>Campaign breakdown<br>Emotional beats<br>30 sec TV-commercial<br>Target audience analysis<br>Reference movies<br>Reference campaigns<br>Global sales breakdown | Treatment elaboration<br>Finance vs. production costs<br>Idea emerged from real-life observation<br>Domestic market potential: reference movies, target audience analysis<br>International markets: unpredictable element |
| **Scope** | Collect requirements<br>Define scope<br>Create WBS | Shooting script<br>Overhead diagrams<br>Storyboards | Shooting script<br>Number of shots & quality<br>Shot size |
| **Time** | Precedence diagramming<br>Dependencies<br>Resource breakdown structure<br>Analogous estimating<br>Parametric estimating<br>Three-point estimating<br>Critical path method<br>Critical chain method<br>What-If analysis<br>Management reserves | Shot list<br>Breakdown sheets<br>Call sheets<br>Daily reports<br>Camera report<br>Script supervisor's reports<br>Movie Magic Scheduling<br>Schedule This – software | Shot list<br>Breakdown sheets<br>Call sheets<br>Dependencies<br>Daily reports<br>Script supervisor's shot logs<br>Movie Magic Scheduling<br>Microsoft Excel<br>What-If analysis<br>Management reserves |

The Table shows how the PMBOK establishes the link between movie production tradition and best practices in project management, and presents the data in a globally understood manner. In the charter / green light part there can be seen that the treatment elaboration was found in both the case movie production and movie production literature. Both also employed target audience analysis and used reference movies. PMBOK offers business case for the same purposes. Also Prince2 methodology uses the term business case. The purpose is nevertheless identical in all three.

PMBOK offers WBS for scope management purposes. Movie production literature and case movie employed industry specific methods to cope with this area, most importantly the shooting script, which actually resembled the WBS method. Although the PBS presented in Prince2 methodology might be even more accurate equivalent for the shooting script. The case and movie production literature deviated by the use of storyboards, although the possibility to use them was identified also in the case movie. Also the literature stated that the usefulness of storyboards vary among productions.

Time management was the widest topic. PMBOK offers vast range of methods to cope with the project schedule. Most of these methods are not found from the movie industry. Then again, the case and movie production literature shared many methods, most importantly shot list, breakdown sheets, call sheets and daily reports. The case and PMBOK also shared two methods: management reserves and what-if analysis. Although the management reserves were used in slightly different manner than suggested in PMBOK.

The project management standard proved to be useful tool in describing what is happening in the management of a movie project. It allowed systematical categorization of the deviations and analogies. The final key observation made in this research relates project management methodologies. The movie industry has a broad set of effective and detailed industry specific methods. Even though these individual methods correspond to project management practices, a comprehensive methodology that would cover the whole production process, such as Prince2 or Scrum, seems to be missing from the movie industry.

# 6    CONCLUSION

How would we understand movie production if we would take project management perspective? This thesis provides insight about how some project management methods relate to movie production. The knowledge areas included in this research are "develop project charter", "project scope management", and "project time management. The techniques related to these knowledge areas were compared to views provided by movie production literature and real-life conventions from case movie. This approach was created to direct the focus of the thesis on project management perspective, and uncover deviations and analogies between PMBOK standard and movie production traditions.

The empirical material was gathered by semi-structured interviews with one producer and one line producer. The focus of the interviews was on procedures used to cope with project management related issues in movie production. The target of interviews was a real-life movie and interview questions were addressed to preproduction and production process of this particular movie. However, during interviews also more general procedures were discussed. The interview data was categorized according to the three knowledge areas from PMBOK standard. Deviations and analogies were found between the standard, movie production literature, and case movie.

