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A CASE STUDY EXAMINING
THE ADOPTION OF NEW TECHNOLOGY
BY A NEW TELEVISION BROADCAST STATION

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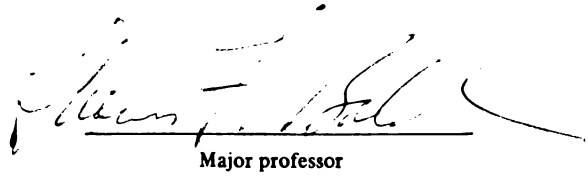

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A CASE STUDY EXAMINING THE ADOPTION OF NEW TECHNOLOGY BY A NEW TELEVISION BROADCAST STATION

By

Peter J. Martino

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ABSTRACT

A CASE STUDY EXAMINING THE ADOPTION OF NEW TECHNOLOGY BY A NEW TELEVISION BROADCAST STATION

By

Peter J. Martino

This case study focuses on the adoption of new technology by interviewing key employees on questions emanating from five propositions. It explores a broadcast station start-up in an effort to identify factors that support the development a formal policy or strategy for the adoption of new technology. This study presents three questions that address the issues of: a) how a station adopts, b) who is involved in the adoption process, and c) the effect that adoption has on the environment of the organization.

The study concludes that the development of a policy or strategy for adoption of new technology should: a)attempt to maintain a technical and administrative balance when adopting innovations, b)consider the composition of both initiating and implementing groups in order to facilitate the adoption process, c)develop an awareness of the impact that a competitive market has on a new technology.

In loving memory of my father, my brother Mark, his wife Martha, and their son Daniel.

ACKNOWLEDGMENTS

I would like to especially acknowledge my gracious and patient wife, Karen, who supported my desire to finish this thesis and my degree. I would also like to thank my thesis director, Dr. Thomas Baldwin for his patient direction and support, Dr. Connie Ono for her comprehensive and thoughtful guidance, and finally Robert Albers who has supported me throughout my graduate studies.

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Introduction

A case study was performed to test propositions relating to the adoption of new and emerging technology by a broadcast television station. The propositions originated in research concerning innovation diffusion and the adoption of new technology. This will provide a framework to explore and examine how organizations make the decision to adopt emerging technology.

The purpose of the research is to: a)validate the basis of a technique improving the process of adopting new technology, and b)clarify issues for research on the emerging technology adoption process in telecommunication organizations. Because the major purpose of this study is exploratory, it is important to maintain that perspective while reviewing individual conclusions of theoretical propositional inquiries. It is also important to examine the adoption process in the context of current industry circumstances.

Background

The broadcast industry is currently undergoing some major transitions. Rapid changes in video tape formats, production automation, stereo broadcasting and the impending decision to abandon the NTSC transmission standard for a

high definition television (HDTV) format ("Downlink," 1991) will put unprecedented strain on the decision-making process of broadcast stations. It is now common in contemporary television stations to encounter active participation by senior management in the decision to purchase one communications technology versus another. In fact, the involvement of diverse staff members (Rosenthal, 1990) in the decision to adopt technologies is now commonplace. The days of sole reliance on the chief engineer to initiate change is being transformed into a group process. In addition, the composition of broadcast engineers is changing.

There is a shortage of trained engineers (Mozzillo, 1990) in the broadcast industry that may eventually inhibit the industry's efficient and strategic transition from one technology to another. When these decision-makers, managers and engineers, move on to new stations, they often leave behind a legacy of purchase decisions that affect the station's physical plant and financial bottom-line long after their departure. This may compound a recent financial trend that indicates station value and turnover is also slowing down (Goldman, 1991). It appears that all of these factors work together to make the decision process in long-term investments of great importance.

The importance of the decision-making process in purchasing new technology is of significance to any firm adopting a new technology (Boddy, Buchanan, 1987). The

advent of large scale changes in television systems (production, transmission, and reception) of future technology (HDTV) mandates that the organizational composition of the station (broadcast and cable) must continue to evolve. The organization must foster the development of effective decision-making policies when adopting new technology if it expects to survive. While the product (programming) of television broadcasting has changed very little in the past forty years, the next twenty years may render it unrecognizable ("HDTV," 1990) to the next generation programming and production managers. This uncertainty, regarding production and product, compounds the number of variables in the process that decision-makers must consider when facing a major capital purchase.

The manager of the future will need to possess more refined and effective technical, organizational and analytical skills in order to successfully navigate through the coming decades of communication technology growth. The administrative aspects of the station are also changing rapidly. Personal computers have replaced the minicomputers that control traffic and billing. The widespread use of computers graphics for weather, word processing in the office, and remote transmitter controllers in engineering, contribute to the complexity of the modern broadcast station.

The problem that may emerge for the broadcast station or telecommunications organization of the future focuses on

the difference between the "anticipated" performance of an emerging technology versus its "actual" performance in the organization. This decision-making consequence suggests three questions to be explored in this study of the adoption of a new technology.

- How does a broadcast station make the decision to adopt an emerging technology?
- What group makes the decision to adopt a technological innovation?
- How does emerging technology influence the environment of the organization?

This case study will explore how a new broadcast station start-up in Lansing, Michigan, made adoption decisions relating to new and emerging technology. In addition, this exploration will analyze the adoption of emerging technology(s) within a framework of organizational theories of innovation with an emphasis on the adoption process.

Chapter Two

The Literature and Research

The decision-making process and the adoption of new technologies merge in a research area (Pennings, Buitendam, 1987) that considers new technology as organizational innovation. The study of the adoption of new technology can be viewed adjacent to three related research areas: the innovation-decision (e.g. Downs & Mohr, 1976), the diffusion of innovations (e.g. Rogers 1983), and technology as organizational innovation (e.g. Kimberly 1987).

Downs and Mohr (1976) define an "innovation-decision" process and prescribe a concept of the "adoptability" of the innovation. Organizations and innovations both contain what they refer to as primary and secondary attributes. The importance of this difference becomes more evident when attempting to classify technology as an innovation. Primary attributes are unchanging and essential to the technological innovation. A secondary attribute defines the innovation in relation to the organization. They vary as the senses perceive them. Downs and Mohr suggest future research consider the specific organizational unit in relation to the "innovation to be adopted" and not consider all innovations or all organizations as being the same. Research that fails to classify innovations based on secondary attributes will generate interpretation problems.

This concept is crucial to the case study. The innovation and the organization are defined within the context of a broadcast station. Secondary attributes of an innovation may classify a technology, not ordinarily perceived as innovative, as being very unique to the group adopting it. Television stations may operate on a macro level with one goal or unified vision in mind, while an individual department utilizing an innovation may function quite differently to meet the immediate needs of the unit.

Roger's (1983) model, for example, delineates a process approach to the innovation decision in the study of the diffusion of innovations. The process is divided into discrete stages of initiation (agenda setting and matching) and implementation (redefining, clarifying and routinizing). Roger's approach, and adjacent theories (e.g. Zaltman, Duncan, Holbet, 1973), depict the process as proceeding step-by-step in a forward-direction only. Roger's contribution as a process approach to research is at the organizational level of innovation, although his work also examines individual levels of the diffusion process. Of particular importance, are the discrete stages of process that proceed forward toward the adoption decision.

Zaltman et al. (1973) depicts an "innovation dilemma." Factors of centralization, formalization, and complexity affect the adoption process. Centralization is the degree to which decisions are made at the top of the hierarchy. Formalization is the extent to which rules and procedures

are enforced in the organization. Complexity refers to the amount of specialization in job positions. Structural variables of centralization, formalization and complexity are shown to have inverse effects at the point of initiation of the innovation as compared to the time of implementation. Zaltman's research demonstrates that at the initiation stage, low levels of organizational centralization and formalization keep channels of communication open. High levels of complexity lead to greater diversity of ideas, and therefore, facilitate the adoption of innovations. However, at the implementation stage, high levels of centralization and formalization put decisions where they can be implemented with standard policy and procedure, and low levels of complexity keep the issues clear and thus are facilitating factors.

How one classifies and defines the adoption process must be considered. It is here that Kimberly (1987) develops a contextual model of the adoption process. He considers technology as organizational innovation within the environment of the organization. This results in five typologies of the organization. Therefore, the organization with respect to the innovation can be: a user; an inventor; an inventor and user; a vehicle; or an innovation. Kimberly maintains that innovations should not only be considered an innovation in their broad or "field" sense as a radical departure from an existing method or state-of-the-art, but also in their "reference" sense, or how an organization

specifically considers or utilizes the innovation. This latter sense of reference is crucial to the depiction of the innovation in a station because many inventions and modifications, although not new or state-of-the art to the industry, are quite novel to specific organizations.

