ICT INFLUENCE ON TELEVISION NEWSROOMS.

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Thesis submitted in partial fulfillment of requirements for the Degree of Master of Business Administration in Project Management

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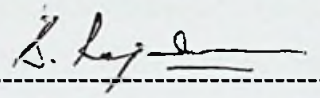

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Date:

Abstract

Newsroom Computer System (NRCS) plays a critical role in today's cutting edge Media world. By bringing different functions of newsroom together into one large integrated system, an NRCS creates opportunities for growth in the sector and increased productivity.

The study examines the ICT influence in TV newsroom, ICT has played a major role and newsroom has changed enormously. The study was supported by literatures related to ICT influence in newsroom operations. The research methodology process was on qualitative approach, study relied on combination of detailed interviews document analysis, experimental process and observation. The importance of the study is the findings and the data, which was obtained from newsrooms where a complete NRCS system is in operation. Analysis were performed in stages, Financial analysis was done on BBC, where annual reports and financial statements for several years were reviewed and identified BBC has invested £79M for digital initiative and due to poor management the project was withdrawn with a loss and partial amount being recovered. BBC reinvested £144M for new NRCS system. BBC displayed loss and investments in the period but was growing with revenue and pushing for new technology. Further analysis was performed on News1st broadcast schedule (FPC) in years 2007 and 2015, which was the periods on traditional system and use of NRCS. News1st have shown 20% increase in programs after the use of NRCS and also TV channel ratings display higher percentage of audience share. Experimental analysis was conducted on traditional system vs NRCS in the aim of identifying the operational efficiency. Newsroom ten activities like scripting, ingesting, editing, etc. were taken and real time operations were performed and recorded on both methods. Activities on NRCS are efficient and low time consuming, no documentation and less resources. Interview analysis was performed with 10 candidates, overall opinions state NRCS is the futuristic and it`s important for newsroom in current generation.

Conclusion were drawn that efficiency and benefits were gained in use of NRCS and journalist practices were changed. Recommend as per study, NRCS should be considered by newsroom in Sri Lanka to be in par with technology and leading news provider.

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I wish to express my gratitude to my research supervisor Prof. A.A.D.A.J. Perera, Professor, Department of Civil Engineering, University of Moratuwa for his continuous encouragement, guidance and support rendered during the period of this dissertation.

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Also I wish to convey my highest appreciation and gratitude towards the NRCS users who contributed to the interview and observations by sacrificing their precious time and energy. Further I would like to convey my special gratitude to all friends and colleagues who helped me to gather information and helped me to find the contacts from broadcasters for this research.

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S. Rajamanoharan

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List of Abbreviations

IT – Information Technology

ICT – Information Communication Technology

NRCS – Newsroom Computer System

DMI – Digital Media Initiative

ROI – Return of Investments

FPC – Fixed Point Chart

HD – High Definition

SD – Standard Definition

MIS – Management Information System

PAL – Phase Alternating Line

MJPEG – Motion JPEG

MPEG – Movie Picture Expert Group

MAM – Media Asset Management

COTS – Commercial off the Shelf

OB – Outside Broadcasting

VTR – Video Tape Record

FTP – File Transfer Protocol

MCR – Main Control Room

SAN – Storage Area Network

NAS – Network Attached Storage

CHAPTER 1: Background

1.1 Electronic Media (Newsroom)

The entry of electronic media into Journalism, a few decades ago, revolutionized the industry as a whole. The conventional mode of publication was pushed to a second place as the audience intentionally or unintentionally started opting for electronic media for its comparatively better speed, availability and accuracy. News and factual programs have a clear public interest and Electronic media serves the audience who use electromechanical energy such as Television, radio or internet, to access news or current affairs, whereas print media produce news on paper as in magazine, books and newspapers. With the enormous growth of Information and Communication Technology (ICT) the invasion of Broadcast journalism into media industry has undoubtedly transformed the world in all spheres of life. Any incident in any part of the world is recorded and is accessible with minimum delay perhaps immediately on live with the advantages of latest ICT installation. ICT has etched a phenomenal record right throughout since its implementation and has forged ahead fostering boundless growth in the media field by way of reducing manual operations, tightening the network and increasing its efficiency. To strengthen this assertion, computer technology has enhanced news processing and news reporting. Using Internet is of immense assistance to journalists. It enables them to acquire authentic information to add accuracy and punch to their stories. They can access relevant sites to source their foreign or local news for the day's bulletin and thereby produce quality news presentation. The importance of Information and Communication Technology as a tool for news processing is immeasurable. The use of ICT in broadcast industry has undoubtedly upgraded news processing. Access to information is fundamental to achieve empowerment. Knowing the impact of fast increasing digital convergence in media, it has enabled environments guaranteeing people's access to information through the adoption of this technology. (Adigwe, 2012)

Convergence of ICT in newsrooms will invariably create changes in journalistic practice in television and newsrooms focusing on better prospects and examine the already existing theoretical claims on the impact of new technology on news output by

exploring journalists' accounts of these changes. Convergence is usually considered to bring radical and fundamental changes to media that are less technological. At a structural level, the restrictions between traditional and latest modes of communicating are becoming vaguer and the relationships between different media are characterized by increasing cooperation, compatibility and connectivity. The digitization and convergence processes seem quite irreversible. All media in future will adopt to be digital yet the implications of these developments are not easy to predict. Many speculations, following changes at different levels, have been raised regarding traditional media organizations and their interest to adopt themselves to the new environment. Their survival itself could be under threat. As far as news production is concerned the current situation seems to suggest that convergence is more a case of evolution rather than revolution. (Saltzis & Dickinson, 2003)

This study will focus the newsroom, where journalists–reporters and producers, along with other staffers work to gather news to broadcast on television or radio. Although Newsrooms can be a separate production unit, they are usually a part of larger organisations or a broadcaster as it requires huge technical capabilities support and informational support. Newsroom is combined with operational and information system in which three useful features work together: Software, Hardware and human resources. Newsroom is expected to produce essentially high quality news in terms of contents and structure. Videos have to be of the best possible quality. Journalists, super journalists, technicians, grapiest, editors, presenter, camera operator, audio engineers, light controllers and all others work as a team to bring the best quality productions in its fastest order. Time is a very crucial factor in news production as it determines the deadlines of the given tasks. (Rezza & Ikuesan, 2012)

1.2 Statement of Problem

As global trends vary, it forecasts an increase in the service and the deployment of ICTs in all areas, in order to achieve better efficiency, accuracy, and to speed up operations. Arguably ICT and its service in the newsroom and in news processing activities is a huge investment, as money would have to be invested into acquiring both relevant hardware and software. However, as argued the use of Information and Communication Technology shrinks the users' jobs and task by a higher percentage,

but it has never shown proper figures or outcome with regard to any convergence related to newsroom operations in Sri Lanka. Also ICT convergence in newsroom has never shown any comprehensive justification for the organization, which has gradually resulted in a threat to further improvements or upgrade in technology of newsroom in Sri Lanka.

Therefore, the study tends to investigate a media organization (Newsroom in Sri Lanka) which has a fully-fledged newsroom system, with numerous operational challenges and concerns including investments, maintaining regulations and standards and which keeps up with emerging trend and technologies. In this backdrop, the findings will focus on the efficiency and enhancements gained by newsroom in overall processes and operations after the ICT convergence.

1.3 Main Objective

The study will explore the News Media Institutions, where the Digital Newsroom automation system is fully functional and the research will be done on the below given sub objectives,

1.3.1 Sub Objective

1. To establish the impact of productivity and efficiency of the Newsroom in using automation in the media Institutions.
2. To review and identify the trends of technology related newsroom automation

1.4 Research questions

There are three research questions in this study.

1. What is the efficiency of the newsroom with the use of the newsroom automation system (NRCS)?
2. What are advantages and benefits provided by newsroom automation system?
3. What are the challenges and difficulties faced prior to the Newsroom workflow implementation and the new newsroom automation system implementation?

1.5 Scope of Study

This study focuses mainly on broadcast stations in Sri Lanka to investigate the impact of Information and Communication Technology (ICT) on newsroom. Currently, there is one newsroom automated system in operation in Sri Lanka. A formal survey will be conducted by administering interviews with experts.

1.6 Methodology

The research methodology requires study to be done using interview as the instrument, which makes it most relevant and most appropriate for conducting a study that involves asking some questions from a set of respondents. Also will carry out an observational research and a field survey in one of the broadcast stations in Sri Lanka, where fully functional newsroom system is in operation. If required qualitative interview research and true experiments methods to be conducted on the news process.

1.7 Chapter Structure

There are five Chapters in this study. These are introduction, literature review, methodology & design, Data analysis and presentation and final chapter conclusion, Recommendation and Managerial implications.

Chapter one – (Introduction): Covers Background of the Study, Research Problem, Objectives of the Study, scope of the research, Significance of the Study and chapter outline in relation to study of the influence of Newsroom automation System on efficiency of News Room in Sri Lanka context.

Chapter Two 02(Literature Review): talk about the secondary evidences from the internal and external sources in order to support the research model and solving research problem. These sources can be used to provide an insight or prior understanding on the problem of how the influence of Newsroom automation System on efficiency of News Room in Sri Lanka context.

Chapter three 03(Methodology): Research methodology includes Theoretical Framework of the research, Research Design, Interviews, Sampling Design, Sample Selection Procedure ,Sample Size ,Data collection methods and Techniques Used for

Research Analysis in relation to the study of the study of the influence of Newsroom automation System on efficiency of News Room in Sri Lanka context.

Chapter Four 04(Data analysis & Presentation): Data analysis and presentation includes analysis of data and its graphical visualization of the problem. Reliability and validity of the study will be discussed in this chapter.

Chapter Five 05 (Conclusion & Recommendation): conclusion and recommendation includes summary of the study, conclusion of the study, recommendations and suggestions for further research in relation to the influence of Newsroom automation System on efficiency of News Room in Sri Lanka context.

CHAPTER 2: Literature Review

2.1 ICT and Journalism

"Telecommunications and computing/information system, commonly referred to as Information and Communication Technology (ICT), has long been associated with economic development and social/cultural change". (Baishakhi, 2011)

The information communication systems have advanced to a position that it has today become an integral part of everyday life with routes spanning the entire world carrying voice, text, pictures and many other types of data in no time of its release. The most recent developments and integrations of technology have enabled computers to become more recognized, less expensive and widely available. This has virtually encouraged the public towards the use of the device and their interest in connecting them to internet. Computer system allows millions of computer users around the world to exchange information with the use of the internet. Information Communication Technology (ICT) has been taken to a different level altogether due to easier and speedier of computer systems. Many bodies have sprung up to assist the use of this technology such as Management Information Services (MIS), Information Technology (IT) and many others. Information Technology (IT) is concerned with the use of technology in large organizations. In precise, IT works with the use of electronics, computers and software's to transform, store, secure, process, communicate and retrieve data. With the arrival and use of the computers, internet and the broad band connections, this has changed in emphasis and has resulted in outcome of the operations in whole of media and news. (Adeyemo A, 2010)

Journalism is an activity which includes of investigating and reporting of events, questions and trends to the mass audiences through the medium of print, broadcast and online media such as newspapers, magazines, books, radio and television stations, networks, blogs, social and mobile media. The product generated by such activity is called journalism. People who gather and bundle news and information for mass dissemination are called journalists. The journalism field includes writing, editing, design and photography. With the motive in mind of updating the people, and also cover individuals, organizations, institutions, governments and businesses as well as

cultural aspects of society such as arts and entertainment. News media are the main purveyors of information and opinion about public affairs. The main goal of those employed in the journalism profession is to provide their readers and audiences with accurate, reliable information they require to function in society. (Anthony, 2013)

Journalism has long deviated from a strictly print-based format of informational media to inculcate all sorts of categories such as social media, data journalism and photo journalism. The ultimate target remains the same a well written, well produced story about a person, place, thing or an incident. Nevertheless, the ways in which media is consumed has evolved over the years with the height of technology. Lately, possessing technological skills have dominated the selection of individual who wish to pursue or excel in journalism. All journalists now depend solely on computers in different purposes, regardless of their excellence. Reporting has moved from pen-and-paper to word processing. Recorders are used for interviews contributing immensely to its accuracy. Recording interviews are done through visual, audio, or both. New features in the technology allow audio to be transcribed as it is spoken. Multimedia journalism has evolved from Broadcast journalism, and advances in audio quality and production have amazingly improved over time. The role of the journalist today is undergoing substantial change. New skills are added to the professional role of journalists while traditional skills might be altered or even discarded. The traditional skills such as specialized, investigative beat reporting and deadline sensitivity have been downplayed and replaced by immediacy in reporting, multiskilling and multitasking, copy-paste mentality and 24/7 deadlines with ICT playing a crucial role. (Steen, 2009)

2.2 Newsroom Convergence

Convergence is referred as to an arrangement of products, technologies, employees and geography within different provinces of print, television and online media. The situation of convergence might be analyzed at least from four perspectives: technological, management, communicative and professional, which is connected in a media atmosphere in constant evolution. Convergence is changing the settings of journalism in a variety of ways, as journalistic practices, news content/production and newsroom structures are all developing. The process is explained in terms as technology use, collaboration and cooperation between different media newsrooms

and other areas of latest media companies. (J. a. G & M, 2008) Convergence mainly focuses on integrations of media and generates changes in the work practices of journalists and newsroom organization. Digital systems provide journalists to share data files (audio, video and text) in order to elaborate and enhanced the news content for the various platforms, with increasing flexibility. Newsroom structures, journalistic practices, and news content are all developing. Therefore, the practice of journalism is undergoing intense changes, in turn it`s being influenced by its professional nature. (Medienhaus , 2004)

All journalism involves computers today. Regardless of whether you write for a newspaper or magazine, an online site, or for a television or radio newscast, you almost certainly will write with a desktop computer or laptop and some form of word-processing package. Computers are involved as the main means in news content creation and news production process after a story leaves a reporter's table. But if you are not using it to its fullest capacity, you are ignoring the importance of information. (Stephen & Stephen, 2008)

The growth of internet and use of multi-media / portable devices, has enabled with more and more media content now available on multiple platforms and it is widely acknowledged that convergence has actually reached. Across the media, many organizations have responded to convergence by integrating systems and migrating towards a diversified multi-platform method for production and dissemination of content. (Gillian, 2010) Typical Converged workflow process, Figure 1.

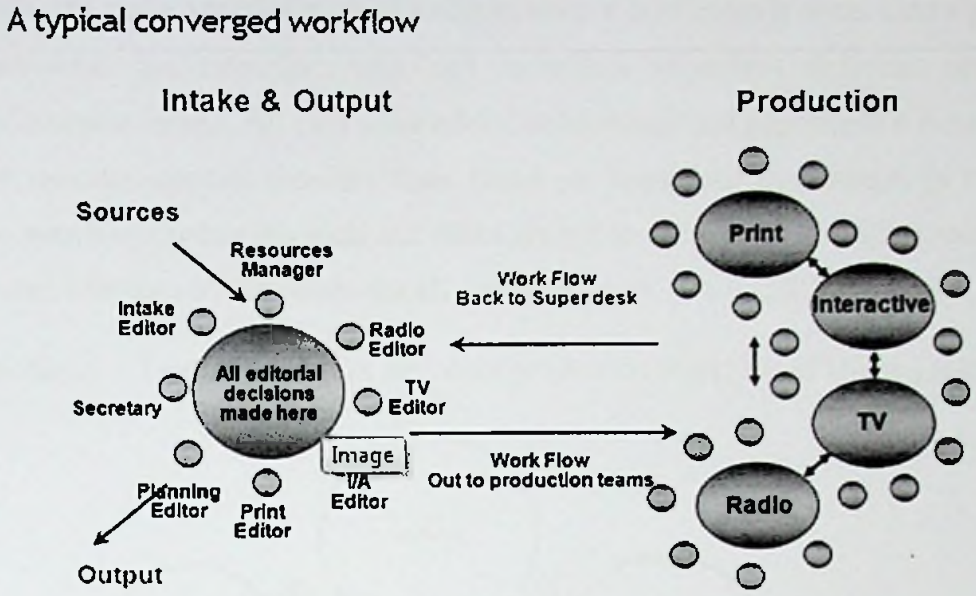


Figure 1 Typical Converged workflow

(David , 2012)

Converged workflow considerations as follows,

2.3 Benefits

News converged workflow output will be consistent on all devices. This will strengthen the brand and Centralized quality control will ensure that the content on all devices is of the highest standard and shared planning will ensure a steady supply of original journalism covering the issues of most concern to the audience. Streamlined newsgathering will improve news response speed and efficiency, there will be a reduced duplication of effort leading to savings in resource costs. The news organization will be able to respond to new business opportunities and will be able to produce the content from existing resources using such converged workflow.