Key analogy discovered by this research was inside scope management knowledge area. The scope management embodies the creation of work breakdown structure (WBS), which is the process of defining the project deliverables. PMBOK standard suggests decomposition of project deliverables in smaller and easily manageable parts. Movie production literature describes the same process by introducing the concept of shooting script, which decomposes the screenplay into individual shots. These shots then constitute as deliverables and they are smaller and more manageable parts of the of the project, than a raw screenplay would be. It is easy to see that these two approaches share the same view to managing the project deliverables. Also the planning process of the case movie was analogous with the literature for this part. This outcome was expected, because movie industry has strong and internationally established conventions to breakdown the work in screenplay.

Another key analogy was found inside time management. This knowledge area embodies the task of defining activities, which is a process of decomposing the content of WBS into specific activities. The activities represent work effort needed to complete each deliverable, or in movie industry the work effort to complete each shot and scene. PMBOK suggests creating an activity list, which includes all the work effort needed to complete each deliverable. Movie production literature describes the same process by introducing the concept of script breakdown sheet, which is made for each scene and includes the work effort (e.g. set dressing, stunts, special effects, cast, make-up, wardrobe, props, sound) needed to complete each individual scene. Again, these two ap-

proaches share seem to resemble each other considerably. Also the conventions used in the case movie were analogous with views provided in the literature.

The major deviation found by the thesis was in the management of resources, which refers to estimating the type and quantities of different resources needed to perform each activity. PMBOK standard suggests creating resource breakdown structure and identifying resource requirement for each activity. The movie production literature used in this thesis does not identify resource management as a fully independent process like shooting script / WBS. Instead the literature concentrates on budget expenditures and introducing different departments (e.g. camera, sound, art department) that are responsible for their own resources. The resource management in the case movie was partly outsourced to these kinds of departments, and even though the line producer oversaw the planning and use of resources, the head of departments (HODs) enjoyed great deal of independence in their operations. This kind of approach is actually found from Scrum methodology, where resource planning is considered to belong to individual team members. However, the procedures employed by HODs' varied considerably between departments. There were not detailed guidelines to direct HODs' resource planning process. It was mentioned during the interviews that procedures vary even inside a single trade depending personal preference of HOD. One HOD might employ "business-like" Excel charts and other use pen-and-paper approach. There seems to be no established conventions to manage resources for any particular department. The interesting side of this observation is the contrast to other precise methods provided by movie production guides. How can resource management be overlooked in movie production guides?

The movie production research states that the software systems, used commonly in the field, do not support the whole process of movie production, but only a part of it. The empirical findings of this thesis support this discovery. The scheduling process of the case movie was done with Movie Magic Scheduling software, but the project team needed to use Microsoft Excel to complement the planning of the whole production. The movie production research provides a solution for this issue. A research team from Germany claims that they have developed new software system, which includes all the resources needed in movie production.

This thesis covered also the green light process of movie productions. Green lighting refers to the decision making process that aims either approving or declining the movie production. The PMBOK standard introduces project charter as the key document of formally authorizing the existence of a project. Both, the movie production research and project management research sees this process having a disproportionally large impact on project success, and even minor improvement in this process has significant benefits. The movie production handbooks introduce various techniques to cope with green light decisions. During the green light process of the case movie these techniques were not employed in systematic matter, but there were similarities in the approaches, especially

in the use of reference movie. However the major deviation was that the green light decision of the case movie was not documented in the fashion suggested by the handbooks. The process in a way took place only in conversations between producer, director and the financiers. Nevertheless the case movie proved to be a successful project, so the green light decision they made was a right one.