Different types of innovations are also identified in research on an organizational level. Damanpour and Evan (1984) examine the notion of "organizational lag" between two types of innovation: technical and administrative. A technical innovation refers to an innovation within the operational system of the organization and is directly related to the primary work activity. Administrative innovations, on the other hand, occur within social functioning of the organization, where people are interacting to accomplish the organization's goals and tasks. Damanpour and Evan demonstrate the theory of "organizational lag." This is the degree to which administrative innovations "lag" behind the introduction of technical innovations. Their research support these hypotheses: 1)organizations adopt technical innovations at a faster rate than administrative innovations, 2)the degree of lag between adopting both technical and administrative innovations is inversely related to the organization's performance, and 3)the adoption of administrative innovations tends to trigger technical innovations more than the reverse. Their main thesis proposes that the performance of the organization is enhanced where there

exists a balance of both technical and administrative innovations. The organization must constantly minimize the amount of "lag" between technical innovation and subsequent administrative innovation in order to improve performance.

Robertson and Gatignon (1989) demonstrate the competitive effects of technology diffusion in their research in marketing. They demonstrate that the competitive structure of both the adopter and supplier industry influence the adoption/non-adoption decision. They delineate the differences between adopters and non-adopters in relation to information-processing activity.

Robertson and Gatignon maintain that factors of industry concentration and inter-company communication among the adopter industries tends to increase the adoption of technological innovations. The decision makers' information-processing characteristics exhibit a dominant influence. Attributes such as a preference for negative information and information heterogeneity (the consideration of extra-industry sources) are positively linked to the tendency to adopt new technology.

The organizational environment within which technological change occurs is also established to be a factor in research conducted by Tushman and Anderson (1986). They cite the concept (Abernathy, 1985) that technological progress develops through stages or increments of slow enhancements, interrupted only by destructive changes (discontinuities) in the process. Tushman and Anderson,

however, go on to delineate these changes (innovations) into "competence-enhancing" and "competence-destroying" discontinuities. Technology that builds on existing technologies, yet represents an order-of-magnitude improvement, while not rendering earlier technology obsolete, are considered "competence-enhancing." Technology, on the other hand, that renders skills and techniques obsolete are deemed "competence-destroying." These discontinuities are correlated to either new entrants or existing firms within a given industry. Mature firms tend adopt "competence enhancing" technologies that stabilize the industry and strengthen the barriers to entry. New firms, however, will adopt "competence-destroying" innovations in order to disrupt the market and lessen the effects of the barriers to entry.

The nature and definition of an innovation must be introduced in any study of the adoption process. West and Farr (1990, p.9) define innovation as "the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, organization or wider society." The main characteristics of this definition are the intentional nature, the broad sense of benefits, and the lack of restriction to technology. This is the underlying definition used throughout this case study.

The research areas of innovation diffusion and technology adoption are immense. This review of technological innovation and change only begins to scratch the surface of the abundance of research material in the study of innovation and technology. It does however, delineate a framework of research that, when projected on a series of events relating to the adoption of new and emerging technology, should reveal insights into the phenomenon.

Chapter Three

The Propositions

Technology as organizational innovation, and the subsequent performance issues, can orient the organization to the technology being adopted. By linking the performance of the organization to its innovations, we should get a picture of how technological innovations influence organizational development. The ancillary issue of why an innovation is adopted should also surface as performance issues are delineated. The issues that are surveyed in the first two propositions attempt to explain the phenomena of "how" an organization makes the decision to adopt an emerging technology. These propositions also indirectly determine the time of adoption, in relation to its typology (either technical or administrative.)

Proposition One: Administrative innovations adopted by the organization tend to trigger technical innovations more than the reverse. (Damanpour, Evan, 1984)

A broadcast station may be more likely to adopt the latest technology in an organization where employees are encouraged to develop independent projects by top management. Top management that actively supports professional activities and education outside of the station may improve motivation and lead to the adoption of technical innovations. This contrasts with a company that initiates high technology adoption and fails to develop the administrative side with the same intensity. The thrust of

this proposition is to explore how a new station innovates in both administrative and technical areas.

When considering this proposition the primary focus is the influence of administrative innovations on the organization's tendencies. The climate for the introduction of technical innovations is forecast to be more congenial after the introduction of an administrative innovation. This is mainly attributed to the fact that administrative decisions usually trickle down from the top of the hierarchy (Evan, 1966), while technical ones move from the bottom to the top (Daft, 1978).

A broadcast station typifies this when top management implements new administrative innovations. A decision by the station manager to offer extra vacation time to an employee for a suggestion on how to improve station operation is an example. This type of directive could only come from the top where the authority exists. It is a directive emanating from the functional level of a staff position. An employee would then be motivated to suggest the introduction of either a technical or administrative idea. This proposition states that the resulting idea from the employee is more likely to be a technical innovation triggered by the introduction of an administrative innovation.

In summary, this proposition asks, what is the innovation and how did it get here? Although not directly

answering "why" an innovation is adopted, it may uncover the rationale of adoption.

Proposition Two: A balance of technical and administrative innovations correlates with a higher level of performance by the organization. (Damanpour, Evan, 1984)

The second proposition examines the performance of the organization within the context of adopting innovations. A balance of social and technical innovations tends to correlate with higher organization performance. This proposition explores if and why a balance exists.

The first two propositions are concerned with the organization from a comprehensive viewpoint. One example might be when a broadcast station adopts a new technology that allows for news stories to be originated anywhere in a statewide area (satellites), the social or administrative system must adjust to the increased demand created by the adopted technology. How crews are assigned, who is attached to the unit, how much travel time can be tolerated, are all aspects of the social system of the organization. Without subsequent action on the administrative side to address these issues, the resultant "organizational lag" will be a detriment to the ideal performance of the technology.

The performance of the organization must be identified in the second proposition along with its measurement instruments and values relating to the innovation. It is this identification that may answer a part of the "why" an innovation is adopted?

The innovation-decision area examines the decision process for its effects and its consequence. The process, or "how" of decision-making usually escapes direct observation for practical reasons, however, the consequences are present following any decision on the adoption of technology. The following propositions address the question of "who" makes the decision to adopt a technological innovation.

Proposition Three: A group that is not centralized, very informal, and works with a high degree of complexity in an organization will facilitate the selection of an innovation at the initiation stage. However, at the stage an innovation must be implemented, a group that is very central, formal, and operates at a low complexity will be more likely to adopt the innovation. (Zaltman et al., 1983)

This is the "innovation dilemma" of the organization that Zaltman addresses in his research. Simply stated, the very factors that aid selection of an innovation at the initiation stage, will be a detriment when it comes time to adopt an innovation.

A broadcast operation might support this proposition when the initiating group consisted of employees not near the top of the structure, operating informally with very few rules, while considering very complex issues related to the technology. This type of group would be more likely to adopt an innovation at the initiation stage.

An group of employees from production a engineering trying to solve a battery charging problem would be a good example of an initiating group. They are not central to the

station, nor do they operate at a high degree of formality. They will consider options that may be quite diverse indicating a high degree of complexity. They would more likely adopt an innovative technology.

At the implementation stage the opposite would be true. This group would consist of employees from management operating in a very formal manner while considering issues of very low complexity. They would be more likely to adopt the decision at the implementation stage.

The initiating group would then offer their suggestions to the implementing group. This would be a group authorized to allocate funds if needed. The station manager and accounting manager may be the target implementing team. They operate with more formality than a group of employees trying to solve a battery problem. This team is interested in a clear and understandable solution to the problem with obvious benefits.

Proposition three examines the organizational structure of the firm by examining the person(s) making the decision to adopt, and the person(s) that implement the decision. The major questions of interest concern the flexibility of the organization. Does the organization change its structure to facilitate the adoption, or will the organization encounter problems from initiation to implementation if the structure is not conducive? Any flexibility relating to the proposition, will manifest

itself in a tendency of the organization to adopt a new technology.

Proposition Four: The consideration of diverse sources of information (negative or positive) by decision makers tends to be a trait of those that are more likely to adopt innovations. (Gatignon, Robertson, 1989)

This proposition examines the person(s) involved in the decision process and in the process itself, with an emphasis on communication characteristics. It acts as a framework for the study of the adoption process from the perspective of information flows to and from the decision maker(s). Within this framework, data about how information is gathered and from what sources (e.g., conventions, sales calls, etc.) can be analyzed. It attempts to illuminate an answer to the question "who" makes the decision to adopt an emerging technology.

The sources of information on emerging broadcast technology products tend to be from publications and sales demonstrations. These sources are usually positively biased toward the product because of advertising. Negative information, although present, tends to surface long after a new technology has been introduced.

Decisions to adopt technical innovations are not made in a vacuum. Internal factors of performance will define why a technology may be chosen, but will not describe the climate in which the decision was made, nor the influence of the decision on the organization.

Proposition Five: A new entrant into the market tends to adopt "competence-destroying" discontinuities. (Tushman & Anderson, 1986)

A broadcast station may enter the market place with an innovation that renders past skills and experience in an operation obsolete. The introduction of the mini-cam replacing 16mm film cameras in the 1970's is an excellent example of a "competence destroying" discontinuity. It required the learning of new skills and procedures. The reliance on past procedures of film processing and editing was minimal and time was saved. A station adopting the mini-cam first could set a new precedent in the market by getting the story on the air faster. This would disrupt the market by increasing the viewer's reliance on the station for fast breaking news.