2.4 Human Resource Factors

Converged workflow ensures that all existing staff and new staff realize they are working as part of a multi-skilled team in a multiplatform news operation - you may need to look at existing contracts and offer training for those who need to learn new

skills, but make it part of the media organization's development rather than a personal preference. Set corporate, unit and individual objectives defining newsroom performance targets. All staff must work flexible hours and implement a Rota system that ensures adequate recovery time. Carry out workplace assessments in terms of ergonomics (whether the seats and desks are set so that they don't injure your staff). Ensure adequate screen breaks for all computer users. (David , 2012)

The figure 1.1 below illustrates the News production workflow of Human resources.

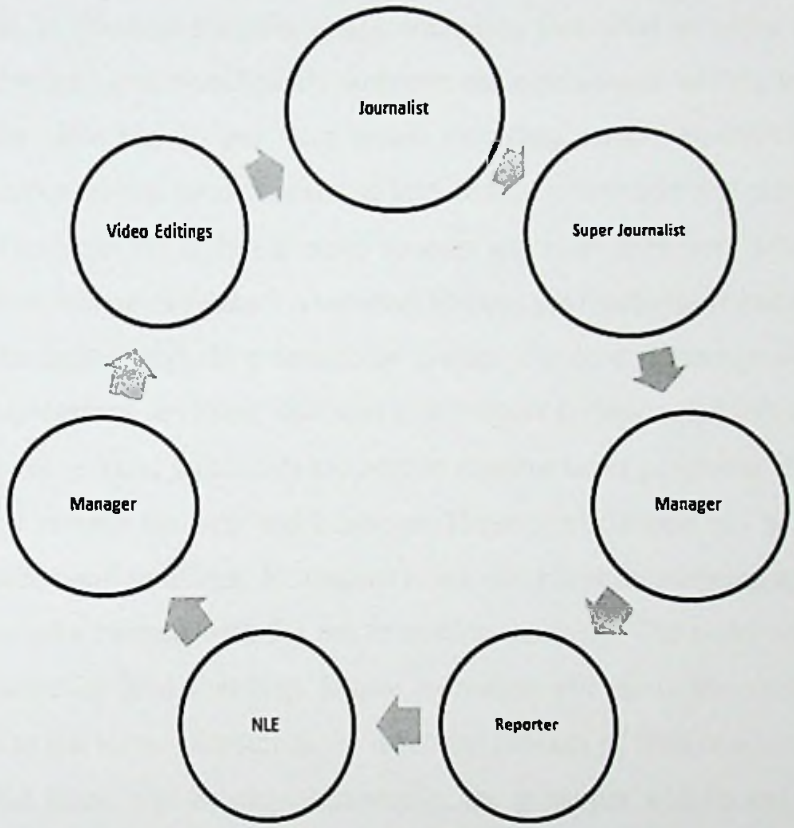


Figure 2 News production workflow of Human resources

(Rezza & Ikuesan, 2012)

Convergence offers many more benefits than just cost saving and efficiencies in news production. It will prove a major benefit to your journalism and your media business. (David , 2012)

2.5 Newsroom Workflow

In Today`s word, news station and news teams need to be technologically updated and watchful 24/7. In addition to that, they also must not rely upon a linear storytelling model, and they must be in a situation to distribute contents across multiple platforms without geographic restrictions. Similarly, the technology they deploy for production has to do more and flexible to be simply present the daily television news bulletin. The role of media institutions maintaining news production workflow is mainly to communicate accurate information's promptly. The switchover from tape media system to file-based media usage, including that used in news coverage of on-air broadcasting can significantly improve the operational workflow that used to take lengthy time and longer than actual recording hours. Nowadays fully digitalized newsroom servers could consist of hundreds of computers and servers. Journalists are able to search via different news sources and providers from tele-texts, satellites to websites and news-feeders. They benefit from automatic tools and applications, which help to create news. In a newsroom system, the central storage maintains and stores news programs, archived data and other valuable data's and this storage is linked to powerful servers, journalists are able to monitor news programs and access data from central storage via their workstations. These workstations can be ordinary PCs with standard configurations, Journalists make news text on scripting applications and it is multimedia content with the use of editing machine. The news will be sent to senior journalist for final checking. Senior journalist will check the news structure and will put it to the News Director in the selection process of final rundown and News Value. Playlist items will be played in studio, the presenter will be only reading using the guidance of prompter and the producer will be controlling the rundown. All audio/video parts will play automatically accessed from central storage. These systems are usually in a newsroom network:

—Archive network and systems
—Satellite- Tele-text receivers
—Internet feeders
—Journalists systems
—Graphic systems

—Narration systems

—Studio systems

—monitoring systems

—ingest systems

—Crawling systems and Character Generators (CG)

—Reggie systems

—Server room systems

(Rezza & Ikuesan, 2012).

2.6 Broadcasting, Newsroom System and Technologies

2.6.1 Broadcasting

The history of Sri Lanka Broadcasting Corporation (SLBC) goes back to year 1925, when its pioneer, "Colombo Radio", was launched on 16th December 1925 use of Medium Wave radio transmitters of 1KW output power from Welikada, Colombo. Colombo Radio was the very first radio station in Asia Region, launched after three years of BBC Radio. The Radio Service became the latest medium of mass communication and highly popular in the years that followed, but also soon developed into national "Radio Service" being then known by the 'call sign' 'Radio Ceylon' in 1949. (SLBC, 2013)

Then came the arrival of Television Broadcasting industry to Sri Lanka, and the first ever TV Station in Sri Lanka was the Independent Television Network which commenced operations on 13th April 1979. With quite modest early development, and consisting of a 1KW transmitter and a 65 foot antenna pole, ITN started transmitting programs to a radius of about 15 miles in and around Colombo with the available basic equipment's at that time. On the 5th June 1979 ITN was transformed to a government owned business undertaking, under a Competent Authority. (ITN , 2013)

On the 23rd of January 1982 government of Sri Lanka formed the state television channel Sri Lanka Rupavahini Corporation (SLRC). It was recognized on 14th February 1982 and started operation and transmitting from 15th February 1982. SLRC

expanded their studio and transmission services in 1986 and transformed most of the original equipment with digital technology by 1998 under the grant aid projects offered by the Government of Japan. The SLRC studio complex were located in the heart of Colombo, Sri Lanka. (SLRC , 2013)

Since then until now several private Radio and TV stations have leaped up in the industry by competing with each other rigorously with the use of latest technologies and new program line up with par of international standard.

2.6.2 IT in Broadcast

The seeds of change were sown when the mathematicians and the computer people started to take an interest in television. The computer people believed that once pictures could be converted to a stream of ones and zeroes, then broadcast media could handle and managed just like any other data. However, unlike their traditional customers in banking, insurance or personnel, television generates data at a relentless pace of 25, 50 or more megabits per second and continues for hour after hour after hour. The mathematicians were able to help somewhat: they realized that the repetitive and predictable nature of television images suggested huge redundancy in the data, when a composite analogue signal, like PAL was digitized. MJPEG and MPEG followed, dramatically reducing the need for bandwidth and storage. There was a quality penalty, of course, but for quality-tolerant production, like news, and distribution to the end users this was not a significant issue.

Then the computer people really started to get excited. The tumbling data rates were within the capabilities of multipurpose computers like the PC. As long as the handling requirements were kept simple: capture a continuous stream, like a complete program, and play it out again computer based digital servers were a practical proposition. In production, as opposed to straight playout, the natural granularity of television is not a file, but a frame. Editing and compositing, for example, both require access to the media at frame level. The ideal television production server is able to communicate at a file level, using standard IT connectivity, while presenting and managing the media to production workstations at a frame level. Although moving into the realms of the

IT sector, this type of technology has generally been developed by specialists in the broadcast space. However, for media asset management, this is not the case. Even if you look back to the earliest pioneers in MAM technology you will see the basis of a solution that is much more IT than broadcast technology.

The key here is that the right IT solutions in a digital production environment should provide significant improvements in efficiency and speed of operations alongside traditional broadcast infrastructure. They should be adding value not replacing value. IT solutions in the broadcast news production environment need to offer improved workflows, simultaneous access to material, digital distribution of content and new revenue opportunities which are all well proven potential strategic benefits, provided that you place the media assets at the Centre of your operations and value them accordingly. (Francis & Brinkman)

2.6.3 Evolution of Newsroom Computer System (NRCS)

News is evolving. There is new technology in the newsroom and many more different types of customers of live news. All this means that the newsroom computer system (NRCS) must change from the traditional TV? Only model to one that can both make use of, and deliver to, a wider range of media platforms. There are new opportunities for mobile devices to contribute to news creation. At the same time, budgets are shrinking, and so the efficiency of both the equipment and labor required to run news production is also essential. The NRCS is a key part in the success of news production, and it spreads its tentacles in many directions. The NRCS is only a portion of the complex association of technology that produces the news, so it must interface efficiently with a wide variety of equipment and people. As a result, high costs have long been associated with NRCS, but it does not have to be that way. Today, a modern design that achieves the required results is not so much about leading-edge technology but providing what is right for each newsroom. Commercial off-the-shelf (COTS) computer hardware and well-designed software can provide a platform that is powerful enough to run an NRCS platform of any size and do so at a cost-effective price. Innovation to meet the particular requirements of each individual customer, including price. Today, customers are able to choose from the wide range of NRCS available on the global market. It is not possible to build one fixed off-the-shelf news system to suit

everyone, so a large degree of flexibility built into the design is essential. Then news broadcasters can exactly choose the system they want. There is also always going to be preexisting equipment and facilities such as stills stores, graphics, video editing as well as the traditional newswire services. It is most likely that these are file based, and so it should be possible to integrate them with the NRCS. The most efficient way to achieve this is to have all elements running on the same type of platform, which, in practice, means being able to offer news systems working on Mac OS X, Windows or Linux platforms. Such platform independence makes basic integration easier and leads to a greater exchange of information between the components of the newsroom. In addition, further development for deeper integration with specific relevant products, such as media asset management (MAM), can deliver even greater efficiency. (Gabriel , 2015)

Is it possible to eliminate all the paper handling in the newsroom production process? CNN International (CNNI) wanted to know about it. Its goal was to cut the costs of operating laser printers and free up journalists from chasing paper from printers to production staff. But the key objective was to provide complete and flexible control of the newsroom script preparation with a system that would integrate with the network's automation system, iNEWS from Avid.In autumn 2002, the network contacted Autocue to discuss its interest in a solution and introduced to CNNi, which went on-air with the system in June 2003. (Gerald, 2004)

From there onwards adoption of newsroom system has grown, an increasing number of broadcasters are moving away from the legacy model, whereby the NRCS is an key for identification for the outside world as a series of passive devices and black boxes. Information technology enhanced news operating model to be a faster, cheaper and more efficient, as IT has matured enough. (Misra, 2014)

Even though with the days of unconstrained budgets for newsrooms have long gone, adoption of new workflows and technological advancements are driving the market. As tapes disappear, broadcasters are redefining their production workflows. Several news channels have been launched in worldwide and are competing furiously to be the leading and wants the technology support to be highlighted and visually stand out in the crowd. Displaying cutting edge, most of them are leveraging new technology like never before. The newsroom computer system has evolved from a simple text-based

wire browsing, script and rundown editing system to a multimedia workflow engine that spans well beyond the newsroom floor. (Prasad, 2014)

A newsroom automation system integrates with the newsroom computer system of the news station, in such an outstanding way. The basic of Newsroom outcome is that the product integrates into any operational workflow and accommodate every requirement of the management team and staff who are using the product every day.

In Sri Lanka, The Capital Maharaja Organization a large privately owned group of companies. They adopted the Newsroom Computer system (NRCS), and deployed for it`s free to air three TV channels. Which operated in local languages and was fully managed by the group. The system was one of the first to be implemented in Sri Lanka. The implementation was done by Benchmark Systems a leading system integrator for Octopus Newsroom System. MTV Channel (Pvt) Ltd went on air with NRCS in 2005. (Priyal, 2014)

2.7 Newsroom System

Some of the leading Newsroom Systems as follows,

- Octopus Newsroom Computer System
- SI MediaNews Newsroom Computer System
- iNEWS Newsroom management system
- ENPS Newsroom Management System

(Octopus, 2013) (SI Media INews, 2013) (iNews, 2013) (AP ENPS, 2015)

2.7.1 Octopus Newsroom Computer System

Latest version Octopus7 is a platform, which is a cost-effective newsroom computer system and runs on windows, Apple OS and Linux. It offers the news preparation at the ease of the user, in speed and flexibility at every stage of the process. Octopus7 provides the journalists in TV newsrooms as a tool to fulfil all phases of the news distribution workflow, browsing, searching, sourcing material, writing scripts and preparing rundown. The application is scalable to all types of operation, from 24/7 news networks to channels with few bulletins per day.

With the features and scalability, Octopus supports a wide range of languages, multi-platform publishing. As Octopus 7 is an open architecture solution, can be used in any newsroom and does not matter on the size, language or workflow. Octopus7 sits in the central of the news production and is the main system that connects and integrates to all other systems in the newsroom automation, such as graphics and Teleprompters together with the industry standard MOS protocol. Octopus newsroom systems have been implemented and working in over 130 channels around the world and currently leads the market in Central Europe and South Asia. Some of the main Octopus clients include TRT in Turkey; Euro news in France; WGBH in the USA; Al Jazeera English in Qatar, News1st in Sri Lanka, Network in India; FOX in Turkey, and many others. (Octopus, 2013)

2.7.2 SI MediaNews Newsroom Computer System

SI Media has developed a complete platform composed by several modules for NRCS (News Room Computer System), with an application to create and manage stories and rundowns, a contribution software for PCR (Program Control Room) and a fully integrated CG's solution. All these features create a deeply interconnected environment, thanks to the complete integration of SI Media's NRCS applications with MAM workflow manager. The solution supports MOS protocol whit all levels implemented, giving extreme flexibility to integrate our applications with 3rd party Teleprompters, CG's, Playout Contribution and other devices or software. This allows to configure a comprehensive workflow with all the tools required to have a competitive digital NRCS (acquisitions, editing, stories and rundowns management, CG's , play out contribution, VOD and Youtube and much more). (SI Media INews, 2013)

2.7.3 iNEWS newsroom management system

The iNEWS newsroom computer system is the live center for news content preparation and to distribute, create breaking news, manage entire newsroom operations, and involve with audiences through web, mobile devices and social media channels. As a story breaks, the news team should be there, it could the studio or the field, journalists

and producers can create, view, and edit stories and browse rundowns through a web-based interface or on mobile devices. iNEWS is a workflow tool that provides a dashboard view for the user on all contents related to the key stories in single location. Journalist covering hot topic news can aim on what matters most, creating and delivering convincing news stories. iNEWS provides journalists, producers, editors and news directors a speeder access with every moment of the status information, feeds, stories, playback and rundown to using the iNews command. iNews solution provides the speed, accuracy and reliability for the newsroom to produce more content than before. (iNews, 2013)

2.7.4 ENPS Newsroom system software

ENPS Newsroom sysytem software has a unque model, that offers a licenced based annual subscription system, where the broadcasters do not have to ' invest' for the software. In this method, the software upgrade cost is eliminated and the end user will get the benefit of having the most upgraded sotware. In providing the services, the service provider also has the benefit of maintaining one software version with all its clents.

AP ENPS is the one system for your entire news organization whether your staff are working in the field or in the office. No matter where the AP ENPS user is, they can create content for your broadcast or digital platforms. AP ENPS Anywhere is enhanced with the world's best mobile functionality. Send video and photos, create and edit stories, access planning, rundowns, contacts, news wires and message co-workers, all from your smartphone or tablet. (AP ENPS, 2015)

2.8 Newsroom Technologies

Newsroom has been changing with the new communication technology in the way which news is abstracted, gathered, produced and disseminated. Mobile devices has enabled journalist to gather news from every corner in the world and send text message to the news team or relatives using the new media technologies. Internet mode has provided media personals with unlimited access for them to demonstrate on any subject and email newsgroups facilities have allowed journalists to share knowledge

in a group with several non-journalist and journalist by working collectively to understand the knowledge. How positively the internet is accepted as a source of new opportunities for journalist offering unlimited possibilities in improving their skills and knowledge but negatively it blames that creativity is lost from journalist and they have created a copy and paste culture. These have shifted in journalistic routines, news values and ethical practices that are embedded within the social, political and economic environments in which these the new media technologies are deployed for better result. (Technologies, 2013) Here are some of the listed technologies used for gathering news,

I. Microsoft Skype using internet as communication base on mobile devices
II. 3G/4G News Gathering – (products like Live U, TVU pack, etc.)
III. FTP (file transfer protocol)
IV. Satellite ENG Service (Costly Option)
V. OB Vehicles (High Investment)

With the latest innovation and advance of communication and technology, it has become a challenging role for journalist and managers to cope with the trend.