As a conclusion it can be said that established movie production conventions and the PMBOK standard share many aspects of project management, but not all. Nevertheless, when analogies with these two emerge the link is strong. This might have something to do with the fact that both fields have a history in the U.S. military. PERT method was developed in the U.S. navy during the 50's. Then again, the relationship between Hollywood and U.S. military goes back as far as 1910s when Hollywood was filming air shows and movies from World War I. This relationship continued through World War II and Vietnam War, so it is not surprising that project management standard that is build on the techniques developed by U.S military seems to resemble movie production conventions, at least partly. Of course lots of time have passed and these two trades have drifted apart. This can be seen for example from the fact that PERT and critical path methods are not present in the movie production conventions. However, the processes happening in project planning before these methods are applied are more analogous between the two fields, such as defining deliverables and activities. The deviations emerge later in the planning process, but the foundation for planning corresponds. So, the traditional military-like task definition still seems to have strong foothold in both the PMBOK standard and the world of movie production with strong and established conventions. The section in movie industry with less established conventions is the resource management, although software solutions to cope with this are provided by research. *How to solve a resource-constrained-project-scheduling problem in the Finnish movie industry using a dedicated software solution* could be the interest area and research question for a follow-up research.

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# APPENDIXES

## Shooting Script

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13. INT. KIARRA'S SAFEHOUSE – DAY

**A - ECU** — **B - MS**

On a table: a gun, whiskey, classified documents and a laptop showing grainy surveillance footage of an Afghan military compound taken from a spy drone.

Kiarra sits at the small table analyzing the footage. Suddenly, she hears a CAR pull up and rushes to the window. She creates a small gap in the blinds to peek out.

**C - CU** — **D - ELS (POV)**

She sees Smith and Vogler get out of their car and approach her building.

**E - MLS (handheld)** — **F - MCU (handheld)**

Kiarra closes the blinds, grabs her backpack and stuffs her computer and critical files into it. Tucking the gun into her waistband she rushes to the front door.

**G- MS**

At the door she stops and listens: HEAVY FOOTSTEPS coming fast up the stairs, so she heads for...

14. INT. KIARRA'S SAFEHOUSE / BACK ROOM

**A- MLS**

...a small window opening out to the back alley. Kiarra lifts the window open, it's a two story jump, but she climbs out and takes the leap.

15. EXT. BACK ALLEY

**A- MS (low<)**   **B- LS (pan with)**   **C- MS (low<)**

Kiarra lands hard but quickly recovers. She hurdles over a fence and races down the alleyway toward the street.

**D- CU to LS boom**

16. INT. KIARRA'S SAFEHOUSE – SAME

Smith rams the door open with his shoulder. He and Volger sweep their guns across the room.

**A- MLS (2 shot)**

                    VOGLER
        Don't move! Don't you move!

Faced with an empty apartment, the men lower their weapons.

**B- CU Vogler**   **C- CU Smith**

                    SMITH
        She ain't here, boss.

Vogler starts sniffing at the air. Smith watches him.

                    VOGLER
        We just missed her.
            (sniffs)
        She was just here. Search the place.

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17.    EXT. CITY STREET - SAME

**B- LS (pan with)**

**A- MCU (gate)**

Kiarra emerges from the alley and, staying low, shuffles to the passenger side of Vogler's car.

**C- MCU (driver side)**     **D- MS (passenger side)**

The DRIVER sits in the idling car, looking up at the apartment throught the open driver's side window.

Hidden by the door, Kiarra BANGS on the passenger window behind him with her fist. The driver turns to the noise, but before he can figure out what's going on, Kiarra circles around the car, grabs him by the neck and drags him through the window.

**E- CU (driver feet)**

18.    INT. KIARRA'S SAFEHOUSE - SAME

**A - LS**

As Smith searches the bed, Vogler checks the table for clues.

**B - MCU**

Vogler examines the whiskey glass and sees Kiarra's lipstick print on the rim. Slowly, he places his lips right on her lip print, tastes some whiskey and smiles.

**C - ECU (lip)**

His reverie is broken by the CAR REVVING. He and Smith rush to the window and see their car take off; the driver prone on the street. They turn to each other on disbelief.

**D - LS (POV)**

19.    INT. JFK AIRPORT - DAY

**A - MS**

Kiarra lays her notebook computer and leather boots in a security tub and sends them through the x-ray. She confidently steps through the metal detector.