How does the new station in the market consider its role in the marketplace? This proposition considers the effects of the environment. Did the nature of the station and its newness affect the decision to adopt an emerging technology? "Competence-destroying" discontinuities disrupt the structure of the industry by lessening barriers to entry while setting up new barriers. The innovation also affects the environment. "Competence-enhancing" discontinuities usually are developed by mature firms in an attempt to maximize the barriers to entry. This station is a new start-up and its technological inventory has just begun. Therefore, does the station consider this as an opportunity to enter the market at an advantage?

Financial Considerations

There are several financial issues that are of importance to the capital budgeting and acquisition process. The primary importance of any capital expenditure is its relation to the short- and long-term goals of the organization. This case study will attempt, where data is made available, to include financial considerations in the final analysis of the adoption decision. Although the financial considerations are not propositionally stated in this study, their existence in the final analysis of the adoption of an emerging technology should be valuable.

The major concepts to be considered in this case study revolve around the expenditure and evaluation process. It is important to note that the decision to make or not make a major capital expenditure is not the focus of this study. Rather, it is the decision relating to the adoption of an innovative technology. The station could decide to invest in tried-and-true technology. In that context the following areas will be pursued:

> *Bottom-up versus top-down decisions*. Did the decision to invest in emerging technology emanate from the top or bottom?

The objective is to explore the motivation behind the decision to adopt new technology. Strategic planning aimed at investing in new technology occurring at the top of the corporate entity might suggest a long-term market goal. A decision from the bottom usually reflects a need for improvement in a particular area. This type of information

would directly comment on the overall thesis of the need for a standard policy to adopt new and emerging technology.

Type of judgement vehicle. What type of vehicle did the firm utilize when making the decision to adopt an emerging technology?

The objective is to determine the financial integrity of the judgement vehicle. There are several financial instruments to use when judging a new investment. Net present value (NPV), internal rate of return (IRR), average return on book, benefit-cost ratio, and payback are examples. They range in type from instruments that assess the profitability of an investment (e.g. IRR), to those that make simple analyses of investment (e.g. payback).

Type of performance evaluation. What type of method(s) will the organization utilize to evaluate performance?

Will they compare an actual budget to the projected budget when adopting a new technology? Can the quality the of work output be utilized as an effective and appropriate measure of the performance of the adopted technology? This relates specifically to the performance issues in the propositional section. In a broadcast station, the manner by which a decision is evaluated at the top may differ from the manner departments use their evaluation.

The objective of including financial considerations in this case study is to separate the decision in its pure financial aspect from its value to the organization adopting the technology. This information is being gathered to support performance conclusions used in the propositional section of the case study.

Classification

Classification of the organizational structure relates to the propositions by providing a model of how the organization functions. Primary to this section is the identification of the organization as outlined by Gullet (1975). This refers to whether an organization can be classified as "mechanistic" or "organic."

Mechanistic implies an organization that is not flexible, has a more stable structure, with clearly defined jobs and tasks. Knowledge in this structure is synonymous with rank in the organization. Rewards are based on obedience to instructions. The ability to process information is relatively slow.

Organic implies a very flexible structure that can adjust easily to change. There is a de-emphasis on job description and specialization with an emphasis on problem-solving. Decision making is decentralized and knowledge is not automatically an assumption of rank. It has a relatively high capacity to process information.

Goals and Objectives

The intention of this area is to see if any company-wide goals exist. Common goals can act as a focus and minimize hidden agendas within the organization. It is important to identify goals at the top echelon and determine whether they have been conveyed to the rest of the

organization. This reflects on the ability of the organization to focus on a common issue throughout the firm.

Method of configuration

Finally, the organization is defined according to how departments are categorized. An organization may be configured according to its function, output, client or geographical location. This information will be used to determine the structure of the company in order to build an organizational chart. Although not necessary for conclusions to be drawn, this information is being offered to provide as much background on the structure as possible.

Chapter Five

Method

Rationale for method

The case study method was chosen because of the contemporary nature of the series of events that occurred within the firm. In this case, a television station start-up and its related decisions involving emerging technology are the events. The phenomena, the adoption of new technology, involves a series of events for which the researcher has no control or ability to manipulate. This makes it ideal for a case study. In addition, the propositional nature of this study, the "how" and "why" questions, are an attempt to illuminate a decision-making process. The contemporary nature of the subject, the lack of control over events, and the how and why approach, suggest a case-study (Yin, 1987).

The type of case study selected is a single-case approach. One of the criteria for a single-case study is where the case represents an extreme or unique case. This is the qualifying circumstance that existed in the study of Channel 53 in Lansing, Michigan. It is unique in that there are few broadcast start-ups. The other factor was the schedule to be on-the-air in less than six or seven months instead of the normal twelve to eighteen.

Rationale for Site Selection

The rationale for the site selection is primarily based on the fortuitous start-up of Channel 53 occurring during the time interval of selecting a site for study. It is rare that broadcast television stations start from the ground up physically and organizationally. It is equally rare to find a market (Lansing) with the absence of a network affiliate that affords a station the opportunity to make an ambitious start-up; ambitious in the sense that without network affiliation[1], the station would not have included the news department in both the scale and scope of operation. Therefore, the combination of organizational development, network affiliation, and complete physical plant construction, permitted a unique examination of the decision-making process with regard to the adoption of new technology.

Hypothesis

The major thesis being presented is that the generation of a policy or strategy for the adoption of new technology by an organization will enhance the performance and organizational structure in a positive manner.

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[1]Network affiliation refers to Channel 53's desire to become an ABC affiliate.

Case study procedures

The case study begins with a description of the firm, its recent history, the type of organization that best describes its operation, and the extent of the technology to be examined. When necessary, information on the organizational structure, the financial budget processes, and the overall corporate philosophy and goals will be presented. The focus of this study is the innovation in relation to the group adopting it. In the case of Channel 53, the adopting group is the entire station, except where noted. The individual technologies, however, differ in composition. Interviews were conducted with the vice-president/general manager, news director, chief engineer and his assistant, senior producer, and a master control operator on two consecutive days. Information from the questions were compared where possible in an effort to minimize recall error by the participants. During each interview care was exercised to insure that each interviewee was given similar information when introducing questions to minimize errors in administrating the questions. This was an attempt to minimize interviewer bias resulting from the prompting of the respondent. There was also an effort to incorporate as many sources of information as possible before, durning, and after the site visit to improve the reliability of this study.

Each principal in the research was asked questions that fell into two categories. The first category asks general

statements that help develop a context for the study. It contains questions that deal with the organization's structure, goals, objectives of individual department, length of employment with firm, length of employment within the industry, and professional goals. This section was used to develop a structural model of the firm and present a profile of those interviewed. The data is provided primarily as a reference for the reader. The importance of professional goals may shed light on responses dealing with administrative and technical adoption factors. In addition to interview data, information obtained in pre-interview conversations was also utilized in developing a structural model of the station.

The only item in this section that is related to the propositions is the identification of an overall goal and accompanying objectives within a department. This was included as an aid in developing a model of the organization. It also serves to analyze the overall thesis, the existence of a policy or strategy for the adoption of new technology.

The second category contains questions that relate to the stated propositions of the research. In addition to the major propositions, information was solicited on certain financial aspects of the adoption process.

History of the Station

The broadcast station that was surveyed is Channel 53, WLAJ-TV in Lansing, Michigan. The station is a UHF-designated station operating on ultra-high frequency (UHF) Channel 53. It went on the air in October of 1990 with a brand new operating facility. Historically, the Lansing market was a two-station market. The CBS and NBC network affiliate stations, channel 6 and 10 respectively, have operated in the market since the 1950s. ABC coverage, however, is the result of "leakage" from the Flint and Battle Creek ABC affiliates. The late 1970's brought the arrival of a third station in the market, that tried, but could not demonstrate to the ABC network the value of an affiliate located there. That station, currently a FOX television affiliate, operates as an independent. In 1989, the present owner of Channel 53, demonstrated to ABC that a station in the Lansing market with a specialized coverage pattern could be a viable outlet and was awarded the ABC affiliation. This was the genesis of Channel 53. It is important to note that the station's existence as an ABC affiliate was made possible by a complex technical concept that is related to the shape of the coverage pattern. While most television patterns are concentric in design, the Channel 53 pattern consists of two linked (peanut-shaped) north-south patterns that enable the signal to fill a void in the coverage of both the Flint and Battle Creek ABC affiliates.

The awarding of the ABC affiliation also meant that the station had the top-rated network evening news program. It was assumed that this would enhance the audience to lead in with a local newscast. This factor had an influence on the final character of the staff by allowing the station to pursue a full-time news operation.

The station currently employs around fifty people, which is fifty percent of the employee's of each network affiliate stations in the Lansing market. They are attempting to operate a station in the same market, operating with the same quality, with significantly less staff than its competition.

The fact that Channel 53 would not exist in its present configuration as an ABC affiliate, without the development of a unique coverage pattern, is an interesting footnote to this study. The "peanut shaped" coverage pattern is a technical innovation. It is the event that lead to the ambitious composition of the station and preceded the development and subsequent adoption of many innovations in the station.