2.9 News Production

Newsroom automated workflow is integrated and installed with several sub systems tied together to provide full features system. NRCS supports journalists in getting hold of contents, media management, distribution, nonlinear editing, and rundown preparation and automated teleprompter scripting in the field. Scripting, editing media and story basics such as graphics, keying, supers and many more are handled by journalist and NRCS systems are also a journalistic workflow system. Storage Systems are the main data storage in News operations, Storage solutions could be found in news are Network attached storage (NAS), storage area network (SAN), and archive storage systems are common and operates in the chain of news operation. News room computer systems have reached worldwide implementations around 22%. Newsroom automation is the current in fast growing sector in media and in places especially in places like America and India. The news production automation solutions are costly and broadcasters are looking for ways in cost cutting a solution due to the prevailing economic environment. Commercial broadcasters are concentrating on NRCS with a

proven ROI. Due to the maintenance or operational cost, manufacturers are focusing on products and systems that save money for the broadcaster. In this economy turmoil, looking for systems with efficiencies and improvements, without increasing costs, is more critical than ever. Countries using advanced news automation systems are looking to improve their existing news operations by looking at hybrid type automation systems. (News Production System, 2009)

2.10 What is Newsroom?

Newsroom can be defined as: **"an office at a television or radio station or a newspaper where news is gathered and reports are prepared for broadcasting or publishing."** The newsroom is where the stories are gathered, written, put together, edited and assembled for the news broadcast, telecast or newspaper. (Alexander, 2015) The size and kind of the news operation often governs the organisations of the newsroom. The bigger the newsroom, the more decentralized it is in Newspaper. Equally, radio and television are more centralized, because the staffs are fairly large and news gathering and production operations are handled by central communication post. Driving news out in several formats requires a different method of organizing and managing news. It challenges the grade in terms of who controls the decision needing to be made. Each news organization that is attempting more convergent has established its own newsroom management organization to accommodate that change. But primarily it requires an understanding how the news organization that are being asked to work together function on their own, and then figuring out the finest way to bond the differences. Most newsroom operations work can be divided into two segments, "outside" and "inside". Generally, outside work involves news gathering and talking to people and getting information, visuals and sound. Some news gathering can be done over the telephone, or by email, internet searches, and database analysis. Often the best news gathering is done in person (eg: interview, etc), out in the field.. Inside work is most often production work, putting together and developing the pieces of story so it can be presented to the public in the best possible way. This also means putting together different stories for an organized newscast. In broadcast, it involves editing as well as audio, video presentations, and interactivity. Newsroom organisations and management goal is to coordinate the so called inside and outside

work. In operations trying to be convergent, and coordination is complicated because inside and outside work is changing due to the development of technology. (Janet, 2006)

2.11 Who is in the newsroom?

Broadcast newsroom operations vary intensely from those of newspapers or online roles. The number of jobs roles and people working in the newsroom differ from each media outlets. In smaller media outlets for example the newsroom will probably feature only a couple of journalists and reporters. Sometimes the editor will be there, although in many smaller television stations the editor has a moving role of overseeing number of local channels situated in different regions or offices. In larger media outlets, such as metropolitan radio or television, the newsroom is much bigger and complex operations, with a greater staff. They include job roles as follows:

- News Director (all news operations including the newsroom come in his or her preview and bears ultimate responsibility for all newscasts.)
- Producers (Producing a news bulletin and responsible for production team and process and for coordinating technical and nontechnical production essentials.)
- Production assistant (PA) or Broadcast Assistant (BA): Supports producer and director during production.
- Assignment editor (assigned to cover specific events as an reporter)
- Video Journalists (Covers story by shooting and editing video as an reporter)
- Reporter (Gathers the stories and reports news from locations)
- Anchor (Presenter of newscast in studio)
- Director Engineering (In charge of the news operation engineering, and responsible for a IT or engineering activities in news)
- Floor manager (Responsible for the studio floor activities and supervises floor personnel)
- Art director (In charge of the creative design, set design, location, and graphics)

- Graphic artist (Preparing graphics related on air and news requirements)
- Makeup artist (Does the makeup and reports to floor manager)
- Photographers (Operates the professional cameras for outside photo shoot in news)
- Camera operators (Operate the professional video cameras for news coverage)
- Sound and lighting technicians (In charge for sound and light)
- Editing room staff (Editing video and audio for newscast)
- Sub Editors (Edit stories and check them for any legal)
- Receptionists and News Desk coordinators (Coordinate and gather News Materials received from outside)
- Archive or Library staff (Manage Library Materials)
- IT Engineers (Provide IT / Engineering Support)
- Editors or chiefs of staff - either in charge of sections of the media's coverage, or of its overall coverage.

(Mohamed, 2012)

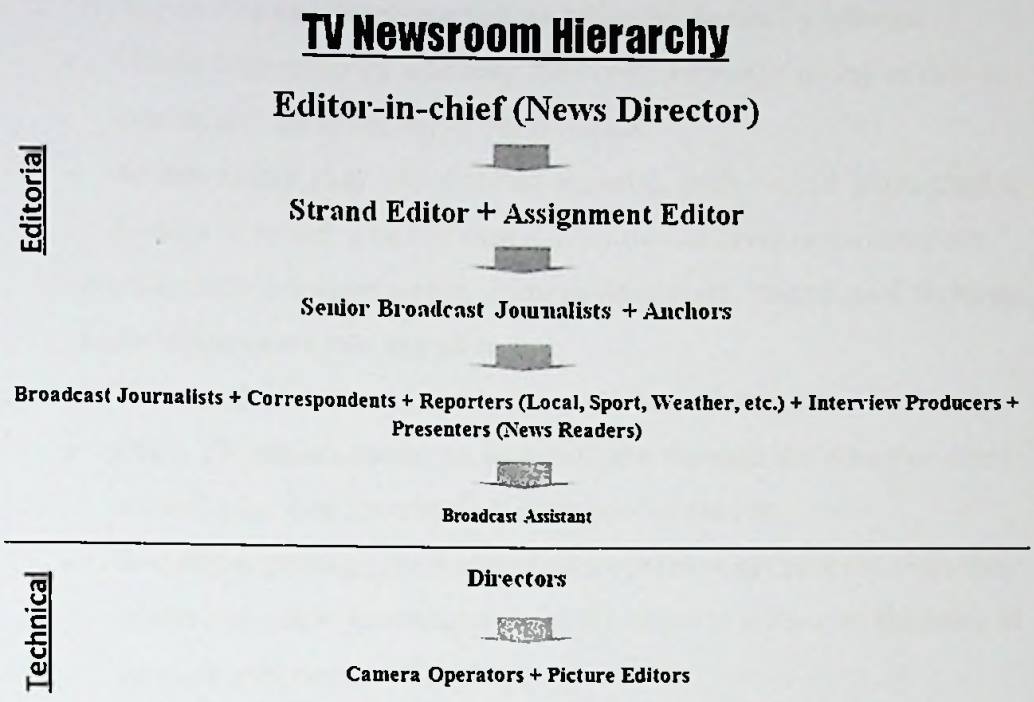


Figure 3 TV Newsroom Hierarchy

2.12 How the newsroom works

Newsroom has it's differences in operation. Its operation differ between newsrooms in similar media outlets (for example, TV differ from newspaper) but huge differences between, television and newspaper newsrooms.

A newsroom works along these lines:

1. **Stories come into the newsroom :**
   - From contacts, or press releases
   - Coverage of important events, activities and occasions.
   - From story leads followed-up by journalists.
   - From issues or stories the editors, producers or chiefs-of-staff themselves want covered.
   - From calls by journalists chasing up current stories.

2. **As the stories develops, journalists assigned stories by editors:**
   - This is done either by attending the event or through phone or face-to-face interviews or the use of press releases.
   - At times they may use archival material, such as old photographs, footage or sound, which is stored in written archives or on computer.
3. **At this time photographers, camera operators, sound and lighting technicians come into the picture.**
   - The visuals for stories can be organized through the editor.
   - Often TV camera crews are assigned jobs through the editor or chief-of-staff after they have looked at the pool of stories.
   - Sometimes photographers and camera operators get sent out to do their job on site, while journalists stay in the office to follow up the story or conduct interviews on the phone.
   - Any graphics needed to accompany a story is organized and the work allocated to graphic designers.
4. **Once photographers or camera operators return with their visuals the newsroom, items are put together and the stories are compiled before deadline.**
   - With electronic media, raw visual footage or audio ends up in the editing suite, where it is reviewed and the most relevant or newsworthy grabs are used to put together the story. Any overdubbing or re-recording also occurs at this stage.
   - For print media, photographs are loaded into a computer and saved.
   - At this stage any other graphic information needed is completed
   - Meanwhile, the journalist spends time finishing their story before it is saved and sent to sub-editors.
   - At this time, editors, producers and chiefs-of-staff often meet again to review the story list and see if there are any new stories to include.

5. **When stories or news items are completed, they are usually checked to ensure everything is fine (Legally, factual, etc.)**
   - Sub-editors will go through stories, and often make changes to improve readability.

(Media-Making Contact- How Newsroom Works, 2015)

2.13 Traditional Newsroom

In the late 90`s the traditional broadcast operation, broadcast journalist and newsroom producers face multiple live events and dozens of playback sources, far tighter broadcast deadlines. This includes control of film or video playback machines and switching to and from the network signal using simple electronic pulse control. The automation process was standardized using time code for program switching in television network news gathering and distribution.

In News1st, one of leading news broadcaster in Sri Lanka. Their technology before Digital Automation was a traditional setup and as follows operationally. (Christoper, 2009)

2.14 News Gathering and Ingesting

The news related video contents are either bought by reporters on dv/beta tapes or from direct feeds (Eg: Reuters, OB, etc) or through FTP. The ingesting and previewing is done by using VTR decks. Video contents /materials were received on tapes are recorded by reporters using professional video cameras. FTP (File Transfer protocol) method is used by reporters to send the files required on priority from locations which are far from the station point. These new video contents/material received are then available in house for journalist reference. A journalist will be allocated by the News Director depending on the story. He or she will be required to go through the content and develop the story and to identify the important video material to be aired, depending on stories, the journalist numbers for the process could increase. The Journalist will be using a VTR playback and record deck for previewing video material and marking timecode. They will preview the contents received by inserting the

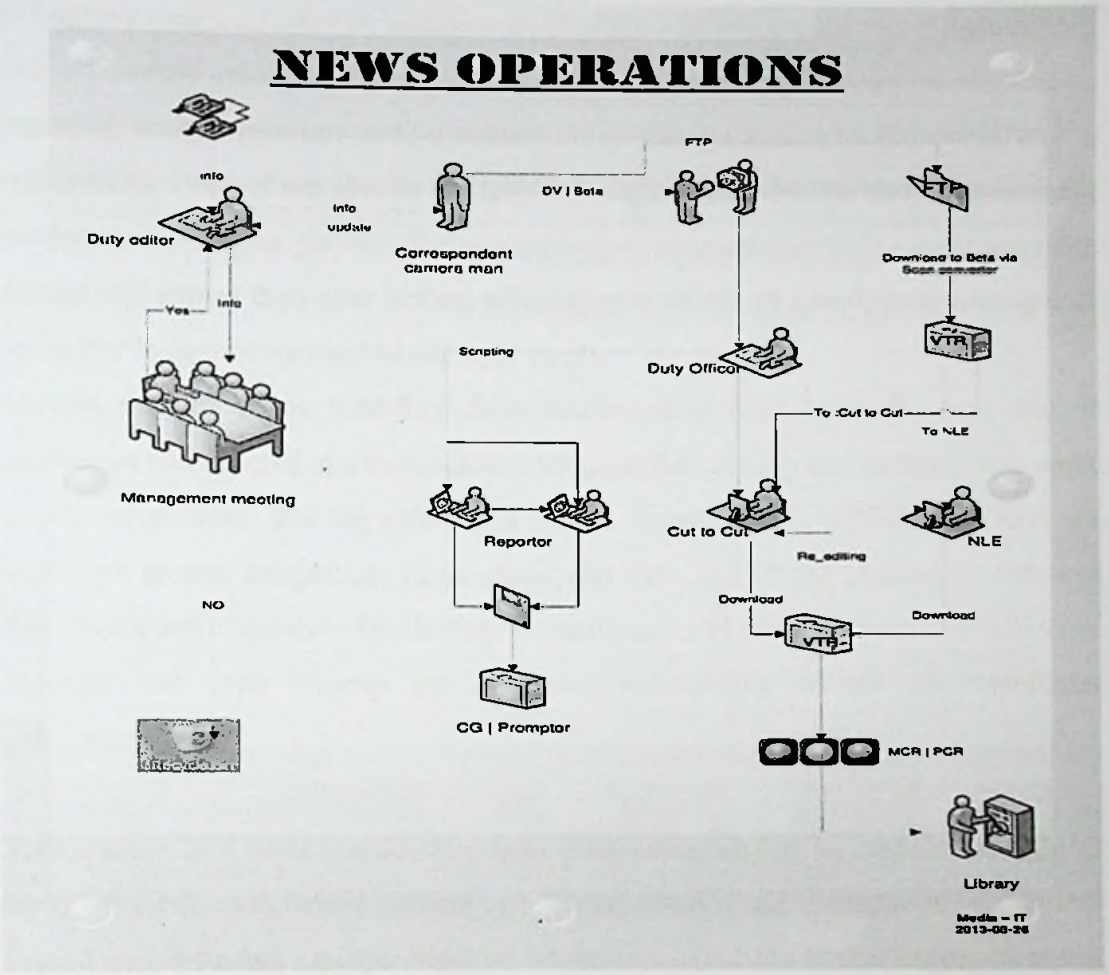
received tape to the VTR deck. Also the same time, hand written script is being generated and typed by the Journalist on the story by using the computer. Once the previewing is done and finalized, the timecode is marked by the journalist. The timecode will be the reference of the video material location on the tape and by using cut to cut mechanism (Cut to cut is having two VTR units, one will be used to playback visual and other one to record), the required material as per time code with be re-recorded on to another tape for airing.

The files received using FTP are directly ingested to the tapes and the same process explained above is followed. They also preserve all important stories approved by News Director in the News library. News Library either maintains on dv/beta tapes or on cd/dvd source for future reference (Sabar, 2015).

2.15 News Production and Broadcasting

When it comes to traditional news production operation, the stories for prime time news bulletin are being discussed and a rundown will be prepared. Depending on the rundown order, the contents are orderly being recorded to tape by cut to cut mechanism using a VTR hard disk recorder and later the tape will be the primary source for airing. Also on the same time Graphic production requirement are met separately and ingested to tapes. Finally, as per the rundown, using VTR Deck the tapes are being inserted for airing (Sabar, 2015).

Let's take a look inside the traditional newsroom, an example of which is shown in Figure 4 , and see how it all happens.



(Sabar, 2015)

Figure 4 Newsroom Operational Workflow

2.16 Automation / Digital Newsroom

The arrival of the 24-hour news cycle and the tremendous number of broadcasters covering local, regional and global news are driving a technology revolution in today's newsrooms. Being relevant and gaining and keeping viewers depends on speed and agility. In the newsroom, time is money. Quickly and reliably executing the entire production workflow is critical to a news organizations. End-to-end live broadcast technology enables stations to gather, prepare and broadcast news as it breaks. Within this workflow, integrated editing, storage, and archiving tools and software are

delivering new speed, reliability and capabilities. Nonlinear editing tools provide timeline editing with no rendering required for fast-turnaround news production and to improve rough-cut edits by adding text, graphics and voice-over recordings. Highly flexible storage solutions, based on scalable and modular architecture and including metadata, enable operators and journalists to browse and search by keywords, and to edit content. Content can also be instantly accessed throughout the entire network for production, editing or playout. Today's editing, storage and archiving tools are more nimble and robust than ever before, bringing new levels of speed, productivity and reliability to newsrooms and to our daily news.