# Shot List

| **TITLE:** Kiarra's Escape | **Dir.** Miles Adgate | **Scenes:** #14, #15, #17 | **Shoot Date:** 7/11 |
|---|---|---|---|

**SCENE: #17 EXT. CITY STREET – DAY**
*SET-UP 1*: Angle on front gate to street
      1) 17A: MCU K. enters checks if coast is clear, exits left.

**SCENE: #15 EXT. BACK ALLEY – DAY**
*SET-UP 1*: Angle on window (low angle)
      1) 15A: MS K. opens blind, window and leaps out.
*SET-UP 2*: Angle on Kiarra
      2) 15B: / PAN WITH K. lands, recovers runs and leaps over fence.
*SET-UP 3*: Extreme Low angle from ramp
      3) 15C: MS X-TREME LOW ANGLE K. leaps over fence (and over camera)
*SET-UP 4*: Angle down alley
      4) 15D: CU – LS/BOOM UP K. lands in front of camera. BOOM as she sprints away.

**SCENE: #14 INT. KIARRA'S SAFEHOUSE / BACK ROOM – DAY**
*SET-UP 1*: Angle on window
      1) 14A: MLS K. enters left, open blind, window and leaps out.

| **TITLE:** Kiarra's Escape | **Dir.** Miles Adgate | **Scenes:** #13, #16, #17, #18 | **Shoot Date:** 7/20 |
|---|---|---|---|

**SCENE: #17 EXT. CITY STREET – DAY**
*SET-UP 1*: ANGLE ON CAR - DRIVER'S SIDE
      1) 17B: LS/PAN WITH Kiarra. Start up street, pan with and follow action to end.
      2) 17C: MCU on Driver casual. K.'s hand hits window, roll down window. To end.
*SET-UP 2*: ANGLE ON CAR – PASSENGER'S SIDE
      3) 17D: MS on Driver casual, hand hits, window down, K. enters screen left, attacks!
      4) 17E: CU on Driver's Feet (hand held) Feet struggle as he is dragged out window.

**SCENES: #13, #16 and #18 INT. KIARRA'S SAFEHOUSE – DAY**
*SET-UP 1*: POV ANGLE ON STREET
      1) 13D: POV from west window.
        Start with blinds shut, cracked open, then snapped shut. (Kiarra's hand)
      2) 18D: POV from west window.
        Start with blinds shut, cracked open, then snapped shut. (Vogler's hand /stand in)
        *** *Car* & Driver *are done and can go home* ***
*SET-UP 2*: ANGLE ON WINDOW (EAST)
      3) 13-C: CU Kiarra enters left. Opens blinds, looks, reaction, close blinds. Exit left.
*SET-UP 3*: ANGLE ON TABLE
      4) 13A: ECU table top. K's hand lifts glass out of frame (top)
      5) 13B: MS K. looking at footage, noise, reaction. K. exit frame right.
      6) 13E: MLS (*hand held)* K. enters right. Packs up. Follow to door. Exit right.
      7) 13F: MCU (*hand held)* K. enters right. Packs up. Exit left.
*SET-UP 4*: ANGLE ON DOOR
      8) 13G: MS K. enters right w/backpack. Listens. Registers noise. Bolts right.

      *\*\*\*Kiarra is done for day and can go home\*\*\**

      9) 16A: MLS 2 SHOT MASTER Smith & Vogler. Break in. V. exit left. S exit right.
*SET-UP 5*: 10) 16B: ANGLE ON VOGLER: CU reverse shot
*SET-UP 6*: 11) 16C: ANGLE ON SMITH: CU reverse shot

CONTINUED:

**Breakdown Sheet**

| Scene #: | | Sheet #: 1 |
|---|---|---|
| | **Breakdown Sheet** | Int/Ext: |
| Script Page: | | Day/Night: |
| Page Count: | | Est.Time: |

Scene Description:

Settings:

Location:

Sequence:                                        Script Day:

| Cast Members | Background Actors | Props |
|---|---|---|
| | **Stunts** | **Vehicles** |
| **Special Effects** | **Wardrobe** | **Makeup/Hair** |
| **Set Dressing** | **Greenery** | **Special Equipment** |
| **Notes** | **Music** | **Sound** |

# Campaign Breakdown Process

*Script campaign breakdown*

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## Script Campaign Breakdown

**Production Company: Over-the-Top Pictures**
**Picture Title: Spare Parts**
**Date Prep: 4/22/2010**  **Analyst: MCS, ZM**

| Page # | Setup | A streamlined spaceship streaks TOWARD CAMERA. The beautiful red and green planet in the distance suffers a series of brilliant, violent explosions high in its atmosphere. |
|---|---|---|
| 1 | | |
| Page # | Setup | The controls and machinery glow and spark ominously. The instruments still working all read in the red danger zones. |
| 1 | | |
| Page # | Setup | THREE MEN man the controls, struggling to keep the ship moving. |
| 1 | Line | COMMANDER: We're gonna fry if we don't blow up first. |

*Sample script for TV commercial*

---

## Sample Script
### Major Entertainment
### "Film Title"
### 30-Second Script

**Internal Greenlight Draft**
**Cumulative Time**

| Video | | Audio (Wild sounds throughout spot) |
|---|---|---|
| Charlie in his BMW takes the MLK Blvd exit off the Fwy. | | (S.O.) Two drumsticks smack together counting a steady single rhythm about 50% greater than a resting heartbeat. More music cues. |
| | :02 | VO: IN EVERY CITY |
| Rachel rides with her father through Beverly Hills in the rainy night, police car following them. | :04 | VO: THERE ARE PLACES… |
| Rachel sits with a few girls at a multiracial table, Charlie smiles at her, she hesitates, then smiles back. | :06 | VO: WE FEAR TO GO |

*Campaign beat analysis*

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## Campaign Beat Analysis
### Data Entry Worksheet

| **Production Company:** | **Picture Title:** | |
| **Campaign:** | **Date Prepared:** | **Analyst:** |
| **Emotions** | **Sci-fi/Fantasy** | **Cultures** |

---

Romance Drama Comedy Action Risqué Supernatural Horror Men Women Youth Kids

---

Directions:

Each beat scores one point.

Drama beats are every visual, VO, or sound that reveals the story.

Culture beats are those that speak directly to that particular target. If a child is in the scene, this is not necessarily a kids' beat. Culture beats have an extreme perspective of that culture. Each beat may not be a particular culture beat.

*Target audience analyses*

<div align="center">

**Great Producer**
**Amazing Script**
**Date Prepared: 4/20/2010**
**Analyst: SP**
**Target Audiences**

</div>

| | **Beat** | **Campaign** | **Rank** |
|---|---|---|---|
| Traditional audience profiles | Score translation | Appeal (as a percentage) | |
| Women 18+ | 34.0 | 29% | 1 |
| Men 18+ | 32.0 | 27% | 2 |
| Youth 12–17 | 30.0 | 25% | 3 |
| Kids 5–11 | 23.0 | 19% | 4 |
| Total | 119.0 | 100% | |
| Major blended audiences | Score | As a percentage | Rank |
| Youth/young adults 16–25 | 33.0 | 28% | 2 |
| Older women 25–49 | 33.0 | 28% | 2 |

<div align="center">

**Campaign Score**

</div>

| Emotional category | Number of beats | As a percentage of total beats | Rank |
|---|---|---|---|
| Romance | 5 | 12% | 4 |
| Drama | 10 | 24% | 2 |
| Comedy | 13 | 31% | 1 |
| Action | 6 | 14% | 3 |
| Risqué | 2 | 5% | |
| Sci-Fi/fantasy | 0 | 0% | |
| Horror | 0 | 0% | |
| Men culture | 2 | 5% | |
| Women culture | 3 | 7% | |
| Youth culture | 1 | 2% | |
| Kids culture | 0 | 0% | |
| Total | 42 | 100% | |