Classification

The respondents interviewed in this case study agreed in almost all of the questions relating to the classification of the station structure. The station is organic in structure. Organic refers to a flexible organization that easily adjusts to change, has a high

capacity to process information, and stresses problem-solving. It is important to note differences in the introductory responses dealing with the organizational structure and perception. This occurred in the goals and objectives identification.

Goal and Objectives

The identification of an overall goal and subsequent objectives of the firm is problematic. It appears no overall station goal was presented to key employees.[1] The general manager reported that the station did have a clear goal. That goal was the displacement of the two ABC affiliates whose signal "leaked" into the Lansing market. Channels 12 from Flint and 41 from Battle Creek both showed up on ratings in the Lansing market. Either this was not communicated, or it fell on deaf ears. The result is that no goal was reported by the key employees. This could result in a certain amount of goal displacement within the firm whereby immediate goals replace the overall goal of the station. Where there are no goals present, they can become arbitrary and self-serving to the department or individual.

Method of configuration

The station organization is departmentation by function, with the organization grouped (FIGURE 1) according

[1]The term "key employees" relates to the fact that the interviewees were selected by the station, and not the researcher.

to their functional areas. The production department is responsible for production, engineering for engineering and so on.

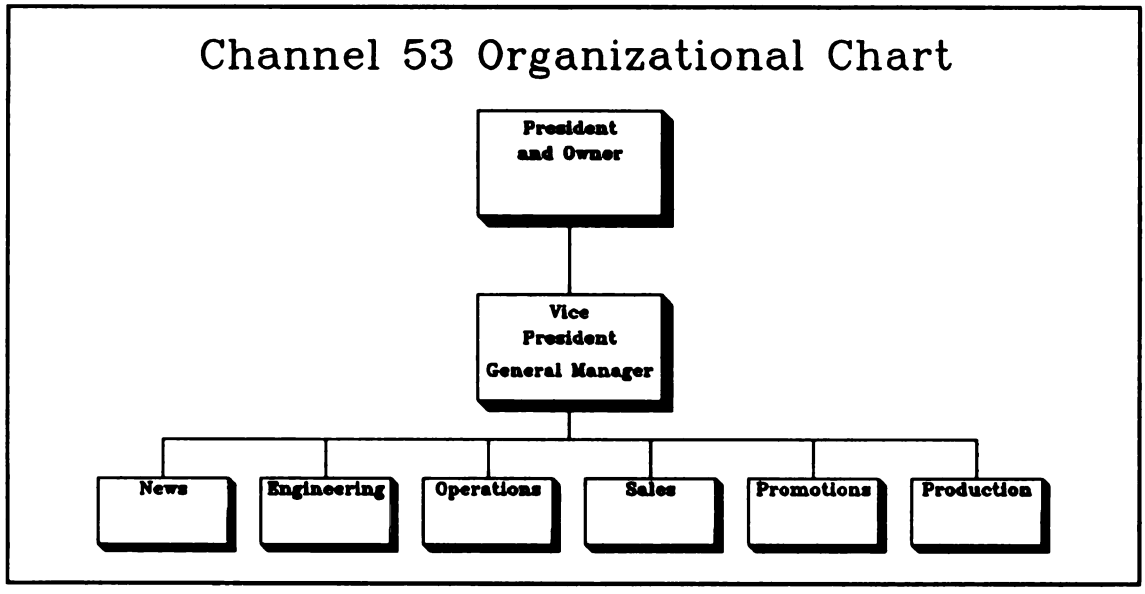

FIGURE 1

An alternative to this configuration would be departments grouped according to their output. In that case, there may be production employees permanently attached to news, promotions, and engineering. There would be no production department, rather, each group utilizing production would have their own production department.

Two advantages of a functional structure can be stated (Gordon, 1981). One, there is reinforcement of professional identities where employees with related training and experience are grouped together. And, two, the enhancement

of professional development takes place as promotions occur within the department.

On the other hand, there are disadvantages to the structure. Coordination and control are often compromised because of differences in expertise, goals, and operating procedures between departments. Communication among departments may suffer because decisions are made from the top of the department. Lastly, individuals may loose sight of the overall goal of the organization because the focus within departments is on specialized operations. The relation of structure to the adoption of technology in the broadcast station is important when looking at how overall goals affect the adoption process. The issue of goal displacement is important. Displacement can occur if top management states an organization goal that is not perceived by others. This is where groups divert energy from an organization-wide goal to departmental or individual ones.

Employee profiles

The vice-president/general manager has complete responsibility for supervision of staff and operation of the station. He suggests, however, that the president and owner makes his presence felt in the daily operations of the station. This type of perception by the general manager must be taken at face value. It does suggest that at times, the owner makes decisions normally entrusted to the general manger. The general manager is an experienced veteran of

the broadcast industry. He began his career as a live-news director in 1951. Since that time, he has worked his way into management positions, most recently at other Lansing stations. His professional goal at this stage in his career is to continue to do the job right and with pride. Short-term, his goal was to bring the station on-line as quickly as possible. He referred to the fact that the sooner they were on-line, the greater the cash flow. He describes the structure of the station as flexible and he relies "heavily" on the department heads. He maintains that the overall goal of the firm is two-fold: one, to become the station of record for ABC in the market, and two, to become a market force in the ADI (Area of Dominant Influence.) The specific objectives stated to enable the goals was a single response, "programming." The station's objective is to build an audience with programming as its major component.

The news director, although less experienced than the station manager, began his career in the industry in 1966. He was also brought on-line prior to the start-up of the station. His background includes employment at a broadcast station in the Lansing market for a number of years. He has direct supervision over a staff of fourteen. His short-term goals stress inspiring the "professionalism" that must exist in an effort to get the station up and running. This also includes his notion of "survivability" during the clamor of starting a news operation. Long-term goals are influenced by his future retirement. He wants to be sure that he

maintains the same enthusiasm and energy without being distracted. This will be accomplished by "taking the market," a reference to the long road ahead competing against the two entrenched news operations in the market. The station organization is very flexible from his standpoint. He echoes the station manager's philosophy by responding that there is no interference, his function is very autonomous. He could not recall the mention an overall goal of the firm, but fashions his own station goal of being competitive after three years, and to be a market force. He refers to the "books" or ratings as the data used to measure this goal.

The chief engineer is responsible for the direct supervision of ten full-time employees. He was hired prior to start up and initiated preliminary thinking on this project (building a station facility) prior to leaving his former position. His twenty-year tenure in the business is similar to the other department heads. He worked in the Lansing market prior to this position, at the same station as the current station manager. Professionally, his short term goal is the successful start-up of this station. His long-term goal is to manage a broadcast station, either radio or television. The station organization is seen as very flexible from his vantage. His role in the station operation reflects his multiple abilities and skills, not just his engineering interests. Although no overall goal of the firm could be recalled, his *de facto* role in the start-

up process was to formulate and present initial goals and objectives. Currently, the process of goal/objective formulation is very dynamic and no single goal surfaced as central to the station start-up.

It is important to note that during preliminary phone calls and discussions with the principals of the station, the chief engineer was credited as the central figure in the start-up of Channel 53. Everyone interviewed stated that the technical, physical, and comparative financial proposals were created by him. In this author's opinion, the chief engineer in this case represents the new breed of engineer in the broadcast field. In the past a station manager might rise from the ranks of the sales department. Today's station manager is just as likely to come from an engineering or financial area in the company. The chief engineer in this case has a long-term professional goal to manage a broadcast facility. His interdisciplinary approach to technical, operational, strategic and management areas is reflected in his roles of getting Channel 53 on the air.

The senior producer directly supervises seven employees and reports to the production manager. His eight years in this industry are all with television stations in this market. He was hired prior to the start up of the station. His short term goals are very opportunistic. Experience and opportunity are the goals that will hopefully support his long term professional goal of advertising agency

management. The overall goal of the station was reported by him to be the number-one station in the market.

The master control operator is the only line level employee in this study, and has no supervisory duties. He is responsible for operation of the master control switcher and its related functions. The master control area processes the final product of the station by controlling the timing of each program and commercial entry in the station log. The master control operator operates an automated playback machine controlling the programming (programs, commercials, news, special reports, etc.) of the station. This is his first formal position since leaving college, and his short-term professional goals center on surviving and finding an niche in the production business. His long-term goal is to manage a teleproduction facility. He reinforces the responses of others in reporting that the organization is very flexible. The overall goal of the firm was not entirely clear to him, yet he recalled the objectives of getting on line and being competitive.

Chapter Seven

Case Study Conclusions

The Innovations

The propositions will either be supported or not in the following section. However, prior to those results, a brief listing of the agreed upon administrative and technical innovations provide a guideline for the study. An administrative innovation occurs in the social system of the organization. A technical innovation, on the other hand, is directly related to the primary work activity of the organization (Damanpour, 1984). We begin with a list of the technical innovations.