Moving the production workflow from tape-based to digital was the first step of innovation and ushered in a tremendous change to the industry and to those who work in television news. But the innovation hasn't stopped there. Advances across the workflow greater integration, more speed and new agility are making newsrooms themselves more scalable, flexible and streamlined, and thereby more cost efficient. Modular and open systems are delivering outstanding returns on investment (Alexander, 2015).

Today, many 24/7 news broadcasters make great savings by using modular workflows for news production, where content is often repeated. Fully implementing this into Digital makes further savings. Modular workflows avoid the studio having to repeat live bulletins with the same material. By recording repeat items such as the prompter text, video, voiceover, anchor scripts and graphics parts or all of the bulletin can be replayed from the MCR. Going further, the various items that make up a bulletin opening titles, introductions, voiceovers, graphics, interviews, etc. can be scheduled, scripted, produced and recorded as and when they are available for production in the studio (Gabriel , 2015).

Let's take a look inside the digital newsroom, an example of which is shown in Figure 5, and see how it all happens.

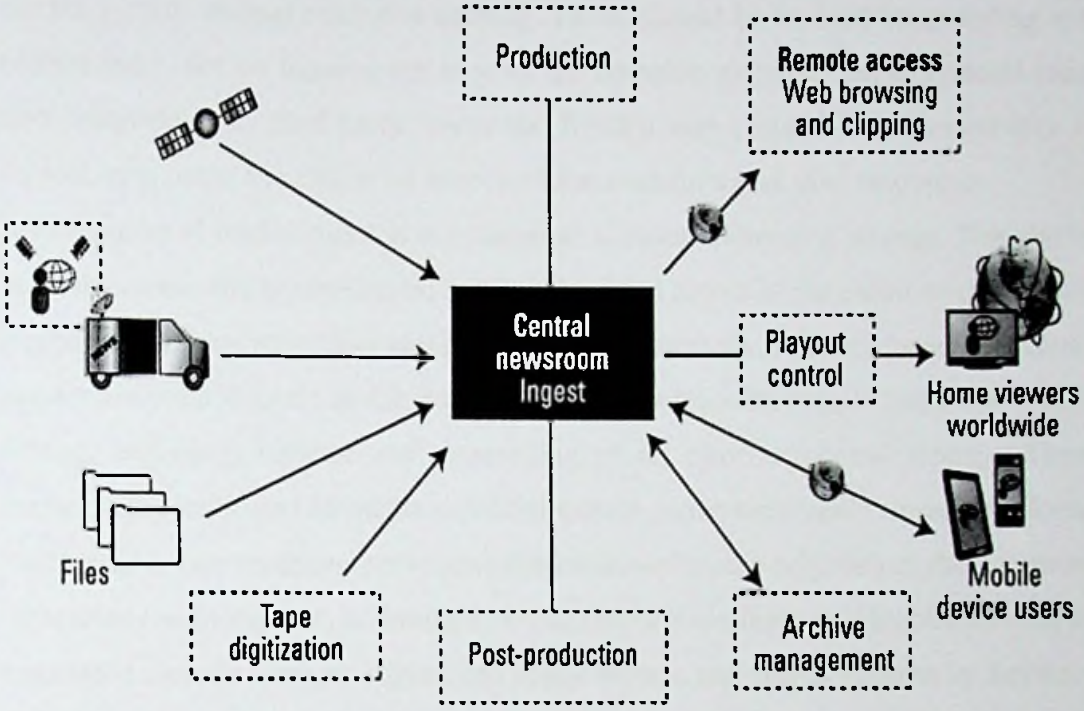


Figure 5 Digital Newsroom Operation

Ingesting live video feeds is where the production process begins. In the most productive newsrooms, any SD (standard Definition) or HD (High Definition) feed can be ingested, most often through an encoder platform or server-based technology. Best-of-breed encoders support all codecs and formats, and can be configured either as an encoder or playout channel for maximum infrastructure flexibility. Intelligent server technology handles all ingest functions, recording multiple video feeds and making this media available throughout the production workflow for simultaneous preview, rough editing, archiving, and playback or post-production. A process of loop recording can ensure that no incoming feeds are missed during recording, even when they're not scheduled or managed. The feeds are then available throughout the production network. Regardless of ingest method, the ingest process must be managed. In today's workflows, this is most often achieved through integrated production

management applications that give the user complete control of production workflow, from ingest control and metadata management to on-the-fly editing and playout scheduling, often from a single intuitive interface.

Ease of use is key, with the goal of enabling every member of a production team to use the system without extensive training. Talent should be focused on operating and editing tasks, not on figuring out how to use complex systems. These systems must also integrate with third-party resources. System and components accessibility is critical, as it helps streamline all aspects of the workflow and save resources.

A discussion of media ingest is not complete without addressing storage. The ability to easily access and browse stored media is a critical aspect of the entire workflow and can be a significant stumbling block if not handled correctly. Footage from ENG crews can be imported directly in the right format and codec with simple tools that enable editing, browsing, transfer and transcoding of all clips to central storage. These management tools send all media to central storage, often removable storage platforms well suited to live broadcast operations. Regardless of media origination, these systems offer short- and long-term archiving of clips, audio/video feeds and highlights with all associated metadata, where editors can easily browse and search content by keyword or edit media content. Media can also be accessed throughout the entire network for production, editing or playout. (Alexander, 2015)

News1st in Sri Lanka, which is the only station having the Newsroom operation in fully automated NRCS , which uses Octopus servers for Scripting, Incite Application for ingesting live feeds, Remote Producer for video production and editing applications and Tyronne and Supermicro NAS for storage in its digital newsroom. Once content is quickly and efficiently ingested and stored, it needs to be ready for immediate editing and preparation for air. Workstations are equipped to allow users to browse incoming feeds and prepare rough-cut edits by creating simple playlists. Playlists can then be pushed to nonlinear editing systems, allowing access to any frame in a clip for additional editing, or directly to playout if required. This allows News1st editors to use the Edius or Adobe nonlinear editing systems to greatly improve the speed and quality of their media editing. For instance, timeline editing with no required rendering is used to improve rough cut edits by adding text and graphics, to prepare news reports, and

to enable voice-over recordings. Availability of support for multiple formats and resolutions on the same timeline and robust metadata management features that can increase editing speed and quality. Digital workflows is fully integrated and craft editors have the capability working with ingest and production processes and online storage, facilitating rapid file exchange with external post-production applications. As this the total production system seamlessly integrates editing software.

Playout. Like other parts of the digital production workflow, News1st newsroom computer systems (NRCS) has the Vectorbox for playout Server technology. This Playout technology is via a server and software-based management technology to achieve successful playout operations, ensuring all clips and associated metadata can be accessed, complete playlist functions are facilitated, and news stories are managed across the news workflow. Additional tools and software capabilities available such as live slow motion and time slip operations for fast review of events, or delay of events so that nothing is missed. Integrated digital systems provide the ability to scale and evolve with a broadcaster's needs. They need to be nimble to accommodate technology advancements, organizational changes or new workflow approaches. Yet building these types of systems requires long-term commitment and trust between broadcaster and technology provider. New challenges are sure to emerge. Many news providers are now operating as multiplatform providers, making news available online, on radio, and to a range of connected devices — including mobile phones and laptops — so consumers can access news at all times, wherever they are. This capability is critical to leveraging greater revenue and reaching larger audiences in the future. There's a new breed of newsroom: It's tapeless. It's fast. It's scalable. And it's fully interoperable. (Priyal, 2014)

2.17 Challenges in Digital NRCS Convergence

Challenges faced are on the launch of digital newsroom, which went through several difficult situations. On the first day of broadcast, the screen which shows all the items to be broadcast went black, just three minutes before one of the daily main news bulletin was going on air. Fortunately, the producers had a backup copy of all the items on tape so they completed the bulletin without viewers noticing. When the computing network broke down, because of a technical communication failure, which meant that

some edited material could not be retrieved from the system and had to be edited again. During the first month using the digital system, all the edited items were duplicated on video tapes as a backup so none of these problems prevented the news bulletin from reaching the audience in time. The implementation involved testing all software offline, building in backups, maintaining the analogue technology until the new one was fully working and having technical managers ready to deal with any problems as soon as they arose. These issues faced at start were all sorted out with support of the technical team and integrators in few days. Rigorous training and guidance were required for the staff, as the challenge of getting the staff to follow the procedure on Digital Newsroom workflow was a task to achieve, as staff mistakes could cause a total system halt on live news. (Garc, 2002)

As said by Garc in 2002, this is one of an instance. As for now the NRCS has scaled to a much higher level and more flexible operationally. Yet some of the challenges faced by media outlets are,

- Huge initial Investment for NRCS
- Recurring yearly cost on AMC
- Frequent Training requirement, as office staff retaining is low in media outlets
- Software user Licensing and expandability are costly
- Local technical support is limited
- Changes in journalist roles and responsibility

2.17.1 Benefits of the Digital NRCS Convergence

Newsroom computer systems have been implemented in order to simplify technical And operational parts of compiling a television news program, improve communication within the news operation, and replace human machines operators where possible. The reason for system implementation is that this simple but vital way of controlling the news workflow ensures that the journalists get their material on air at the right time in the right place and without any confusion (Brautović, 2009)

The benefits as follows,

- Flexibility - Customers are able to select from the wide range of NRCS available on the global market and it`s it not an off the shelf system but a large degree of flexibility is built into the designing. So news broadcasters can exactly plan the system they want.
- Scalability - Each NRCS are tailored to fit for broadcasters specific needs. It should be able to successfully scale from small too big and always maintaining a low cost per seat and efficient workflow. This has advantages for both the supplier and user. A large broadcaster can have several different sized installations at various locations all from the same NRCS provider that will then be familiar to its entire news staff.
- Language – The NRCS Support most of the local languages for scripting.
- Integration – Most of the NRCS can be easily integrated to any System requirements and has complete flexibility.
- Platform independence – The file based system and can be integrated and on platforms mac, Linux. Even the scripting is browser based and will run on all operating systems.
- MIS – MIS is NRCS is capable of providing manager to use the resources on the workflow. Manage, approve stories and reporting.
- Mobility – Supported on all leading mobile clients (IOS, Android, etc)

(Gabriel , 2015)

2.18 ICT Involvement in Newsroom - impact and efficiency

ICT is seen as more of a convergence of technologies rather than a mechanism that can help transport, convey or disseminate timely information. One key impact of ICTs on news gathering is not only to improve quality news delivery but also facilitates the creation and dissemination of information, by electronic means. In this regard, (Dugo, 2007) maintains that Information and Communication Technologies have transformed the world in all spheres of life in time past. He further elucidates the potential of ICT in reducing manual operations in fostering the growth in the media has increased rapidly. For this reason, ICT bridges the constraints of distance and time by possibly bringing news sources closer than ever before to the news gatherers and reporters. The

increasing use of hardware and software tools in newsrooms is the outcome of several factors. The technological viewpoint emphasizes the need for improved efficiency. According to the target group editors and senior newsroom editors the concept of efficiency was found to be a combination of inputs and outputs (efficiency) and results and objectives (effectiveness). The latter was found to have greater weight. The impact of technology on the perceived efficiency in newspaper and TV newsrooms was considered to be very similar; it was estimated to be less important than for example creativity and contacts. Technology also has indirect effects, such as a positive effect on contacts. As a whole, technology was considered to be less important than individual pieces of hardware and software. However, if a device or program was not available to the respondent, its potential benefits could not be evaluated. This explains why editors' technology requirements were quite modest, in spite of their mildly positive view of the increased use of technology in their work.

Restricted separate studies were conducted to examine the characteristics of a digital camera in the editor's work, such as the use of a camera instead of a text scanner and the input of image metadata by means of audio recording. (Oittinen, Jarvenpaa, & Immonen, 2002).

2.19 Technology and Journalism Practice

The technology advancement, production, manipulation and dissemination have changed shapes in the years and transformed journalism practice, entertainment and advertising. News was never as good as a touch of a button in the era of global information. News is now accessible and available everywhere in all medium online web and newspapers daily. Changes in media and technologies, Cross-examining the nature of news is the priority task was faced in describing the public interest. The implications are serious, as not only for the upcoming news but also the democracy. The important idea of journalism in traditionally has been very effective and outstanding focus on the problem and development of the day. But, traditional journalism, due several reason has many times failed to place the stories in enough context for understanding them completely. One of the most important reasons has been technological. Furthermore, the traditional, analog media have been largely one way in their information flow, from the journalist to the public. This passive audience

model has limited the involvement or engagement of the public in journalism and public affairs.

The evolution of the Internet and the entry of digital revolution. The growth of new branches of media, and the rise of online social networks has changed the landscape of media and created the newsroom something that cannot be imagined. From digital retouching to wholesale deception, the media world is now beset by an unprecedented range of professional challenges. Not only because of the different media that arise, but the new dynamics of work. Every day the new devices and tools are added in exponential growth that sometimes appears to cause an excess of choices and opportunities that journalists and audience don't know yet. These new frontiers have improved news and information resources and changed what has traditional media been the kingdom of newspapers, broadcasters and news agencies. The challenge is to optimize fully the potential of the Internet and digital media without compromising civil rights. (Vineet, 2012)

Today, no one thinks twice about being able to get information and news at any time of the day or night. But a generation ago, that was not possible. If you wanted to get up to the minute score of your favorite team, thirty years ago you had few options. Today you can check these up to date online, have them text messaged to your cellphone or PDA, check graphical crawl on numerous cable and broadcast channels on television, and listen on radio. The technology advances in communication equipment have allowed news and information to be delivered instantly. As a result, news audience expect instant news. (Janet, 2006)

Television news, by its nature, faces an ongoing process of change. Technological, market and global developments have influenced the way television news is gathered, produced and presented. The pace of change has accelerated over the last ten years reflecting the impact of political and economic factors (a liberalized economic environment and deregulation), technological changes (digitization of news in-put and output and the growing use of live transmissions) and global developments (which show an increasing connectedness of events around the world). Discussion of the impact of new technology on journalists practice is as old as journalism itself. The railway, the telegraph and later radio, television and the internet have all played their part in the development of journalism. (Gacie Aviles & Leon, 2004)

2.20 Business and Commercial Aspects

The most important thing about television news is that it is part of a larger business, the television station. All programming is aimed toward capturing enough of the viewer's vis-a-vis competing stations to draw the highest advertising dollar-the primary source of the station's operating revenue and the guarantee of a profit for its owners. Sponsors are attracted by a program's ratings which indicate the size and demographic characteristics of the viewing audience.' So important are these "official numbers" which generate commercial revenue, that several news staffers claimed that the function of all television programming was to separate the all-important commercials. Which generate commercial revenue, that several news staffers claimed that the function of all television programming was to separate the all-important commercials.

Local stations provide news for other reasons besides advertising revenue. The news operation is generally a station's most expensive venture, and many smaller organizations are doing well to break even on their evening reports. Nevertheless, the news is often a part of daily broadcasts.

Despite government regulations, media managers are often quite successful at making a tidy profit from newscasts. How much is made depends on one station's ratings compared to its competitors which in turn influences capital outlay for staff raises, equipment purchase and repair, and general efforts to upgrade the news performance. (Rasmussen & Altheide, 1976)

As said the capital outlay is being used for IT equipment purchase and upgrade to improve the news performance. As IT investment project, is embedded in an organization's technology infrastructure (enterprise architecture), relevant business processes, organizational environment, and external relationships. (Cresswell, 2004)

IT investment project of media institution is to adopt digital news systems, which saw integrated production as a main goal. The ability to handle and manipulate video in the same environment as text in the newsroom PC was a huge advantage. The first and most easily identifiable benefit of server-based production is speed. What are the business benefits of this? The speed; what about journalists and producers editing their own material? The responsiveness of a news broadcaster to live events was often

limited by the amount of available editing. The number of videotape suites was usually constrained by the cost of the equipment, the cost of operators and the cost of the physical space they occupied. The server-based systems which serviced only a few craft suites yielded the speed benefit and often achieved higher productivity as a result. Systems can place editing capabilities on every desk multiplied the number of 'virtual' edit suites enormously.

By offering sophisticated search and retrieval capabilities on the desktop, archived content can be quickly found and edited in with the live footage. All of this is great. The benefits are very real, but they're firmly in the long-term, strategic category. A station with these capabilities is far more likely to succeed in the market and see significant, immediate ROI improvements. (Francis & Brinkman)

2.21 Summary

It looked at the upcoming of newsroom and Digital convergence studies and how these developed into studies that mostly concentrate on ICT involvement in development in digital newsroom. This chapter discussed on the complete TV newsroom operation and the trends of newsroom systems and technologies. Also looked at the difference of traditional and digital newsroom operations by analyzing on the operational workflow and understanding on challenges and benefits. The last sections of the chapters looked at Converged newsrooms in News1st Sri Lanka, and it concluded convergence is progressing in newsrooms and has it shown development in using ICT platform, but there is a lack of academic studies probing these improvements and growth in news operations in media industry. The next chapter will discuss the methodology used in this case study and its link to the qualitative research paradigm. It will set out the adopted case study approach and look at the choice of data capturing methods and some of the ethical issues involved.

CHAPTER 3 Methodology

3.1 Introduction

This chapter rationalizes the methodology of the research. The literature review in Chapter 2 was the main source of information used to develop the research methodology. These permitted the drafting of research questions for testing by this research. For ease of reference they are restated below,

- What is the efficiency of the newsroom with the use of the newsroom automation system (NRCS)?
- What are advantages and benefits provided by newsroom automation system?
- What are challenges and difficulties faced prior to Newsroom workflow implementation and the new newsroom automation system implementation?

Research methodology process is shown in figure and will be on qualitative approach and will be used as data collection mechanism. The study relied in combination of detailed interviews, document analysis and observations. My interviews and observations will be done in the media outlet where fully operational newsroom automation is in place. This will be conducted in view of getting more comprehensive picture and practical understanding of the newsroom system in operation and to identify the main parameters related to the research question.

Last chapters will discuss about data analysis, limitations and chapter summary.

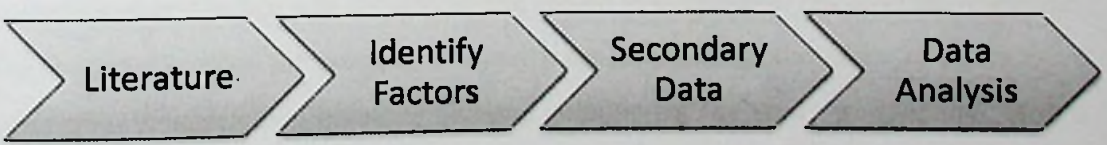


Figure 6 Research Methodology Process

3.2 Theoretical Framework

This study, is examining role NRCS playing to improving work efficiency in newsroom is related and supported to Diffusion theory, due to its relevance towards given the study its desired meaning and backing. According to (Sahin, 2006) Rogers has defined diffusion theory as "the process by which an innovation is communicated through certain channels over time among the members of a social systems" Also he has expressed, an innovation as a new clue, where practice or object measured to an individual. Rogers explained further, that a technology is an approach and a tool for action that decreases the insecurity in the cause-effect connections involved in accomplishing a favorable response. He stressed that a technology is not just a machine and it's information. Technologies are meant to be use of hardware and software components. The hardware feature consists of the tools that represents the technology as a material or physical item and the software features contains of instruments used for information. (Sahin, 2006) Also, based on Rogers definitions, newsroom communication technologies includes hardware and software component used by individuals to receive and disseminate message (e.g. newspaper, magazines, radio, television, film and internet). Software components include the myriad of resources of (books, videos, CD-ROM's, Instructional activities etc.), for effective newsroom productions. Therefore, they stressed that diffusion theory as a framework, helps media practitioners to adopt the usage of technologies, its users friendly oriented model accounts for factors that improves work efficiency through communication channels.

3.3 Qualitative Research Methodology

The nature of the research questions demand that the respondents describe their knowledges and insights of newsroom converged environment. Because the researcher has to interpret what the subjects of inquiry are articulating, therefore an interpretive qualitative research methodology is more suitable for the study in question. With a view of generating empirical data for this study, a research process was designed using qualitative method. According to Denzin and Lincoln, qualitative research is Multi-method in focus, containing an interpretive, naturalistic method to its subject matter. This leads the study of qualitative researchers in their natural situations,

endeavoring to make sense of or interpret phenomena in terms of the meanings people bring to them. (Kasinath, 2013)

Qualitative research is preferably performed in a naturalistic setting with emphasis on everyday behavior and is often descriptive in nature. Qualitative researchers seek to explain the world rather than measure it. The world of social science is explanatory. As Lorio stated, "qualitative research is holistic and blatantly interpretive. Qualitative Researchers go ' into the field' to gather data by observation and interaction with the People from whom they hope to learn from". (Iorio, 2001)

Qualitative research sees the social world from the point of view of the actor other than naturalistic inquiry or quantitative research, qualitative research often focuses on "only some partial set of relationships in group life or on one aspect of a scene". Qualitative researchers tend to conceive of their studies, most generally, as an iterative or repeated process which allows for the flexible application of theoretical concepts and analytical procedures to a wide variety of empirical domains. It is possible to identify three distinctive features that are shared by a number of qualitative research reference. First, there is the concept of meaning, as embedded in and orientation of social action. A second assumption is that "meaningful actions should be studied, as far as possible, in their naturalistic contexts". (Mattern, 2015) In its strong form, this assumption calls for the classical variety of anthropological fieldwork, in which a "researcher's lengthy immersion in a whole culture enables the researcher to ultimately grasp in full 'the native's perspective' on reality". A third common feature concerns the role of the researcher, who is defined emphatically as an interpretive subject. In one sense, all research depends on the human subject as a primary instrument. However, a frequent criticism of qualitative research has been the lack of explicit research procedures. Qualitative researchers often draw on a variety of methods selected according to their appropriateness to the particular study in an attempt to secure an in-depth understanding of the subject. Participant observation and case study are primary methods of qualitative empirical studies. (Mattern, 2015)

3.4 Case Study

Media research specifies that journalistic standards and practices are socially constructed systems, which deal with complex work processes by organizing news flow and explicating roles and competencies. The case study method is regarded as a valid instrument to analyze a complex issue. A case study is defined by Yin as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context". (Hine & Carson, 2007) It is best used to understand complex social and organizational issues. Case study evidence to answer research questions and contribute to theory development originates from a variety of sources, such as documentation, archival records, interviews (qualitative or quantitative) and observation. In this study I focus on one organisations as a unit of analysis and use a combination of non-participant observation and in-depth interviews to address the research questions. The case study approach seems the most credible choice because it concentrates on "an intensive investigation of a single unit" said by Babbie & Mouton (Burden & Roodt, 2007). That unit in this study is News1st. With its phenomenological underpinnings and reliance on qualitative research methods, such as observation and interviews, the case study method provides me with a 'thick description' to develop what is supposed to be the case background and interpretations.

A purpose of the case study as argued by Jensen is "normally to arrive at descriptions and groupings which have implications for other larger social systems". Another view however warns that "the aim of the case study research should be to capture cases in their uniqueness rather than to use them as a basis for wider generalization or for theoretical reference of some kind". (Jensen & W.Jankowski, 2002) With other qualitative research methods, case studies share the detailed attention given to phenomena within their everyday contexts and structural interrelations with other phenomena and contexts.

Finally, with regard to this study, I would like to argue that the strengths of observations outweigh the weaknesses. Therefore I do not wish to generalize any findings from this case study. I will "provide readers with good raw material for their own generalizing" because "the reader can make his or her own generalizations and

interpret according to their way (Stake, 1995). However, the findings will offer insights that could be probed for future studies.

3.5 Methods of Data Collection

The section reviews the main instruments in qualitative research. It is noted that "the adequacy of a research method depends on the purpose of the research and the questions being asked" (Seidman, 2012). This research brings into play methods of observation and semi-structured interviews. Non-participant observation was employed as the first source of data. A second source of case study data was the in-depth interview. The emphasis on observation and in-depth interviewing to gather information and the importance of perspective in explanation are all principal foundations of traditional journalism as well as qualitative methods. The techniques were chosen because of their respective capacities to generate relevant data to the research question. These methods provide the researcher with the opportunity for independent explanations; assessment and descriptions. (Jensen & W.Jankowski, 2002) (Saunders, Lewis , & Thornhill, 2009) This study draws on observation and interview data gathered from employees of an independently owned media company in a mid-sized Colombo city. The company is a market-leading broadcaster. The frequency and speed with which this media company has invested in, pursued, and abandoned innovation make it a prime candidate for a diffusion study. In the past few years alone, it has experimented with frequent and dramatic changes to its products, mission, workforce, management and organizational structure, and audience engagement efforts. In 2008 end, the organization media stepped into NRCS implementation by being the first in Sri Lanka being moving with emerging technologies. The complete workflow operation was new to the journalist and newsroom team. The adoption for the staff in working from traditional operation and to move to the digital based system was a big hurdle. As the senior staff were lacking in computer literacy due to their limitation of use and were slow in progress in adopting to the environment. The organisations made all required arrangement for the staff for training and also organized the system integrators to be in premises until the migration is completed for a successful operation. In the middle of 2009, the NRCS was in operations and newsroom team were restructured to adopt and move ahead. The

responsibilities of senior staff were changed for a better management. Our study focuses on data collected from workers at the news organization by interview process using instrument such as open-ended questions and observations, to be used to give the study its validity.

3.6 Observation

The first method of data collection that was employed in this case study is observations. In an interview process, the subjects can say whatever they want, but their behavior and actions during observation "have a reality verifying character, whereby what people say they do can be compared with what they actually do" Stated by Gorman. (Noort, 2007) According to Jensen, observation refers inclusively to "a set of research activities that involve the continuous presence of the researcher in one delimited locale". The reasoning for observation is that a very informative analysis of a setting is vital to inaugurate the effects of what people do or say (Jensen & W.Jankowski, 2002). This technique is in line with the qualitative need of finding out a person's systematic groupings with regard to the specific field itself. Observation includes the researcher to be persistently involved among those intentional with a view of creating a comprehensive account for the group and the organisations. The typology recommends that observation is best fit for case studies. By interacting with people and while observing, the researcher gathers data. Thereafter analysis takes place and researcher marks about themes found in the setting. Defining the essential events, conditions, and activities that occur in specific social setting is the main requirement of the observation. This is achieved through the evolution of case studies of social occurrences, normally engaging various data-collection techniques. (Jensen & W.Jankowski, 2002)

One of the important aspect in observation studies is that one can actually witness the events or procedures that are being researched. This gives an opportunity for an individual with regard to analysis of situations and processes.

One of the weakness as seen by numerous quality researchers is the latter due to which researchers make biased assessment. In another view this can also be considered as a strength since the researcher is enabled to understand newsroom interactions better

than an "outsider". Another shortcoming that is vital for this research method is that "observation can be very time consuming, even when appropriate events and situations are chosen; and the subjectivity of the observer must always be taken into account", the researcher combined observation with interviews in order to save time and record events and processes as they happened. (Noort, 2007) (Guest, Namey, & Mitchell, 2013) (Jensen & W.Jankowski, 2002)

Elliot highlights that method of observation has one of the following strengths It clearly depicts methods such as interviewing which is within itself, observation has a relationship to present tense, it records the occurring as it is in its natural setting and allows to research the study of persons who can be reluctant in submitting their own reports of their actions. (Clayton, Shep, & Gorman, 2005) (Mishler, 2009) (Noort, 2007) Furthermore, observational studies permit an easier approach which allows researchers to tackle their expectations when moving forward and unusual terms can be cleared understood. Through the data collected from these observation session's interview questions can be built which can be very useful in obtaining a more vivid understanding. The objective of this data collection method was to identify the efficiency post NRCS implementation in the newsroom.

3.7 Interview

The interview method was selected as my second data collection technique since it is an appreciated addition to the observation method and interviews provide potential in offering the balanced and supported evidence in observed occurrences are complex or involved with many factors. (Clayton, Shep, & Gorman, 2005) Case study achieves in obtaining the description and interpretations of others and the case will not appear same for everyone are the two main procedures. Researchers find and show the multiple approaches of cases in qualitative methods. "The interview is the main road to multiple realities". (Stake, 1995)

In a research that is conducted qualitatively one of the very powerful and effective method is interviews mainly since it allows the person who is conducting the interview to step in another person's mind to understand and experience the world as they do themselves". Research interviews "involves gathering of data through direct verbal interaction between individuals". (A. Murphy & Dingwall, 2003)

Most case study interviews are either open-ended or focused. This means that in semi-structured interviews the main questions are open-ended, "where you are raising the topic and indicating the kind of answer but where the actual answers are entirely up to the interviewee". (Gillham, 2002) At the same time, the interviewer stays in control of the terms of the discussion. An open-ended interview is flexible and can range over a wide variety of topics. Sometimes the respondent's answers will suggest a new line of questioning to the interviewer. Interviewing is one of the most widely used methods of data collection in the media and communications research. Bower contends that "a commonsensical justification for this fact is that the best way to find out what the people think about something is to ask them". (Jensen, 2013)

For this research it was necessary to use three different types of interviews: the elite interview, the semi-structured interview and the focused or deep interview. The difference between these types is in the "extent to which the interview is structured, and the degree to which the interviewee is allowed to 'lead' the content of the interview. (Gillham, 2002) An elite interview to be conducted with the four most relevant respondents in this research and these included the News1st Group Director, Technical Director, Engineer, and the Senior Producer. These four people were involved in the establishment of the NRCS convergence process and are therefore the key players in my research. Not only do they have expert knowledge, they were also able to help me conduct my research at the News1st. Their perspectives were different and they have access to information that is withheld from others. They also have a comprehensive grasp of the wider context at News1st.

The four elite interviews planned were semi-structured. This type of interview allows for "probing of views and opinions where it is desirable for respondents to expand on their answers" (Gray, 2004: 215). This means that in semi-structured interviews the main questions are open-ended "where you are raising the topic and indicating the kind of answer but where the actual answers are entirely up to the interviewee" (Gillham, 2002). At the same time, the interviewer stays in control of the terms of the discussion. Other semi-structured interviews were to be conducted within selected senior personals from the newsroom.

3.8 Document Review

Nearly every research study requires finding and probing newspapers, annual reports, correspondence, minutes of meetings, and the like. Data gathering and by reviewing documents follows the thinking as observing or interviewing. Research study should have followed in an organized mind and be open for unexpected clues. The important and useful documents should be allocated in advance and time should be allocated to spend. Spending time in reviewing a document cannot be determined. Always it will appear as we have more time allowed for analysis, having a plan can make researchers be ready for setbacks and exposures. Documents cannot be like observation and will serve as substitute records of an activity that the researcher requires. (Stake, 1995)

3.9 Sampling Techniques

Two or more steps frequently are sampled in Qualitative studies, certain important events are being the primary defining framework which the next section in comprehensive detailed study. In the process of analysis and understanding it`s ideal if the studies require such framework remain accessible to the researchers as the second step. (Jensen & W.Jankowski, 2002)

News1st newsroom was selected as a case study subject. The study focused on the newsroom staff as core members of this inquiry. It employed a combination of purposive and convenience sampling. Purposive sampling was employed to select prospective interview subjects. This sample technique is suitable, as it allows the researcher to focus in depth on issues significant to the study. In purposive sampling, Researchers select cases to be included in the sample, according to their finding in their possession. In this method the sample is been constructed in way that is satisfactory to their exact requirements. (Cohen, Manion, & Morrison, 2007) The reason behind this sampling is to have a small but rich information which is informative.

The selection of the sample is at the decision of the researcher, in consideration and relevance to the case`s research question. Convenience sampling, researchers are able

to choose the sample from the closest available and accessible. Convenience sample does not state to be in a group or larger population. (Cohen, Manion, & Morrison, 2007) Interviewees will be conducted according to their responsibilities and degree of involvement in newsroom NRCS operations, so that this would present managerial areas of the process. Respondents with different specialized roles in the newsroom were selected based on their contributions to the news process and their involvement in news NRCS convergence. To further expand the sample, I also sought respondents in different types of news decision-making roles as well as news reporting and news production roles. Interviews will be conducted with permission of the respondents.

3.10 Data Collection Procedures

The research design and methods have been discussed prior to the data collection process. Letter was forwarded with the purpose of study to the Group Director of News1st requesting permission for the researcher to access News1st newsroom and to observe and interview newsroom staff. On this request and approval, the researcher to conduct pilot study to identify the goals, types of personal and who would be potential respondent and define the interview schedule. The field visit includes observation of facility and draft of interview guide and checklist. Developed open ended questionnaire for in depth interviews.

CHAPTER 4 Data Presentation and Analysis

4.1 Introduction

This chapter will discuss on the data analyses and finding, this is done using tables, coding of interviews and professional observation involving analysis of the operational systems in newsroom. The process is being done in methods discussed on last chapter. Effort is made to present data analyzed and finding in principled structured approach. The data`s will be collected in view of the problems posed in Chapter 1 of this thesis. The findings will demonstrate the outcomes of the use of ICT in Newsroom.