Administrative Innovations:

1) The flexible (organic) classification of the station structure. It differs from traditional stations in the amount of control that comes from the top of the hierarchy. Managers, in this situation, are more likely to give a greater discretionary control in the everyday operation of their departments.

2) A personal computer network was adopted by the station. It allows interactions between departments by means of a shared software system (e.g. word processing) and the ability to access work at locations other than your own desk. This innovation is also classified as a technical innovation and is described in more detail later. Its major

role in the station is to "interface" diverse functions in the station.

3) The newsroom physical layout is an "open office" design. Desks or carrels are centered in the open area of the office. This design was instituted to minimize isolation and emphasize homogeneity and interplay among employees. The news department also instituted "dark time," a period at the end of the day when any news employee could share ideas with the news director in an informal setting.

4) The production department operates in a full-service manner when producing commercials. Full-service refers to fact that one person is responsible for the entire creative process. When a producer is assigned a project, that person supervises the project through its entire life. This allows the producer to control the focus of the production project from initial client meeting to the delivery of finished tape.

It is important to note that this case study does not examine individual technical innovations, rather it considers the entire process of the decision to adopt as an event to be examined.

Technical Innovations:

1) The Odetics programmable cartridge machine that is used to automate the playback of video commercials during the broadcast day. This machine design departed from earlier concepts of master control operation by placing the

central processing capabilities of master control in tape playback, not in the master control switcher. This machine enables the station to completely automate the master control room operation.

2) A personal computer network links all of the station departments. It consists of two local area networks operating under the UNIX and MS-DOS operating systems. The individual networks share office utilities (word processing and database programs) and allow for departments to access each other's information. The future plan for this system includes electronic mail and meeting functions.

3) The Betacam SP (special performance) video tape format is used in most station production. This is a revised and improved Betacam format allowing longer playing time, additional audio tracks, and improved signal.

4) The transmitter and micro-wave links installed are a hybrid system. The technical specifications of the transmitter allow a more efficient use of electricity (of particular concern with UHF transmitters) allowing a reported savings of $50,000 a year. The microwave links to the transmitter from the station included noise-reduction systems uniquely configured for this station by the engineering department.

The first two propositions consider administrative innovations and their existence in the station. It is appropriate to point out that Channel 53 is considered a small firm. The individuals interviewed in this case study

represent a handful of employees. They are considered line level employees directly involved in producing a product or service as output. Administrative innovations, however, are the domain of a staff level person. A person at a staff level is concerned with the advice and assistance to get the job done at the line level of operation. This fact limits the conclusions that can be made from the first two propositions. Although we can look to this group of employees that were interviewed for support information, by definition, they are not directly involved in the administrative duties of this station.

The Propositions

Proposition One: Administrative innovations adopted by the organization tend to trigger technical innovations more than the reverse. (Damanpour & Evan, 1984)

The organic structure of the station and a hands-off approach by the general manager is the first administrative innovation noted by the general manager. Although this is a common management style, in this situation with this manager, it is a departure from his previous positions and is thereby considered as an administrative innovation. His management style, and its existence in this broadcast station was also recognized by both the news director and the chief engineer. There was no mention that the technological make-up of the station mandated the style of management or structure of the station. There was, however, repeated mention of the "flexible" structure of the station

in the same context as the introduction of emerging technology to the work place.

Specifically, the news director mentioned the adoption of the electronic newsroom (PC driven) within the context of top management style. This management style contributed to the behavior that facilitated the adoption of this technical innovation. When the electronic newsroom was first requested by the news director, the added cost was met with resistance by the owner. The purchase was ultimately facilitated by the chief engineer who presented comparative cost data of using manual procedures versus the personal computer. This flexibility in considering information for a purchase in the news area from a separate discipline (engineering) reflects an openness to consider individual knowledge, and not level of authority in the organization. Although the electronic newsroom was adopted, the influence of the chief engineer was in a financial, and not a technological manner.

The chief engineer cited the style of the top management (organic) to be conducive to the design of a technologically-advanced station. This style, however, emanates from the down-sized nature of the station. They rely more on a person's knowledge than their level in the organization. The assistant chief engineer was responsible for the design and operation of the personal computer network in addition to his full-time engineering duties. His dual function made possible the consideration and

adoption of a PC network. The PC network is a technical innovation that is composed of specific software (traffic, billing, etc.) that aids staff in their work function. It would appear that the station utilized its personnel in an effort to facilitate the adoption of labor-saving technical innovations in the form of specific software.

The second related response to the first proposition was somewhat of a surprise. The introduction of the personal computer (PC) and the local area network (LAN), was also identified as an administrative innovation. Since the modern computerized television station was in many ways new to arriving personnel, it served as a means of interaction and social confluence in the office. The general manager and news director reported the PC and the LAN promoted interplay among employees in the time period prior to and during start-up of the station. The employees shared the same learning curve as they operated new software. Those who were more qualified aided those not yet up to speed, and problem-solving became a group activity. Inter-departmental interaction increased as workers using computers shared software. This happened in two distinct ways: one, they could work in a common software "shell" so to speak, and two, they could do so in different locations other than their own desk space. This software "shell" refers to the fact that anyone using the word processor program shared common experiences. Common files, training, and training concepts could be shared. Employees could also access their

work at locations other than their desk. The employee's notion of desk space could therefore encompass the entire office.

This introduces a more complex interpretation of the first proposition because of the nature of computer networks. Can we consider the computer network as both an administrative and a technical innovation? The network-operated software (e.g. traffic and sales) is technical (the work output of the group, while the network operation (social) is administrative. It is complex because, on the surface, hardware and software appear to be preclusive, one can not exist without the other. Trying to analyze what came first is the dilemma. A possible answer lies in the fact that the decision of what "specific" software to adopt exists independent of the decision to operate a PC network. This is not preclusive. One can decide to purchase "traffic" software for the network, or utilize an on-line service out of house. In the case of Channel 53, certain traffic software was purchased to run on the local network[1] that may interface eventually with other systems. Complete automation of scheduling, playing, and logging commercials is possible in the future. Commercials may be sold, scheduled, played and logged in one integrated computer operation.[2]

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[1]This service could also have been accessed by purchasing a terminal and connecting to a minicomputer at a central site.

[2]Long-range plans for the station include the further development of automated traffic and commercial playback

The preceding information appears to support the first proposition. The management style of the station did facilitate and quite possibly triggered the adoption of subsequent technical innovations. One aspect of the PC network can be classified as an administrative innovation. This innovation, the network's existence, preceded the decision to adopt specific software that is a technical in nature. The PC network could have existed in a very basic form with no added technical innovations. The station did, however, decide to adopt software that is classified as an innovation. The existence of the network appears to have "triggered" the adoption of technical innovations. This series of events does support proposition one.

The news department adopted administrative innovations in the forms of office configuration and management. It was the intent of the news director to communicate a sense of professionalism, a common purpose. The objectives to meet this goal surfaced in the notion of an "open office" for idea and story generation for news. The news department employees gather in the news director's office late in the day to present new ideas and approaches to stories. This innovation did not trigger any subsequent technical innovations and therefore, proposition one is not supported within the news department.

The adoption of other major technical innovations, the transmitter, the betacam videotape format, and the automated cart machine, were all mentioned in examining the first two

propositions. It is important to note that all of the above technological innovations were also adopted simultaneously within the broadcast industry. Both the chief engineer and news director agreed on this response. The coincidental adoption and approval by the industry, although influential and fortuitous, does not dictate adoption by an organization. In other words, although historically the innovations were universally adopted by the industry, this does not mandate that institutions adopt them. The issue of choice still exists. The administrative innovation dealing with station structure (organic) was present during the design stage and preceded the choice of technical innovations. This would lend support to proposition one.

The litany of the adoption of technical innovations following administrative innovations supports the first proposition. While there were no technical innovations recalled that may have triggered an administrative innovation, the existence of the station was made possible by the unique signal pattern of the station transmitter. This appears to be an instance where a technical innovation did precede the subsequent station design and operation. The total design and operation of this station, however, is not considered as a discrete technical innovation.

Proposition Two: A balance of technical and administrative innovations correlates with a higher level of performance by the organization. (Damanpour & Evan, 1984)

Support for the second proposition is mired in the notion of station performance. Performance appears to have been, and currently is, measured by the absolute survival of the station in the market with adherence to an aggressive start-up time line. The station manager's measurement of performance was based on the decay of ratings for the stations that "leak" into the Channel 53 market. That has been accomplished. When others were queried about measurement, the responses suggest that those mechanisms will be developed in the future. How that judgement will be made was not clear. "When we get there we'll know, or if we don't the station will have failed" is the perception.

The intent of this proposition is to help illustrate the "why" a station adopts an emerging technology. This proposition concentrates the inquiry around the issue of performance. The ability of the station management to conceive, design, construct, and operate a broadcast station in six months time is an extraordinary accomplishment. Performance levels of the organization can be assumed to be very high. The lack of formal performance measures, however, will make it very difficult in the future to repeat the process with the same results.

It is appropriate at this time to report that meeting with the financial officer of the firm was not possible during this case study. This meeting may have shed some light on how financial factors play a role in measuring station performance.