As the initial stage in analysis and to address the objectives in chapter 1, as discussed in framework of Chapter 3, will be performing a financial analysis in a newsroom of a leading Media Institution in identifying and reviewing the trends of technology related to Newsroom automation (NRCS), this process involves qualitative document analysis method, where the annual reports to analyzed. On completion of the initial part, will proceed in findings on the impacts of productivity and efficiency of the newsroom using NRCS and analysis to be performed as a qualitative experimental and document analysis, whereas the experimental analysis involves operational testing on task and how much time taken in use of technology prior system and current and also will include document analysis in investigating on the production and trend in development using FPC (Fixed point Chart) document. On completion of addressing the objectives, interview analysis to be addressed by use of the methods of qualitative method.

4.2 Financial Analysis and Findings

The Financial Analysis was done in the findings of the objectives discussed on Chapter 1, the objective is to explore a media institution where a fully functional digital system (NRCS) is in place and to identify the trends of technology related NRCS.

For the financial analysis, BBC News was selected as the sample for the study. BBC News UK, BBC is the national broadcasting organisations in UK and the oldest broadcaster in the region, also one of the leading worldwide news provider and famous in adopting and maintaining the latest technologies for broadcasting. BBC`s News

gathering operations is the largest operation in the world, transmitting services through radio and television networks. In addition to this, BBC news stories are available on the web. BBC been the leaders in adopting latest technologies and finding new ways to provide access for BBC News, which has resulted in launch of the service on BBC Mobile, providing developing news alerts by e-mail, desktop alerts on computer and digital television.

The financial analysis process was done through a methodical review of BBC Annual reports & Financial Statements from year 2004/2005 to 2014/2015 in regard to the Digital Transformation and trends of technology.

BBC News stepped in to Digital Transformation (NRCS) in the mid of year 1996 by implementing ENPS Newsroom System for the newsroom. The functionalities related to it and the income and expenses on Digital Transformation was heavily been evaluated by BBC and a better understanding of newsroom system was gathered. The Digital transformation was planned in stages due to large entity and offices located worldwide geographically, they need to make sure regions are covered and technology is adopted. AP ENPS Newsroom system was their pioneer technology and was adopted and implemented to 4600 workstations in August 1996. In the year 2006, BBC marked its 10th Anniversary use of ENPS and has increased to use of 7000 workstations. The actual cost for ENPS service contracts were yearly around £6.7million.

The Chart 1 below displays the service expenses and contract details of BBC as of March 2008. (BBC, Annual Report and Accounts, 2007/2008)

	Service delivery 2007-08		Costs 2007-08		Savings 2007-08		Start to 31 March 2008	
Contract and start date	Total Performance indicators met %	Performance indicators with service credits attached met %	Business case forecast £m	Actual cost £m	Business case forecast £m	Actual savings £m	Business case forecast £m	Actual savings £m
Siemens, Apr '05	83	93	181.8	232.0	27.5	34.3	82.5	104.1
NGW, Mar '98	99	99	87.6	89.8	n/a	n/a	n/a	n/a
Red Bee, Jul '05	92	91	53.3	78.0	n/a	n/a	n/a	n/a
Johnson Controls, Jul '06	96	96	78.5	73.5	0.6	0.7	0.6	0.7
Capita (Licence Fee), Apr '02	94	94	59.3	73.5	n/a	n/a	n/a	n/a
SES Astra, Oct '96	100	100	33.6	33.7	n/a	n/a	n/a	n/a
VTC, Mar '97	86	86	30.0	30.0	2.1	2.1	4.3	4.3
Proximity, Jan '02	n/a	n/a	24.0	24.0	n/a	n/a	n/a	n/a
Steria, Nov '06	93	90	15.3	17.9	10.5	7.9	4.5	4.3
Capita (HR), Dec '06	74	74	14.8	15.6	4.0	3.6	6.6	6.1
UK Mail, Sep '06	100	100	11.0	10.0	0.58	0.15	0.58	0.15
BSkyB, Nov '98	n/a	n/a	9.6	9.6	n/a	n/a	0.0	n/a
HBML, Apr '04	100	100	5.1	8.7	0.9	0.9	2.1	2.1
ENPS, Aug '96	100	100	7.7	6.7	0.39	0.45	0.63	0.69
Capita (Audience), Dec '03	97	97	5.4	5.7	1.3	0.9	6.8	6.8
Paypoint, Apr '06	84	84	6.0	5.3	20.0	21.2	26.6	27.8
Arqiva, Sept '06	95	95	0.85	0.5	0.0	0.0	n/a	n/a
Totals	-	-	623.85	714.5	67.87	72.2	135.21	157.04

Source: National Audit Office analysis of BBC data

Table 1 Service Expenses and Contracts 2007-08, **(BBC, 2007/2008)**

In year 2007/2008 BBC has incurred a cost of £79million for Digital Media Initiative as stated on Annual reports. The DMI (Digital Media Initiative) was a major technology-enabled transformation project and was aimed to achieve by providing the BBC News staff and partners to develop, create, share and manage audio and video files using their desktops. For this move, it requires the development of a newly, fully-integrated digital production and archiving system. BBC made a decision to bid and evaluate on the project requirements. Finally, the DMI project was awarded by BBC on February 2008 to Siemens under an existing agreement of outsourcing and to handle implementation, complete roll out, and operate till March 2015 what the BBC named

its Digital Media Initiative. A total sum of £201million was set aside for the DMI up to 2012/13 for newsroom. (BBC, 2014/2015)

BBC business units roll out was on schedule and Siemens was required to implement by May 2009, with the initial delivery of units was set on November 2008. It was February 2008 and one month into the initial contract and seems the effort was already starting to slip away, as Siemens have not shown any indications on delivery. By November 2008 it came clear that the initial delivery was not going to take place and more likely going to end up being February 2009. (BBC, Annual Report and Accounts, 2007/2008) (BBC, 2008/2009)

By February 2009 as expected delivery from Siemens, it was surprising for BBC Team to see that Siemens still had nothing to deliver on BBC business units, and by May 2009, it was evident that the BBC had to contractually cancel the project with Siemens. Both sides argued over how to blame the other for the project's delay. In September 2009 officially the DMI contract to Siemens was cancelled by a mutual agreement with an effective date of 31 July 2009. A settlement was provided by Siemens on cancellation, the BBC had and effectively recovered £27.5 million from Siemens.

Then the BBC decided to take control over the project and claimed it could handle it. However, now the DMI project was behind the schedule and 21 months has passed. Which now the value of DMI project proposal would change. In November 2009, BBC management developed a new business case for DMI and submitted to the Finance Committee. The project investment was now going to be around £105.1 million, and the benefit was going to only be £74.1 million because of the delay in rolling out the project, this was stated on NAO (National Audit Office, UK) report. The Finance Committee rejected the business case because of the lack of evidence to show the project to benefits to be secured. By again in June 2010, BBC management submitted a fresh new DMI business project plan to the Finance Committee. Where now the investment was required to be £133.6 million (minus the £27.5 million settlement from Siemens), or £106.1 million in total. The benefits shown by BBC was to be £97.9 million and to achieve this, the DMI project was to be rolled out to 13 BBC business units. Which is higher than the initial planned 6 BBC Business units. The new DMI

final completion project date has changed from March 2015 to March 2017. (BBC, 2014/2015)

After the analysis on the Financial records and statements, it`s clear the said started project has made BBC further to incur a loss of £98.4Million in 2011/2012 due to the poorly managed project of Digital Media Initiative (DMI). The reason for the loss incurred was that a fixed sum of £79Million was given to Siemens as a start again of the contract for this project, whereas only £27.5Million was recovered after the project was cancelled. Also further loss occurred after the project was completely handed over to the BBC Finance Committee and all of this came to a halt in October 2012.

Furthermore, in 2011/2012 BBC saw a loss increased by 3.4% in comparison to 2012/13 which was £2,530million (2011/12: £2,446million), largely due to additional investment in the technology due the coverage of the London Olympics. Apart from these shortcomings in 2011/2012 there is an increase in license fee income of £93million. Out of which £74million can be attributed to increased digital transformation activity.

Furthermore, due to these investments such as the newsroom move and increase in expenditure of programs, the business returned an operating loss of £0.8million in 2012/13 in comparison to the profit of £4.2million in 2011/2012. (BBC, Annual Reports and Accounts, 2012/2013)

Amidst these, in 2012/2013 BBC world news was relaunched with an investment of £4Million to provide the journalists with the world's largest multimedia, multilingual newsrooms in the broadcasting house. In September 2013, BBC invited suppliers to bid for a Newsroom Computer System worth up to £144 Million and to provide support for more than 11,000 users. The BBC estimated that the contract value for the mandatory prime requirements will be between £18m and £44m (excluding VAT), and other non-mandatory different requirement would be between £33m and £104m (excluding VAT). The contract is covered by the Government Procurement Agreement (GPA) UK and the initial duration of the agreement will be between 8 to 12 years, with the option to extend the term by a maximum of 6 years.

The procurement process competitive and detailed and was under the regulations of public procurement UK. The newsroom NRCS evaluation process started in September 2013 officially. On February 2015, BBC officially has stated that they have selected Annova Systems for the NRCS and Annova to provide Openmedia newsroom software for all BBC newsrooms and will be fully integrated. The process of implementation to start from mid-2015 and Annova team is expected to spend two years for study, customizing and configuring the Openmedia software. The scheduled roll out is from 2017 onward and will replace the current ENPS NRCS, the rollout is planned for more than 11,000 users and will be worldwide. The long-term agreement covers Initial Services as well as Licensing and Operational Support for at least the next 12 years.

The two exceptions are Property and of Technology, which reflect directly the significant investment the BBC has been making in both its technology and its operating infrastructure in recent years (e.g. Media City UK, Broadcasting House in London W1, Digital Media Initiative). As a direct consequence of this investment, annual depreciation and running costs in property and technology have increased in years.

The investment made are essential to support the new ways of working and to provide the technological capacity, to enable the BBC to produce the dynamic content for audiences and users, which requires in a digital economy where the platforms used for contents have to be developed rapidly. As they implement plans to reduce our property footprint and to bear the costs of vacant production sites, they were ready to use them up to the point of disposal. These surplus property expenses are included in infrastructure and support. The disposal of sites (Television Centre (TVC), White City) in the coming years will deliver significant savings against current cost levels. (BBC, 2014/2015)

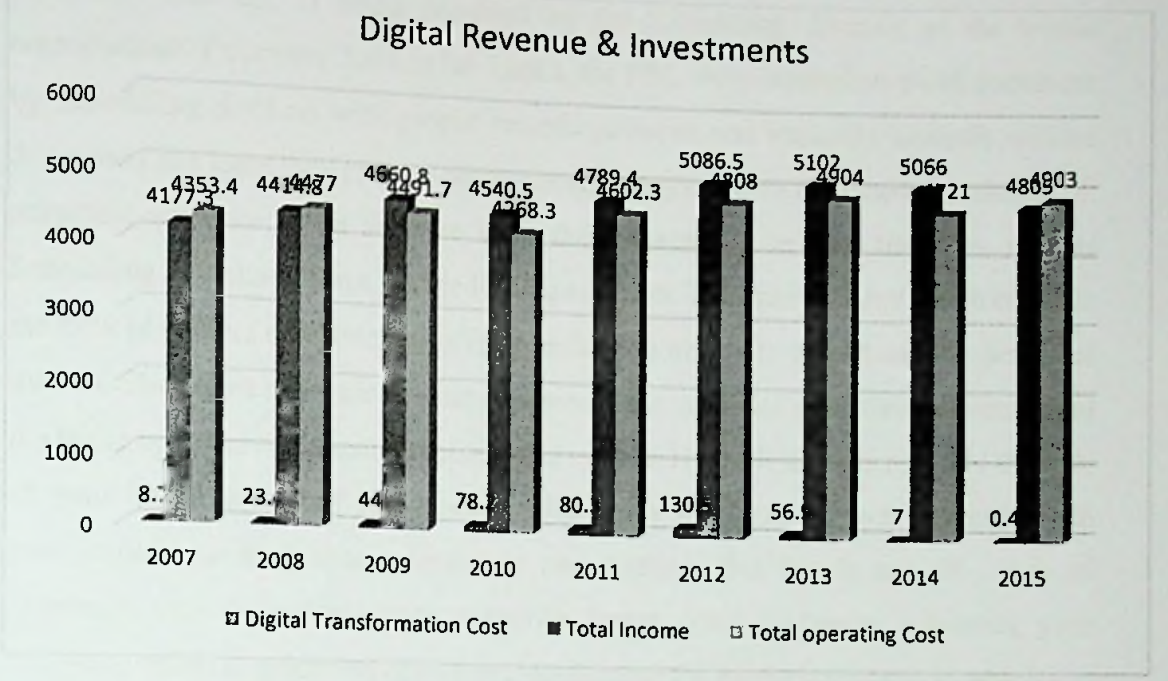


Figure 7 BBC Digital Revenue and Investment **(BBC, 2014/2015)**

While analyzing the graph its clear the total income has increased significantly from 2011 and it's growing, a main reason being the improvement in Digital initiative. Furthermore digital transformation cost and total cost has also increased along the years which gives evidence for the cost involved in newsroom development activities. Also it has been noticed annually there is cost involved for maintaining contracts of Business units with suppliers. (BBC, Annual Report and Accounts, 2004/2005). Trends of technology development related to NRCS is maintained by investments to be as market leader and be the first in technology advancement.

4.3 Production Transformation

The FPC (Fixed point Chart) was taken to the study as an qualitative document analysis method and to address the objective discussed on chapter 1. FPC (Fixed Point Chart) is meant as TV broadcasting schedule. The FPC schedule is the critical and crucial part of the media organisations business management process, FPC is not just a programme listing. If an FPC`s is not planned or does not meet the audience expectation per channel, it could be a main element to effect the sales generation of the media

company. This task is being prepared by the Scheduling division of the media organisations. Prior year 2007 in Sri Lanka, the FPC were created on word document by Scheduling division with proper records gathered and statically analysis will be done, then as a team they plan on programs and progress with the schedules aiming on attracting audience in all ways to view their channel. Currently there are several Scheduling systems in place for Media Organization. The prime source which controls the flow of content and advertising from archive to library to output and the design of the FPC/Broadcast schedule is what determines the potential advertising revenue and it`s being operated on an automated playout system. Hence it impacts not only the core of your business but all the elements that form it including your investment in production/ broadcast assets, inventory and staffing. But this is not all , it is an important tool in building your corporate image, your audience, achieving your corporate mission, goals and objectives, developing the media landscape in which you operate and serving the public at large.

FPC`s are created automatically when the schedules are being bought by sales personals and prepared on the system and as said above these activities are now part of the workflow and making the operation easy, flexible and accurate.

FPC (Fixed point chart) was taken from News1st, Sri Lanka. As my analysis required information's of FPC`s of prior NRCS implementation and the current ongoing. Which the current FPC was available as it`s on the system used by scheduling division of News1st. The prior records of FPC before NRCS required was the year 2007 or before and gathering these records and data`s regard to that was a difficult task. As this process needs to be routed through the Scheduling division to IT division. Which they will need to go through past records and restore from any previous backups available. The total process requires proper request and this should be approved by the head of division of scheduling. As the purpose these FPC records were for study, so I made a request by email on this by mentioning my study details and required FPC information and forwarded my request to the Scheduling head of division for approval. Which in turn after internal discussion, they agreed on providing the available records for study purpose. Afterward with the help of IT Division and Scheduling division, I was able to get the FPC records.

The records were received for a week per channel, they were the FPC of July 2007 and the FPC November 2015. As per the records of Broadcast Schedule, below table 2 illustrates the samples taken from FPC (Fixed Point Chart) 2006 July of News1st.

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
06:0AM-06:30AM	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)
12.0PM-12:30PM	News Lunch Time	News Lunch Time	News Lunch Time	News Lunch Time	News Lunch Time	News Lunch Time	News Lunch Time
19.00PM-19:30PM	News	News	News	News	News	News	News

Table 2 Weekly FPC (Fixed Point Chart) 2007 of News1st

The table 2 displays the weekly FPC of year 2007 per channel, as per the records the main news segments were aired and productions were related to that. Apart from the above FPC, they had an every hourly 55th min, shorter news segment.

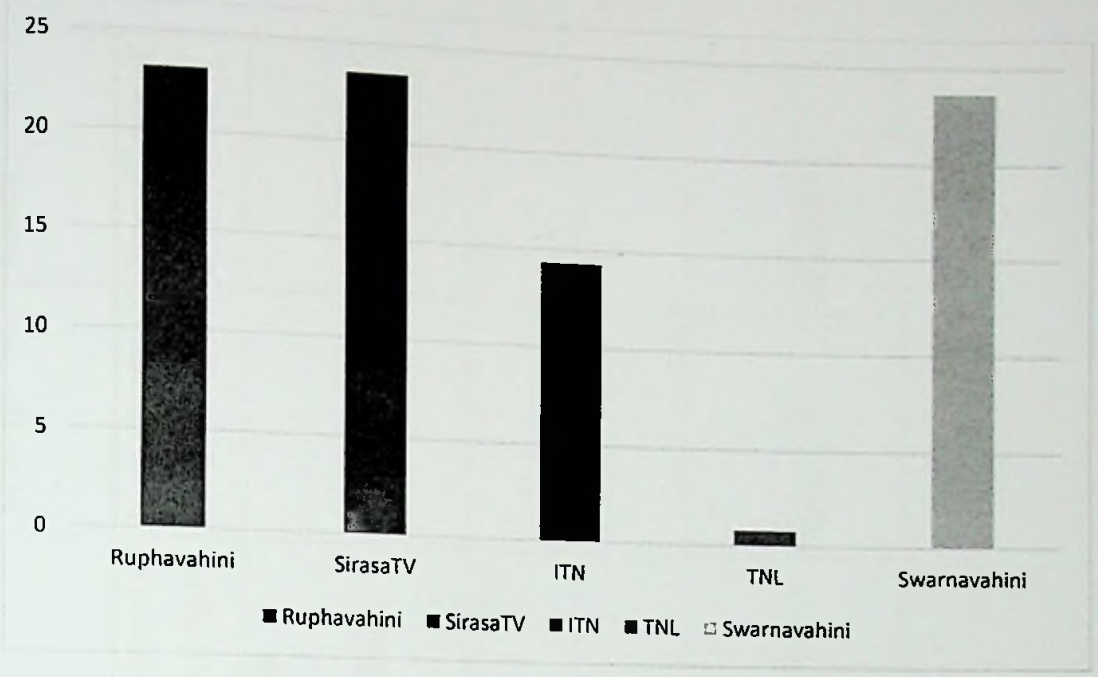


Figure 8 Channel Audience Share (2007 in %) **(LMRB, 2007)**

The Figure 8 displays the Channel Audience share for the year 2007, the popularity of channel rating differs and this is due to the FPC at that time. This FPC does not segment News rating and includes the total share of the channels.

Table 3 Weekly FPC (Fixed Point Chart) November 12th, 2015 of News1st

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
05:30AM–05:30AM	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)	News (Repeat of previous Night)
06:00AM-06:28AM	Pathikada	Pathikada	Pathikada	Pathikada	Pathikada		
06:28AM-06:45AM	Sunrise News	Sunrise News	Sunrise News	Sunrise News	Sunrise News		
12:00AM-12:30AM	Lunch Time News	Lunch Time News	Lunch Time News	Lunch Time News	Lunch Time News		
18:00PM-18:30PM	Youth 1st/Kids1st						
18:35PM-18:55PM	Sathya	Sathya	Sathya	Sathya	Sathya		
19:00PM-19:35PM	News @ 7	News @ 7	News @ 7	News @ 7	News @ 7	News @ 7	News @ 7

19:35PM-20:00PM	Dawasa News	Dawasa News	Dawasa News	Dawasa News	Dawasa News	Satana Series	Satana Series
22:00PM-22:30PM	News @ 10	News @ 10	News @ 10	News @ 10	News @ 10	News @ 10	News @ 10
22:30PM-22:45PM	Sirasa Final Cut	Sirasa Final Cut	Sirasa Final Cut	Sirasa Final Cut	Sirasa Final Cut		

The table 3 shows weekly FPC of News 1st main segment data from August 2015, other than this there were shorter segment every hourly 55th minute, which is a news brief segment running throughout the day, these were called "News live @ 55 and also every 25th minute they have "News1st plus" also runs throughout the day. And prior the main news at 19:00PM, there is segment called "Headline 1st" for 5 minutes, which briefs of the top headlines prior news.

In News1st production produced segments, which were segments called "Newsline", which is a brief interview discussion related to political. This segment runs in between the news and the duration will last for 5 minutes. Also they had program called "Final cut "after the main news and ran for 15minutes. Apart from this they had news produced programs, and are the following,

- Artha Tharka
- Sithijaya
- Youth 1st
- MYB
- Vanija Vatthawa
- Sports Saga
- Ilakkaya
- Munata Muna
- Purawatha
- Sampurna Katha
- Gammedha

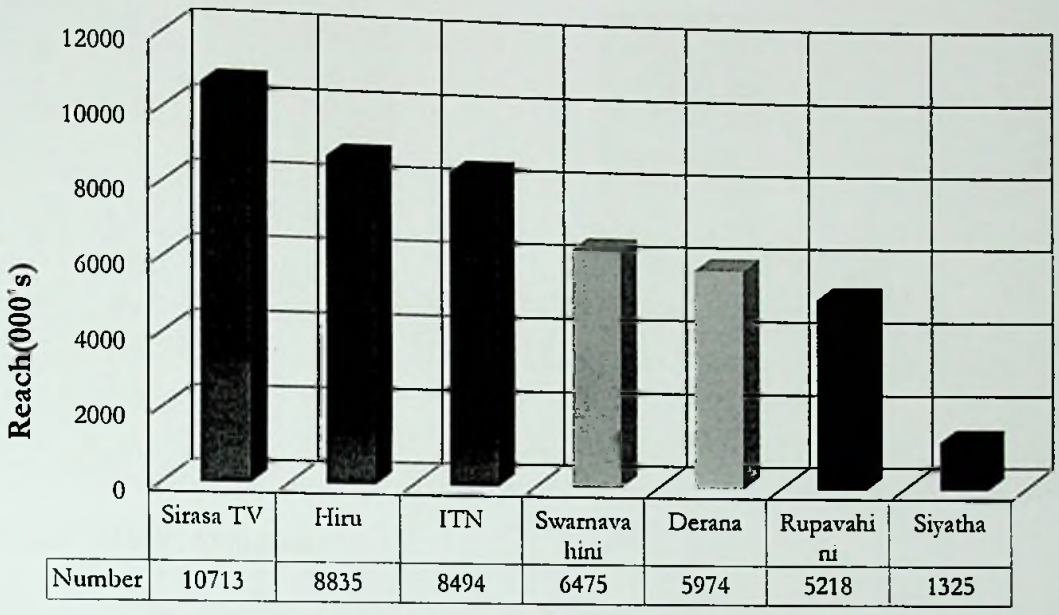


Figure 9 Channel Ratings (2015) **(LMRB, 2015)**

The Figure 9 Channel ratings, clearly displays the increase of percentage in audience share.

4.3.1 Findings

As per one channel according to the FPC, the total news segments weekly were 80 as per the operations on the traditional model. As per the operation on NRCS, it is visible the news segments were 80 weekly and news produced programs 19 weekly. It`s has been noticed that News1st runs total 03 separate channels and weekly news segments were 240 and weekly programs were 27, this was on NRCS platform and the platform is supported and is scalable to 24hour channel functionality.

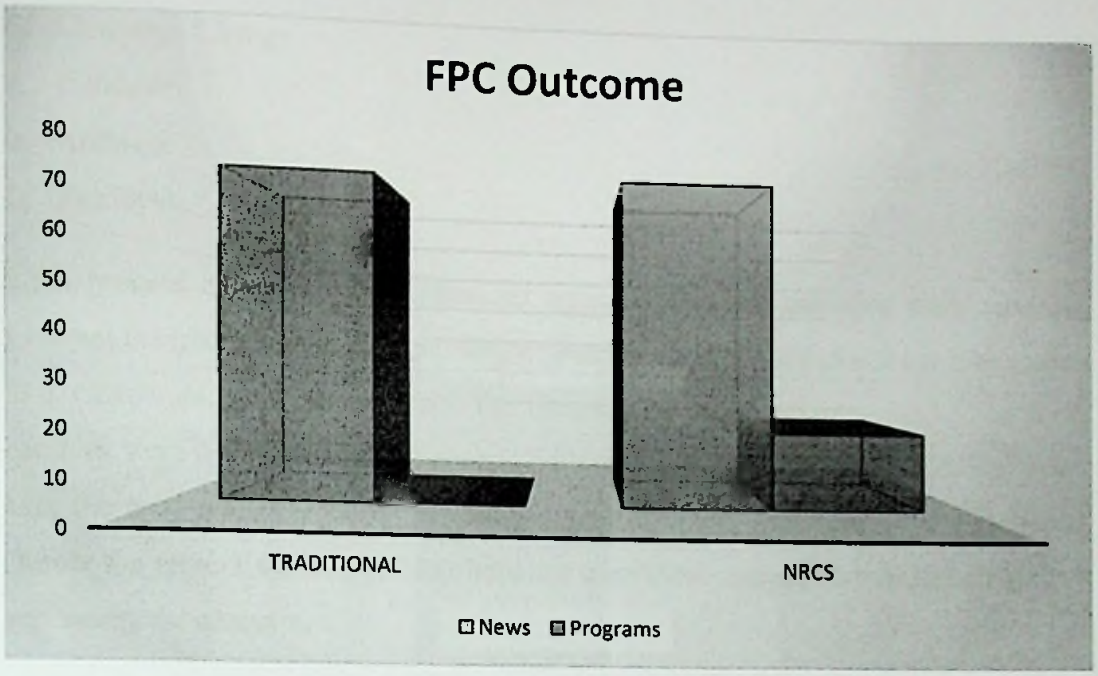


Figure 10 FPC Outcome

4.4 Technological Transformation

As an experimental, the analysis was done in identifying the operational efficiency. The activity in gathering the data was performed at a fully operational newsroom, where a complete operational environment and systems/equipment's are available and running on NRCS. Traditional model systems equipment's were also accessible at the same location, as they were still available as standby. The main operational activities/tasks were taken into the study as a comparison between the traditional model and NRCS model. The listed below on Table 1 are the tasks process explained in details on both traditional and NRCS and the results being displayed on Table 2, which is a comparison of both models and the outcome. List in detail, how the operations were observed and recorded in order to compare, and this activity was done with the help of the technical assistance and Journalist in Newsroom.

a. Script writing
b. Ingesting
c. Script Editing
d. Editing Segment
e. Story Approval Process

f. Language Change

g. Rundown

h. Archival

i. Retrieval

Each process explained were observed operationally and duration were recorded between the traditional model and NRCS. For the analyses, samples were taken using two video materials/footages with the duration of 04:00 Minutes each. The same samples were used to analyses between both traditional model and NRCS. For every task the total real operational procedures were followed and data`s were recorded. Below the table 3 the comparison between traditional system vs NRCS and table 4 represents the analysis.

Table 4 Traditional vs NRCS

Task List	Traditional (Earlier) System Process	Newsroom Computer System Process
Script Writing	When the story or news media file arrives to the news station on Beta \DV or Mini DV Tape. The Librarian will first enter it into the books prior handing to the journalist. The journalist will identify an unoccupied VTR (Video tape recorder) playing device to preview the media file. Once he/she starts the task, first process will be to insert the master tape received to the VTR deck and then followed by pressing play button to view the visuals and audio will be listened using headphone. Previewing process will be done using buttons play, rewind and forward, same instance script will be noted on a paper. Timecode will be noted.	When the story or news media file arrives to the news station on DVD/Micro Chip/FTP/etc., journalist will have to make sure the media file is transferred to the storage with help of Librarian. As soon as the media file is transferred and available for use in the storage, he/she will proceed to an available unoccupied editing workstation. In that workstation, he will use the application Remote Producer to access the media file on the storage. The Remote Producer application provides the capability of previewing and editing the media files. Once the file is accessible, journalist starts the preview operation by viewing the video and listening to the audio using headphone. On the same instance, he/she will write down the script required for the news story. Previewing is done using mouse pointer and moving the bar left to write to rewind or forward and then play.

Ingesting	Mostly the files are bought in VHS, Beta, DV Cam or mini DV. The librarian will make written or typed record of the master copy in to the available system records and later will handover to journalist. Which the journalist will preview using VTR and mark the areas required to be ingested on to another tape. The same process explained in script writing will be also followed. The final approved content by News director will be taken and copied to another tape. Which in turn will be used for airing and storing. This process of copying tape will be done using two VTR`s units one player and a recorder.	The media files are mostly bought in either DVD/Chip (microchip, SD, etc.). The media files are handed over to the librarian, he/she will index and record the file details to the library system and move the media file to the NAS Storage. This will available for access for the journalist.
Script Editing	News director will go through the process of checking the typed script document prior approving the story and any changes, this will required to be retyped.	News director will access using the computer and check the stories and attached video`s on the application itself and if anything to edit or requires changes, he will do the needful real-time.
Editing Segment	Two VTR machines are in play for this task, one VTR is a player and the other is a recorder. The journalist will take the master copy tape from the library again and also the note in the hand, which she marked the timecode while previewing. First will insert the master copy tape to VTR player and a blank tape to the VTR recorder. By this process	As did above in Script Writing & Ingesting, the material received to the facility will be first ingested and then previewed using Remote producer application. Using the same application, the journalist performed on the editing of footage required for airing.

	she will play and record the required segments to the blank tape. This task is called cut to cut.	On completion of editing, the file will move onto the next level task of the workflow for attaching script.
Story Approval	Journalist will on be able to take print copy of the script and get this approved from News Director and if News Director wanted to see the attached Story footage, he will require to go to VTR and play the tape and preview story.	Journalist will show the printed script or the News director will log and check on the script, by using the application called Octopus. News director will be able to check and approve the story and also he also has the facility to view the attached video footage.
Language Change	Journalist will require access to VTR Recorder and mic and the control unit cut to cut to start the process of voicing on video footage. By inserting the recorded video tape with require footage, he/she will proceed with voicing over that.	Journalist will access an editing PC and by using the application Remote Producer, she will access the footage in NAS drive and by using microphone and setting the levels. Will proceed voicing the over the video.
Rundown Publishing	The final rundown is prepared on word document and printed, the scripts are also on word document printed and video`s footage on tapes. Journalist will require to carry the tapes and printed documents to the control room, and will require assistance of a staff in inserting tapes and playing in order.	The final rundown list is automatically created as playlist, once all scripting and attaching videos are done by the journalist. Journalist will only need to sit in the rundown PC at the control room and play one by one by clicking on the rundown list visible on the rundown PC. The news will be on air with help of control room staff.

Archival	The Aired News Segments and related footages are anyway on tapes in traditional model. These will be reviewed by the librarian and required materials are indexed manually on excel for future reference and stored in Library tape racks.	Aired News Segment or productions are stored in NAS (Network Attached Storage). These files can be accessed on the workstations, the IT personal or Librarian on duty will be in charge of the backing up process of the data on storage. Using MAM (Media Asset Management) software the process is backed up on to LTO 4 (Linear Tape Open – 4th Generation). These will be indexed maintained in the news library for future references.
Retrieval	As per the request and approved by News Director. The journalist will proceed to the librarian to inquire on the material. The Librarian will go through the related by accessing the excel files and searching to find out on which tape the requested material is available. After the tape is identified, the librarian will insert to the VTR and preview the tape on requested. Sometime if the process is long and many tapes involved, the journalist might take control in previewing the tapes for required material. Once previewing completed, the required footage is recorded back to a blank tape from master copy using the VTR cut to cut technology.	When a requirement arises in need of a video material from records, the journalist could get the help from the librarian to use the MAM system to identify the file backed up. These process is done by inserting the LTO 4 tape cartridge to the tape drive and accessing this on the workstation. As anyway the files are indexed and if the journalist provides accurate details for search, the files could be recovered easily and also could be previewed in low resolution prior proceeding to retrieve. These process is done with request form and approved by News Director.