The news director responded that his area tried to maintain a sense of "balance" between technical and administrative innovations. The news department, under his supervision, favors the administrative aspects of the department. People are the "primary tools" of the news office and efforts are directed to improve their performance. The news department has a concentration of technical innovations consisting of Betacam cameras and editing stations and a PC-based form of writing the news. It is safe to assume that the news director's personal philosophy of management, is an attempt to balance the technical with the administrative.

Proposition two is therefore supported within the environs of the news department only. A definitive conclusion on a station-wide effort to balance the technical and administrative did not surface. Although formal performance measures were not reported, it does not mean they do not exist. It would be presumptuous to assume that this instrument is not present. It may, however, indicate that management is only concerned with making it through the first year and in the process develop an overall performance measure.

Proposition Three: A group that is not centralized, very informal, and works with a high degree of complexity in an organization will facilitate the selection of an innovation at the initiation stage. However, at the stage an innovation must be implemented, a group that is very central, formal, and operates at a low complexity will be more likely to adopt the innovation. (Zaltman et al., 1973)

The third proposition deals with the make-up of the initiating and implementing groups with regard to the adoption process. The group initiating the technical innovations in the station consisted of the chief engineer and his assistant. They solicited input from various departments managers throughout the initiation process. Their degree of formalization and centralization was very low. They worked with no budgets or standard procedures directed by the corporation, and their composition did not include anyone from the top echelon. Not only are they engineers with a highly complex viewpoint in the development of technical systems, they both are engineers with a wide range of non-engineering skills and interests. The initiation stage agrees with the proposition.

It was inconclusive whether the idea for this television station included the designation of who would initiate, design, and implement. It would be valuable to know the initial intent to determine the amount of change from the beginning. The responses, however, illustrate that a dynamic process, and not a static approach to initiation and implementation existed in order to get the station on-the-air in a short time frame.

The implementation group is different than the initiating one. The engineering team presented a plan reflecting the initiation stage to the owner and general manager. It is important to note that this plan consisted of the complete design of the physical plant. This included

the structure and design of administrative offices as well as technical facilities. The implementation of the plan was done by the owner, general manager, and the chief engineer. The group is very formal and centralized with the inclusion of the general manager and the owner. The information is in the form of a presentation, a distillation of information the makes complexity less a factor. The implementation stage is now in agreement with the proposition.

The third proposition is supported as the organization adjusted its group structures during initiation and implementation for the purpose of facilitating the start-up, which included several technical innovations.

Proposition Four: The consideration of diverse sources of information (negative or positive) by the decision maker(s) tends to be a trait of those that are more likely to adopt innovations. (Gatignon & Robertson, 1989)

The appropriate group to examine in this case differed from previous propositions and is limited to the engineering team. The fourth proposition addresses the communication processes of the adopting group. If we examine the communication process of the entire organization, the reliance on the engineering team to present the station design and configuration to senior management was very limiting. The only potential negative information presented to the implementing group came in the form of bid proposals from various suppliers. This is not, however, the focus of this proposition. The cluster of both initiating and

implementing groups is not the appropriate focus. It is only appropriate to examine the group making the decision to adopt or not adopt an emerging technology, and not the group implementing the adoption decision.

The engineering team examined product information in the start-up of the station that emanated mainly from professional affiliations. Membership in organizations that conduct trade shows, publish articles and offer individual seminars on emerging and existing technology rated high with the respondents. The personal contacts from membership in organizations were extremely important to the team in acquiring information on a new technology. This type of information is generally free from the type of bias that advertising supported publications or factory seminars might contain. They were equally reliant on trade publications as a source of information about technology. Other necessary sources, included sales engineers and factory representatives.

There was support for the team (chief engineer and assistant) for site visits to existing operations that utilized proposed technical innovations, but the ambitious time frame for the start-up of Channel 53 proved to be restrictive. This type of activity would allow the team to examine positive and negative aspects of proposed technology. The impact of these visitations, however, was minimal. It is important to note that potential sites to

visit are usually obtained from manufacturers and vendors of technology with their own agendas.

The engineering team also developed a unique microwave link connecting the studio with the transmitter. In the process, they dealt with factory engineers and took advantage of the technology in a manner new to the manufacturer. This would imply an exhaustive search of the benefits and detriments of the technology in question. It is one example that demonstrates the team's openess to information. Because it is the only reported instance, this proposition is only moderately supported.

Proposition Five: A new entrant into the market tends to adopt "competence-destroying" discontinuities. (Tushman & Anderson, 1986)

This proposition classifies the technology that was adopted. Although earlier propositions did define the technology as technical or administrative in typology, this proposition seeks to illustrate the environmental involvement. The engineering team reports the emerging technologies adopted to be competence-destroying. The technology adopted required unique training and skills and did render existing skills obsolete. The chief engineer estimated that eighty percent of the new technology did not build on existing skills or competence of the users.

Proposition five was supported in this study. Not only did the respondents state the reliance on new competence-destroying technology to be high, but, their stated goal of

accomplishing the same task in the market with less employees was specifically agreed upon throughout the organization. It does appear that the new entrant to the market preferred competence-destroying discontinuities and entered the market place with an advantage of using fewer employees.

Financial Considerations

Financial considerations are included in this study in an effort to reinforce the theoretical framework around the adoption of new technology. The nature of inquiry in the financial area is not as extensive as the propositions because it was concluded early in the formulation of this study that information might be restricted from review. This in no way reflects on the relative importance of including financial aspects in the theoretical framework. Where defined and delineated, they provide valuable insight into the decision-making aspect of a capital budget decision.

> *Bottom-up versus top-down decisions.* Did the decision to invest in emerging technology emanate from the top or bottom?

The decision to invest in a broadcast station was a strategic decision made by the partners of the company. The budget proposal for operations, however, emanated from an engineering group. The strategic decision by the owner to build a station reportedly did not include a dollar amount. However, the owner's past experience in broadcast station

development does suggest a estimated final price did exist. This issue is further complicated by a response from the general manager that the plan was not a "budget driven" plan. The decision to start a station may have come from the owners, however, the specific decision to adopt new technologies was not reported to exist in the overall strategy. The strategy to build a technologically-driven station originated with the chief engineer, and was positively embraced by the general manager and the owner.

Type of judgement vehicle. What type of vehicle did the firm utilize when making the decision to adopt an emerging technology?

There were disparate answers given by interviewees on the judgement vehicle to be used in assessing the plan. The specifics of rationale for emerging technology involved the calculation which included replacing the equipment with new technology sooner than later. This was done by the chief engineer. Comparisons between technologies was based on the assumption that in the future[1], technology purchased now would need to be replaced. It would be less expensive to invest in the new technology today, realize the economies, than to wait a few years down the road.

The judgment vehicle used by the owners and station manager was not reported. Without any discussion with the financial officer, this issue remains unknown.

Type of performance evaluation. What type of method(s) will the organization utilize to evaluate performance?

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[1]The current package of equipment was purchased to last three to four years.

Performance issues relating to the adoption of technology is complicated by station start-up and the concurrent adoption of new technology within the broadcast industry. The overall station's financial performance was reported by comparing actual to projected profit. The individual break-out of new technology is measured by survivability in the market with a "shrunken" staff. The quality of the station's on-air look was mentioned, but it was not reported as a formal measure.

The general manager reported that the additional cost of the station operating budget to use up-to-date technology versus older technology was about thirty percent. This does indicate that a financial comparison was made at the time of implementation that may have itemized the emerging or innovative technology.

This section of the case study suffered the most by the lack of access to the financial officer. The purpose of this section is to identify factors relating to the adoption process. It is concluded, therefore, that there was no financially-based corporate strategy for adopting emerging technology. There is no formal mandate from the top indicating a strategy or policy for adopting emerging technology existed in the plan to build the station. There were indications that alternate technologies were considered. This consideration, however, appears to have overwhelmed by the decision to build a technologically-advanced station.

Chapter Seven

Analysis and Discussion

Analysis

The purpose of using a propositional approach in this case study is to provide a theoretical framework from which to explore the process of decision-making in the adoption of a new technology. The limitations and qualifications of this study, however, affected the propositional conclusions. First, the scope of this case study, the adoption of emerging technologies by Channel 53, should not be confused with an overall examination of the start-up process. This case study focuses on new technology adopted after a decision to build a broadcast station was made. There were only five employees interviewed over the course of two days. Missing from this group was a finance person and the production manager. Lack of information in these areas could not be substituted and left many questions about the process of adopting an innovation. A major problem surfaced when overall station performance measures were not identified or reported. This lessened the influence of the propositional conclusions on the support of the major thesis. The study also sufferred from a lack of sufficient innovations, both administrative and technical, during the short time period studied. This seriously impacts any generalizations from this study.

This analysis begins with a review of the major thesis presented in this study. The existence of a formal strategy or policy for the adoption of new or emerging technology in an organization will enhance its performance. A review of the major questions of this case study in relation to the theoretical propositions should contribute to the validation of the major thesis.

- How does a broadcast station make the decision to adopt an emerging technology?

Propositions one and two define the organizational framework within which the station makes the decision to adopt or not adopt an emerging technology. Both of these propositions were supported, administrative innovations did trigger technical innovations more than the reverse, and a balance of the two types appears to benefit performance. Although the performance issue is troublesome, the conclusion that performance is enhanced can be made based on the notion of the station surviving the first year.

In the case of Channel 53, the "how" aspect of this question is interwoven in the decision to operate the station in a very flexible fashion (organic structure) and to exploit the emerging technology that will allow the station to operate efficiently. This supported an atmosphere for innovation. The station management and ownership didn't start out with a formal and rigid

structure, instead, they took advantage of individual expertise, in an effort to finish the station.

The news operation was, from the outset, designated as an important component of the station. It is therefore, consistent with the second proposition, that an effort was extended to "balance" the technical and the administrative sides of the management equation.

It is important to review the concept that the station was technologically-driven. The dominance of technology was so great that the complete design and configuration was placed in the area of the engineering group. This places a great amount of weight on the substance and development of administrative innovations. Although no formal policy existed to emphasize maintaining a balance of technical and administrative innovations, the results of the propositions in this study indicate that "organizational lag" existed. Specifically, the news department acknowledged the dominance of technology and made an effort to "balance" the two. This indicates that a policy addressing the adoption of technological innovations should include a component that monitors the "balance" of innovations in a station.

- What group makes the decision to adopt a technological innovation?

Propositions three and four relate primarily to the issue of describing the groups that make the decisions. Proposition three focuses on the "innovation dilemma." The

factors of centrality, formality, and complexity tend to influence the adoption of innovations in opposite directions from initiation to implementation. The phenomena of an aggressive time line had a major impact on this proposition. The initiating and implementing groups appear to have functioned dynamically by making continual adjustments affecting centrality, formality and complexity. The station management transferred an enormous amount of responsibility into the domain of the chief engineer. His role as both initiator and implementer aided the dynamics of the process. His membership in both groups appears to have regulated the process by facilitating communication, thereby minimizing the effects of the innovation dilemma.

Proposition four addresses the communication processes of the group adopting the new technology. This proposition states that adopters who are open to information, negative and positive, are more likely to be adopters. There was enough information to suggest that the engineering team was willing to listen to both aspects of a new technology. The engineering team developed a unique configuration of components used in the studio-to-transmitter microwave link. In the process, they worked closely with factory engineers. This process involved an exhaustive examination of the benefits and detriments of the technology in question. This precipitated many facts about the positive and negative aspects of the equipment being considered.

The professional affiliations and involvement by the chief engineer and assistant are an indicator of open information flow to the engineering staff. Members of professional organizations, not bound by commercial endorsement, are a source of valuable user experience, both pro and con.

Propositions three and four, although not strongly supported, describe the group making the decision to adopt. In the case of Channel 53, this group adjusted their characteristics to minimize the effects of the innovation dilemma. They were open and receptive to any information useful in the decision to adopt or not adopt a new technology.

- How does emerging technology influence the environment of the organization?

The final proposition tries to illuminate other factors that surround performance. This proposition describes the influence of the environment on the adopting group. Briefly stated, a new entrant to the market tends to adopt competence-destroying discontinuities (innovations). The fact Channel 53 was a new entrant in the market place did provide an advantage for them. As a new entrant, they entered the market with a shrunken staff, and with no history or inventory of technology. They took full advantage of recent innovations in the broadcast field. The "competence-destroying" discontinuities they adopted do not

build on existing skills, they render them obsolete. In the case of Channel 53, they started with a new staff, and this stimulated the adoption of new technology. It created a baseline where all employees would start learning from the same point in time.

Not surprisingly, this proposition is supported. Although it could have been different. Channel 53 could have decided to purchase tried-and-true technology and not gone with the more expensive up-to-date technology. The station did, however, make decisions to purchase key technologies that were not of the same cost or quality[1] as the technical innovations cited. The cameras purchased were selected from a "professional" line of equipment versus a "broadcast" quality line. The cost savings incurred did shift money to other items that were of higher "broadcast" quality and cost. This reveals the fact that many decisions and factors in the decision to adopt are outside the scope of the individual propositions in this study.

This proposition demonstrates the impact the environment can have on the adopting group and the impact that the adopting group will have on the environment. What impact the station will have on the market will surface as Channel 53 competes in the market and influences adoption decisions at the other broadcast stations.

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[1]Video equipment is classified in three divisions; "broadcast" quality being the highest in cost and performance, then "professional," sometimes referred to as corporate, and finally "consumer" quality.

The final analysis of Channel 53 in relation to the adoption of new technology is moderately clear. There was an overwhelming decision by the adopters to embrace new technology. Although not reported station-wide, their was a clear vision of technology driving the new station within the engineering group. It appears that management decided to develop the administrative side of the station when the start-up operation settled down. Decision-making was forced by the necessity to get the station on-the-air as soon as possible. This fact, however, did not appear to negatively affect the adoption process. The groups involved in the adoption process were flexible in terms of control of information and events related to adopting technology. This flexibility also appears to have aided in building the station on schedule. Finally, the station was new to the market, and this lead to certain advantages in the types of new technology they could choose. They took chances with new technology in an attempt to do more with less staff.

The station probably would have benefited if an adoption strategy or policy had existed under different broadcast industry conditions. The concurrent adoption of technology by the broadcast industry was a great aid in the decision-making process. If the industry had been in a state of flux with regard to the adoption of technology, the start-up of Channel 53 may have been more problematic. The lack of industry inertia favoring one technology over another may not have enabled the station to operate at an

acceptable performance level. This is probably the most important impact that a policy should make. It is that type of environment that awaits other telecommunication organizations as technology development continues at its rapid pace.

Discussion

This case study presents information to moderately support the generation of a policy or strategy for the adoption of new technology. Although its conclusions are based on a single unique case, the issues of policy and strategy do surface. How broadcast stations, local origination channels, and broadcast-based facilities of the future meet the challenge of decision-making is clearly an issue for further monitoring and study. There was no formal policy or strategy to structure the adoption of emerging technology at Channel 53. There was, however, a "vision" stated by both the general manager and the chief engineer that related to a technologically-advanced station. The jump from a "vision" to a formal policy or strategy is a great leap, and would require some sort of translation to be of benefit to the entire organization. The benefit of their "vision" was realized within the group initiating the adoption process, but that vision did not emanate from an overall goal of the station. The decisions to adopt, may have been influenced by fortuitous adoption decisions in the

broadcast industry. This may have had a greater impact than the concern for future performance.

While this study does not try to prove or disprove the effect of a stated policy, it does suggest further research in the adoption of emerging technology, specifically in news operations. News gathering and processing, with the accompanying technological advances in camera and recorder technology, editing, and personal computers, should become more ambitious as fiber increases bandwidth capacity and therefore information quantity to the home.

A future case study in the adoption of new technology by this researcher would focus on the complete analysis of administrative and technical innovations. The complete study of organizational behavior of a telecommunications facility from a technical/administrative thesis (Damanpour and Evan) would provide valuable information relating to strategy and policy of both technical and administrative goals. Maintaining a balance of technical and administrative innovations is very important to an operation that is technology-driven with the expectation for high performance. The results of further study would benefit future telecommunications facilities when the innovative technologies of fiber optics, digital transmission, mass storage, computer-aided design, and alternate viewing formats like HDTV emerge. Further research may describe methods to develop formal policies addressing the issues of administrative and technical balance.

APPENDIX

APPENDIX

QUESTIONS USED IN THE FIELD INTERVIEWS WITH CONDENSED RESPONSES

KEY

General Manager	GM	Senior Producer	SP
Chief Engineer	CE	Master Control Oper	MC
News Director	ND		

A. How long have you worked for this firm?

	___years
GM	1
CE	1
ND	1
SP	1
MC	1

	Prior to start-up___	At start-up___	Following start-up___
GM		X	
CE		X	
ND		X	
SP		X	
MC		X	

B. How long have you been employed within this industry?

	___years
GM	40
CE	20
ND	25
SP	8
MC	1

C. What are your professional goals, short and long-term?

	Short term:	Long term:
GM	Get station on-line fast	Pride of station administration
CE	Get station on-line	Station Manager role
ND	Get station on-line	Take the market
SP	Opportunity of position	Ad Agency work
MC	Survive, find niche	Manage TC facility

D. How would you describe the structure of the organization that you work for? responses.

Flexible __		Rigid__
GM	X	
CE	X	
ND	X	
SP	X	
MCO	X	

__ Rigid or mechanistic: not flexible, a more stable structure, clearly defined jobs and tasks. Knowledge is synonymous with rank in the organization. Rewards are based on obedience to instructions. Manifests itself with an organization by function and geographic location, relatively slow information processing capability

__ Flexible or organic: very flexible structure, can adjust easily to change. De-emphasis of job description and specialization and emphasis on problem solving. Decision making is decentralized and knowledge is not automatically an assumption of rank. Manifests itself with an organization by output or client of the structure that has a relatively high capacity to process information.