Table 5 Comparison of operational task between Traditional model and NRCS

Duration of Activity (Units of Time)				
Task/Process		Traditional Model (Units of Time)	NRCS (Units of Time)	Difference (Units of Time)
a.	Previewing	25min: 30sec	18min:55sec	21min:95sec
	Script Writing	15min: 20sec		
b.	Ingesting	12min: 25sec	5min: 15sec	07min:10sec
c.	Script Editing	3min: 15sec	3min: 05sec	00min:10sec
d.	Editing Segments	19min: 49sec	10min: 24sec	09min:25sec
e.	Story Approval	6min: 33sec	6min: 55sec	00min:22sec
f.	Rundown	3min: 35sec	2min: 35sec	01min:00sec
g.	Language Change	25min: 37sec	15min: 25sec	10min:12sec
h.	Archival	4min : 01sec	1min: 50sec	2min: 11sec
i.	Retrieval	10min: 15sec	4min: 26sec	05min: 49sec

4.4.1 Findings

As per the table 1, the durations recorded states that NRCS operations are rapider in completing task than the traditional model, the outcome and noticeable were,

- Low Performance was recorded on Traditional model Equipment's and resources (VTR players and recorders, workstations, etc.)
- Complicated technical operations and functionality of Equipment's and resources on traditional model (VTR`s Recorders & Players, etc) Tapes formats and limitations of (Beta, DVcam , mini DV, VHS, etc).
- Operational workflow procedure on traditional model was long, reasons caused were the need of manpower for each task, and limited equipment's in operation

due the high cost of procurement of equipment's and maintaining was not scalable.

- Approval process was lengthy due to the limited technology advancement on traditional model.
- The traditional model process took long but was reviewed by Journalist in several instances compared to NRCS.

4.5 Interview Analysis

Total of 10 Candidates were interviewed. The interview process was detailed. In that 05 candidates were from News 1st Sri Lanka, 03 candidates were from IBC News London and 02 candidates are consultants one from Sri Lanka and other from UK. The candidates include News Directors, General Manager, Technical Director, Producer, Journalist/Editor and Engineer. The interview was done for around 35minutes to an hour and this varied from candidates. All the candidates interviewed were representing a media institute and were holding vast experiences in News operations. The IBC UK candidates were interviewed using the phone and was recorded and later transcribed.

4.5.1 Findings

RQ1: Efficiency of the newsroom with the use of the newsroom automation system (NRCS)

Newsroom operates with a flexible organizational structure. The news desk is the heart of the system, and the role of the workflow is to simultaneously manage and supply the radio station and television. The news desk consists of the Producer, editor and assistant editors. Editors supervise all the assignments and stories and report back to respective producer. The Newsroom system (NRCS) is the key to execute the operations smoothly, as said by the candidate 1 from News1st,

Newsroom system is an essential tool in today's context. Which provides accessibility to information for Management and controllability. For a better streamlined operations.

The use of NRCS in Newsroom has displayed enormously improvement. Some of the main areas which impacted in growth were increase of production, man power reduction and time. The program production has increased by numbers due to the flexibility of the system and the integrated workflow, as the system is capable of handling multiple formats of video and audio files from varies sources. The NRCS workflow is such organized that the task could be executed as scheduled. Man power compared to traditional system the need has reduced, as the system workflow handles most of the areas. As in previous traditional system, the equipment's and processes mostly require a staff presence to execute or monitor, whereas now, NRCS is a complete workflow and staff involvement is very low. Also every task or activity on system, there is a visible time savings compared to the traditional system. Candidate 5 from IBC UK stated,

It was hectic earlier days, the script needs to be taken to the typist and typist will have to type and then forward for approvals and if re-correction again this needs to be corrected. But now with NRCS, it complete automated, scripts could be approved or corrected by Head online from System and this will move on to the workflow next level.

Candidate 6, Consultant has stated that,

Yes I can see improvements but I feel that when you compare with earlier traditional workflow with current NRCS workflow, it lacks re checking of content and monitoring. The reason is that NRCS does it all and expected accuracy but finally if something goes wrong and that will affect the channel quality.

NRCS system workflow makes it flexible and easy for users, as the same content could be published to radio & TV, whereas previously in traditional system, the task needs to be done by two separate teams. Moreover, NRCS has made Newsroom a better efficient work environment with deadlines, accuracy and flexibility in aim.

RQ2: Advantages and benefits provided by newsroom automation system?

In the traditional system, where the scripts are being typed and print out is been taken for every news approvals and the cost incurred for papers in use of Newsroom was

high. When the NRCS came in to play, the cost of paper has been cut down drastically. Also the use of NRCS workflow will eliminate and reduce use of paper in all areas. NRCS has no limitation in importing file formats into system, as it supports all most all industry standards. This has made convenient for production in news, as contents could be available in any sources like mobile, tabs, etc. When you look at NRCS security, it has great benefits of providing the management details on user accessibility and work completed, also NRCS caters a portal separately for senior management to monitor, errors are avoided and work efficiency is improved. As stated by Candidate 2 from News1st,

NRCS workflow mechanism is such that it controls effectively the operations. NRCS is user friendly, Flexible and could integrate to any third party systems and will cater for any operator.

NRCS has facility to integrate all newsfeed agencies (Reuters, SNTV, etc) which makes the newsroom to be updated and have international leading stories at their fingertips, whereas in earlier traditional system that capability was not there and requires separate links to be terminated for service. NRCS has shown high reduction in manpower and high efficiency compared with traditional system, this has been discussed in the framework. NRCS provides mobility for management access, this enables senior level team to access and approved stories using mobile phone or tab. Candidate 4 from IBC UK points out that,

NRCS is the present and future path in technology for Newsroom, which benefits in Cost, Controllability, flexibility, Mobility and Expandability.

NRCS workflow has made the tapes and video tape recorders disappear by bringing memory cards and storage for easy access and speeder solution. This introduction of tapeless system has enormously benefited in production by increase of speed and reduction of man power, airing of news quicker than before and also compatibility with all systems.

RQ3: Challenges and difficulties faced prior Newsroom workflow implementation and the new newsroom automation system implementation?

In the traditional system of Newsroom, the operation was complicated and requires more time and man power in executing a task as mentioned in the framework. The difficulties and challenges, if we take the task of news scripting as a sample, which requires the journalist to bring in the approved story and he or she will have to first write down and draft out the news important story in a paper by previewing and playing the video using the VTR (VTR –Video Tape Recorder/Player operating is not an easy task and requires guidance specially for such cut to cut operations) and then records the important contents from the master tape to the tape to be aired. The written down drafted news is given to a typist to enter and print out is taken. Once everything is done, the print out of news and video file on tape will be sent to the News Director for approval, on his approval the story will be taken to be aired. This process at least requires 2-3 persons depending on the stories content and priority in a traditional workflow environment and also will take longer duration to preview the story and record to tape. The same way every task in traditional method was not integrated and requires separate allocation of man power and resources. When taken production, which will not be easy to handle several productions weekly in earlier days. The important lacking was the technology capabilities in the earlier days in traditional process and requires man power in most areas. Overall the operational cost of the Newsroom was high in early days if was compared with now.

Newsroom Computer System (NRCS) was the future for Newsroom and also to overcome the above, as said by Candidate 7 from News1st,

NRCS Workflow was announced by the Senior Management on adopting to the Newsroom Environment for an efficient operation. This story started to spread inside the Newsroom, and some staff members started talking on this negatively and others positively on the NRCS entry to the News1st. NRCS workflow was first such to system to be adopted by a Sri Lankan Media Institution in Year 2007.

The NRCS systems includes of several sub systems to have a complete integrated workflow, the workflow is implemented and supported by a system integrator, whereas the system integrators face difficulties in start and that is not only implementing the system but to train the existing staff in the Newsroom to adapt the new NRCS workflow. Same way the management faced difficulties in getting their staff to adapt and work on computers, as majority of the senior member in newsroom were poor in computer literacy. Also the operations in traditional system were segregated in Newsroom but in NRCS the operations were more organized and could be handled by single staff in most areas of functions, this was an issue for the management eg: the typist in traditional system was not required in NRCS, as all the journalist could directly enter the stories to the system and this will be easily accessible for the management. Likewise there were several position in traditional were not required and the management has to allocate them to different work or task and train them. Candidate 10 from IBC UK said,

NRCS deployment was well organized and the complete project was monitored and handled by the System Integrator and IT & Engineering Team in house but the huge delays and difficulties were caused in adapting to the system by the existing News team and to follow the guidelines or procedures, as any minor mistake could cause the halt of the live channel or black mark.

4.6 Summary

This chapter covered the data presentation and analysis of the research. First the financial analysis was performed in a newsroom of an international media institution and then followed by sections on analysis involving qualitative experimental and document. Observations were also partly documented in analysis. Finally analysis was on the interview responses.

CHAPTER 5 Conclusion and Recommendations

5.1 Introduction

The recommendations are based on the results of the research. These conclusions and recommendations provide data on how ICT has converged in Media Industry and its impact to growth of the industry. First to discuss the conclusions and recommendations of the research. Afterwards to explain on what are the limitations faced when the research is carried out. Newsroom Computer System is a new phenomenon to Sri Lanka and there is lack of sufficient researches done in the medium scale business domain. Finally, it discusses the areas of further research.

5.2 Conclusion and Recommendation

ICT influence in Newsroom use of NRCS. The study on literatures revealed that the NRCS is the future for a newsroom. Today, NRCS use has changed the way journalist work compared to the traditional system years back. The flexibility and manageability with the aim of airing news in a short time. Worldwide, the NRCS solution has been adapted by many leading newsrooms to be in par with the technology development and better management functionality. The first generation of system, which broadcast journalist got used to doing things in a certain way and the current NRCS Generation is huge leap with IT convergence and visible benefits.

The research methodology process was on qualitative approach, study relied on combination of detailed interviews document analysis, experimental process and observation. The importance of the study is the findings and the data, which was obtained from newsrooms where a complete NRCS system is operation. Analysis were performed in stages, Financial analysis was done on BBC, where annual reports and financial statements from year 2004/2005 to 2014/2015 were reviewed and identified that BBC first stepped into Digital Transformation in the mid of year 1996 by implementing ENPS NRCS and yearly they were spending around £6.7M for service contracts. In the year 2007/2008 BBC has invested £79M for digital initiative and this was a major technology transformation project and was aimed to provide BBC staff with fully converged environment. BBC awarded Digital Initiative project to Siemens

in year 2008 and expected completion by mid May 2009. The years passed on and it was the end of year 2009 and still no delivery by Siemens. BBC management were forced to cancel the project year 2009 end. Due to the poor management by BBC , in handling the project and was withdrawn with a loss and partial amount of £27.5M was recovered from Siemens. In 2012/2013, BBC invited supplier to bid for NRCS implementation to support 11,000 users. In the year 2015, BBC officially selected Annova system for NRCS with the reinvestment of £144M. The rollout was expected to be completed in year 2017. As per analysis, it was clear even after huge investments and losses in projects, the total revenue of BBC has significantly grown in years, main reason being the digital initiative steps and improvements and moving towards latest technology.

Document analysis was performed on News1st broadcast schedule (FPC). FPC is the critical and crucial part of media organisations. FPC was reviewed between years 2007 and 2015. In the year 2007 was the period of traditional system in function for Newsroom and year 2015 was in use of NRCS for newsroom. The FPC`s were analyzed on news programs, and it was clear to see an increase of news programs in year 2015 compared to year 2007. A 20% increase of programs have shown as per analysis after use of NRCS and also TV channel ratings display higher percentage of audience share in year 2015.

Further experimental analysis was conducted on traditional newsroom system vs the NRCS were done, in the aim of detecting the operational efficiency. In the newsroom, ten main task/activities were taken for this experiments. These task/activities include scripting, ingesting, previewing, script editing, editing segments, story approval, rundown, etc. The real situation based experiments were performed real time on traditional system, and data was recorded for every activity. Similarly, the same activities were experimented in real time on NRCS. Both methods were recorded and analyzed. Activities on NRCS are efficient and low time consuming, no documentation and less resources. Traditional System recorded as low in performance and manpower requirement was high and operational workflow was long. Overall use of NRCS has shown a 35% increase in efficiency operationally.

Interview analysis was performed with 10 candidates, overall opinions state NRCS is the futuristic and it's important for newsroom in current generation. Interviews from participants from IBC UK and News1st Sri Lanka has voiced out that NRCS has helped in development and improvement in efficiency compared to the use of the traditional system. News1st Sri Lanka implementations, discussion with the technical team and they had stated that they had several sleepless nights in making sure everything was working well in the workflow from start to end and the effort has shown a worth ROI after years of operation. Also the NRCS entry to the newsroom had shown several staffs work as redundant not required and created avenues for several new developments.

NRCS use in media institution Sri Lanka has shown impact in the productivity and efficiency of the news operation. When compared with international media institution, the efficiency is visible but the expectation and management planning differ and especially international media institution follow protocols and maintain industry standards in an organized level compared to Sri Lankan media institution. News operation in Sri Lanka, the media institutes currently address mainly to the local viewer not international and financially they are not in a stable situation to expand swiftly but are developing and trying to maintain operations to the international standard.

The NRCS has shown easy management and flexibility on a complete automated workflow but lacks in proper rechecking again by staff on the process/content, which it's felt has not been addressed by the newsroom management and not occurred in traditional system as this is checked in several points. Also the staff/users have to make sure the content aired is quality checked and seems a lacking area and seems the users trust on the default parameters of the system and was not the case in traditional system. Overall traditional system was a pre-organized method but had delays in operational task and had several levels of checking by a staff in making sure the accuracy. Whereas NRCS workflow had the system accuracy and trust and failed in areas to be rechecked by staff and not a fault on system but requires staff assigned on this. NRCS requires continuous investments and contracts with system integrators in maintaining

the support and upgrades. ICT Security is a critical area and needs to be addressed by the internal team in media institutes, as all contents in newsroom are vital and cannot take a chance of misuse due to the prevailing competition environment.

In conclusion, the recommendation is NRCS being on the platform of ICT has contributed in several ways in development in Sri Lanka media institutions and should be fully adopted by newsrooms than partial in Sri Lanka to benefit out on ROI and the efficiency in operations. Also clear interest and satisfaction were visible on users of NRCS after using for years and they do not want to move back again to any old method.

5.3 Limitation of Study

NRCS is a concept being used or in the pipeline by newsrooms in Sri Lanka therefore one of a major limitation was to find out in more than one newsroom in Sri Lanka that has fully fledged NRCS. The availability of existing data is very limited in Sri Lanka context is another limitation when the research was carried out. Some limitations were due resource constraints. The results and conclusion would have been more reliable and accurate if Sri Lanka had many newsrooms on digital and resources accessible. The accuracy of data collected was depending on many factors such as the data provider's attitude, perception, awareness, information knowledge and skill. Other limiting factor were some NRCS users reluctant to give feedbacks and they point out that the NRCS system is confidential to the company and they consider it contains sensitive information's.

5.4 Areas of further research

This research has potential and to be extended in many corners. NRCS is new phenomena in Sri Lanka for newsrooms and there is a lack of sufficient researched done in the business domain of Media institutes and newsrooms. Further it's very important to extend the research in newsroom NRCS and involvement of ICT security. This is important as several technology improvements and systems could be developed but security factors need to be on priority in an environment like newsroom. Moreover, local software industries have capabilities in providing such systems/workflow and this should be analyzed and extended research could be further done on how cost benefited in an operational model.

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APPENDIX

Appendix A: Questionnaire of the Survey

Interviewee ..... Date .....

Researcher ..... Date.....

Newsroom Procedures & Practices

1. What do you think about Newsroom system (NRCS) convergence?
2. Did you work in Newsroom before it adopted Newsroom System (NRCS)?

YES	NO
- Have your responsibilities changed? - In what ways have they changed? (Covering Story, how is the video or audio being ingested, how is scripting done and disseminated? - Is your job related to story selection or transformation, easier or more difficult? - Explain Why?	- What do you understand by NRCS? - What states that NRCS requires for you? - Does it make work easier or difficult on Traditional? How? -

3. When you hear about the Newsroom system (NRCS) convergence, was this Negative or Positive views?

News Content / Production

4. How do you handle operations in order for news production?

- News Gathering

- Story selection
- Editing
- Packaging

5. What ways has news production developed?

6. Does the news program producing work enhanced?

YES	NO
- Have your in house news related program production increased? - In what ways have they increased? How? - Is the program quality improved? How?	- What do you state as a cause? - What ways this could be overcome? - Does current or traditional process make work easier or difficult? How?

7. What challenges were faced prior NRCS?

Source / Archival

8. How do you handle operations of feeds and source for News Gathering
- FTP (File transfer protocol)
- Feeds (Reuters, SNTV, etc.)
- Live U / OB

9. In what ways news gathering sources has benefited the news operation?

10. What, where & how are the news related material archived and retrieved?

11. In what ways the current archival and retrieval method provides benefits?

Decision Making

12. Where & when does this NRCS platform become important?

- News Gathering
- News Production
- News Dissemination

13. How do you ensure that quality is not undermined?

14. How has computer technologies improved your work efficiency?

15. How was the traditional system compared with current?