E. Can you identify and state the overall goal of the firm?

		In addition, can you identify and state any specific objectives that exist to support that goal?
GM	Station of record for ABC, Market force in ADI	Programming!
CE		Add news to broadcast, net affiliation
ND	None, be competitive after 3yrs	Monitor and change the "books"
SP	Be #1 in market	Establish station
MC	None	Get on-line, be competitive

Proposition-based questions (audio recorded)

Preface to this section:
Administrative: deals with the interaction of employees in a social-type or context

Technical: relates to the actual work or product of the group or organization
Innovation:

1. Have (you or your group)
(another individual or group)
introduced administrative innovations before, during or since the start-up of the station and why?

GM The PC network, choice was; a)mainframe, b)off site or c)PC's, initiated to increase exchangeability between employees, increased interaction between departments-ability to "pioneer" in market, industry development of software concurrent with adoption, operation of news with closed captioning and stereo broadcasting is unique to the area

CE Downsized structure with less people via a technologically advanced station, more reliance on what people know, (organic structure: value is placed on expertise, not hierarchical position) a fluid structure; (Mike Winski-organic structure: specialization in problem-solving not in job description)

ND Newsroom design of an "open office" with emphasis on homogeneity, minimized isolation by encouraging interplay. The 5:30 event called "dark time" in his office where possible stories are presented

SP Start to finish creative control of projects, from visualization to execution

MC Flexible structure of management, promotions by committee, scheduling is autonomous, PC network as a station interface

1a. Do you or your group attribute any change in the climate of the administration (social system) within your group to the introduction of an administrative innovation?

GM People tend to "share" things more often, improvement of departmental interaction

CE Too early to recognize any change, the structure is still evolving, although the growth with some employees is great

ND Development of the "air look" of the station, the learning curve of employees to boss is peaking now

SP Agreeable attitude of employees, energy when hired on is very high
MC Enthusiasm of staff to be involved in direction of station (promotion meetings)

1b. Have (you or your group)
(another individual or group)
introduced technical innovations before, during, or since the start-up of the station and why?

GM The betacam video tape format, Odetics automated cart machine, stereo, closed captioning and portable production unit.
CE Interface of traffic to cart playback, cart playback billing feedback, betacam format, PC network, digital phone system, E-Mail, the transmitter and its pattern (peanut-shaped)
ND Electronic newsroom (10 PC's) ordered with special spell check, thesaurus options; the news cellular call-in line
SP The Ampex interface system-editor to switcher, ADO, audio interface; paint box, betacam format, PC network
MC Betacam format, stereo, Odetics cart machine, satellite control, PC network, redundant weather graphics in production, routing system

1c. Do you or your group attribute any change in the climate of the administration (social system) within your group to the introduction of a technological innovation?

GM The relatively high sophistication of technology is used to "recruit" new employees, initial attraction and interest used to motivate
CE Used to attract or "draw" new employees, extrapolation of cost-effectiveness because they are doing the same as other stations for less.
ND The "look" of the station was influenced, consistency of product all make for a more comfortable environment
SP The gamut of intimidation by some to "frenzy" of excitement by others
MC Sense of "expected excellence" with the technology, quick dissatisfaction when problems with new technology occur causing tension up and down the hierarchy

2. Do you or others in your group perceive any effort on your part or management to maintain a balance of both administrative and technical innovations within the work group?

GM Any sense of effort is mired in the industry and technology driven nature of broadcasting, the confluence of start-up and industry introduction, the decision becomes binary; a)tried and true or b)new and untested, confluence of decisions in the industry to adopt and the need look to the future
CE The sense of balance is affected by the washing out of new systems, resistance to technology, evolution of systems, start-up of the "electronic office" software is slow
ND Yes there is within news, always an attempt to favor the people systems, they are the "tools" of the trade-anecdote that "inactive" mistakes are the worst, at least try
SP None, in fact the organization is technology "heavy" and lacking in management
MC None, no one appears to looking at the big picture

2a. How is performance measured by your superiors?

GM Bottom line oriented
CE Bottom line profit, do the same with less
ND Was job accomplished
SP Doesn't know
MC Not recalled

3. What person or group made the decision to adopt the new technology?

GM The chief engineer, supported by executive group, including owner and general manager-didn't set out to create a technologically-driven station, but the historical events within the industry aided some decisions-alternatives were presented by the chief engineer in a present versus future cost manner
CE The chief engineer and assistant, teaching role
ND The chief engineer and assistant
SP The chief engineer
MC The chief engineer and assistant

3a. What person or group implemented the decision to adopt the new technology?

GM President/Owner, General Manager, Chief Engineer
CE President/Owner, General Manager, Chief Engineer, and assistant
ND Chief Engineer and Assistant
SP President/Owner, General Manager, Chief Engineer
MC President/Owner, General Manager, Chief Engineer

3b. If the groups differ, did the process begin with both groups, or did the composition change after a new technology was suggested?

GM No difference, now the accounting group/person entered during presentation
CE No, but structure of initiating group varied when problems or gray areas appeared, re: ND and parity with other stations and how technology might allow (e.g. 3 edit suites w/t.code cp. to Ch 6 with 5 edit suites)
ND No difference
SP Don't know
MC Owner let them all loose

3c. Were there any problems that either improved or eroded the decision to adopt a new technology within the organization?

GM Calculations of present cost versus future cost
CE Cost
ND Perception of complete support
SP Insufficient information
MC Cost (generator for transmitter), newness of equipment

4. What sources of information were considered in the decision to adopt the new technology?

GM Chief engineer supplied, negotiations with contractors
CE Primarily trade affiliations (SBE), sales engineers-SBE includes conventions, publications, personal contacts; reliance on the "personal"
ND Personal contacts, past ND at competing station, sales engineers
SP Insufficient information
MC Insufficient information, note ABC did not support affiliation with information on technology

4a. Did you or the group seek out information that would not support the decision to adopt?

GM No
CE Yes, two site visits to end-users, hampered by ambitious time-line
ND No, but anxiety in technology reliance was perceived as very high
SP Insufficient information
MC No

4b. Did the decision makers seek out only information that would only lend support to the adoption decision?

GM Yes, site surveys to find up and operating systems, check it out in person
CE Primarily factory support, questions about how a new system might operate, vendor offered end-user list (biased) note: learning curve by manufacturers and users (transmitter links)
ND Yes, personal contacts on the Electronic Newsroom, past contact from newspaper days, salespersons of competitive products
SP Insufficient information
MC No

5. Did the new technology adopted require unique training by you or your staff that involved the learning of a new skill or technique?

GM Insufficient information
CE Yes, the ratio was about 80/20 learning to previous knowledge-the PC network, stereo, editing, odetics cart machine
ND Yes, four week training prior to start, mock air broadcasts
SP Insufficient information
MC Yes, primarily factory training-not all performed yet

5a. Did the new technology adopted require training by you or your staff that augmented previous skills or techniques?

GM Insufficient information
CE Yes, refers to the above 20%
ND No, pretty new
SP Insufficient information
MC Yes, betacam format was more augmentation

6. At what point did the financial considerations enter the capital budget process for the technology?

GM The budget was prepared and then submitted to the financial principals
CE List of the proposal prepared in advance of any financial considerations, preparation of any financial by proposal was in comparing NPV of old versus new, now versus later

7. Did the final budget originate in your group? (what type of approvals in the hierarchy were necessitated?)

GM The proposal was not a budget driven one, the hierarchy was owner, station manager, chief engineer
CE Yes, owner, partner, station manager

8. What judgement vehicles were utilized when presenting the capital budget?:

GM ___Net Present Value NPV
CE ___Payback

9. How will performance be evaluated?
GM, CE ___Financial
Note: profitability and operation given the down-sized or shrunken staff

GM ___Quality
Note: The performance of Channel 53 will be measured by the audience decay on ABC affiliates that previously "leaked" into the Lansing market. This has been accomplished.

10. How will operating performance be evaluated?
GM ___actual versus projected

11. Was the final projected budget
___Exceeded by what percent___% requiring what approvals?
___Came in on budget
___Came in under budget

GM Although there was no real budget, estimates are that it cost 30% more to be up-to-date and meet future needs
CE The proposal was exceeded by 5-10%, physical plant was exceeded by more

Miscellaneous Notes from interviewees:

GM The owner is very influential and makes his presence known which is very strong-no mention of the results of this influence

CE
- Decisions to purchase new technology were based on two factors:
  a) what is right for this market
  b) what is going to last
- The "vision" for the station was a technologically advanced station to accommodated a down-sized staff
- Feedback since operational is the very low amount of make-goods on commercial play which he attributes to the odetics cart machine.
- The chief engineer role of "teacher" in regard to the new technology being adopted was a major role.
- The time-line of the start-up was very ambitious, they attempted and succeeded at a six month time-line where 12-18 months is a typical conservative estimate, this influenced a lot of the decision-making in unpredictable, unrecallable ways.
- Only one item was deleted from the budget, that was a back-up generator for the transmitter

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