

Examining Benefits Realization Management in University Capital Projects

Early Observations of Current Practices

by

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ABSTRACT

This study provides preliminary observations of the state of Benefits Realization Management (BRM) in the context of university capital projects. The study uses a survey tool to seek i) evidence that universities are using Benefits Realization Management methods; and ii) evidence that universities may be facing challenges to obtaining strategic benefits from their capital construction projects. By interpreting the survey data and employing a linear regression model, early observations suggest that universities are only sparingly using BRM, and that the delivery of benefits is a problem for university capital projects. These findings suggest the need for additional research focused on developing a statistically predictive model for benefits realization and identifying best practices for Benefits Realization Management (BRM) within the university setting.

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1. INTRODUCTION

Universities routinely embark on capital construction projects. Capital construction projects involve the design and construction of new buildings, large renovations, and major infrastructure like roads and heating plants. These capital projects pose a significant risk to the university. A McKinsey Institute study found that almost all large projects around the world suffer cost overruns of more than 30% and most are at least 40% late (Changali et al., 2015).

Universities need an effective mechanism to evaluate the benefits of a project against the risks. One approach to solve this problem is the use of appraisal tools. Examples of appraisal tools include cost-benefit analysis, Strength-Weakness-Opportunity-Threat (SWOT) analysis, and the Balanced Scorecard. These appraisal tools evaluate project cost and risk against benefits and are often used to provide a justification for expending resources. A significant recent development in this field is the emergence of Benefits Realization Management (BRM). BRM evolved as a project management process that enhances the appraisal process beyond project initiation. It employs a systematic approach that defines the benefits, measures the benefits, and then ensures those benefits are being realized during and following a project's completion (Ward & Daniel, 2012).

1.1 Research Objectives

The objective of this research is to conduct an exploratory analysis of the application of Benefits Realization Management in the delivery of capital projects at universities. It seeks to answer two questions:

1. Is there evidence that universities are using Benefits Realization Management methods in their capital construction projects?

2. Is there evidence that universities are facing challenges in obtaining strategic benefits from their capital construction projects?

This investigation serves as a foundational step to assess the feasibility of conducting further research at the doctoral level on this subject.

1.2 Methodology

This study began by contacting experts in the field of university capital projects to clarify this subject in the university context, and to focus the research into a limited set of research objectives.

Concurrent to the expert consultations, a review of the existing literature was completed, which resulted in the discovery that there is very little academic literature directly on the topic of BRM in university capital projects. However, there is a body of literature available on the general surrounding topics of i) strategic management of capital projects;

ii) BRM as a project management tool and iii) university capital project literature that is related to these two topics. The literature review for this study is constructed at the intersection of these three distinct bodies of literature.

The expert consultation also revealed that the data gathered might not positively portray the universities who participated. This posed a difficulty in freely soliciting information directly from universities, and this could also introduce bias. To help mitigate this risk, an anonymous survey was selected as the data collection method. This survey was structured to measure the key ideas around strategic management and BRM that were gathered from the literature review.

Next, the survey was conducted at a professional convention. A sample was gathered from a population of university project experts who participated in the survey anonymously.

Finally, the data underwent trend analysis and a linear regression to identify any statistically significant predictors. The results of this analysis and regression were compared with findings from the literature review, and then synthesized in a conclusion that addresses the research questions and proposes areas for advanced research at the doctoral level.

1.3 Scope and Limitations

This study is limited to universities located in northeastern Canada and the United States and is also constrained by the small collection of academic literature on this precise topic.

The intent of the research is to obtain early observations on the application of Benefits Realization Management in the delivery of capital projects at universities. Although the findings are not conclusive, they are intended to act as an initial investigation to inform the trajectory of subsequent research efforts.

2. LITERATURE REVIEW

Due to the limited literature on the topic of Benefits Realization Management in the university capital project context, a wider literature review was necessary to situate this research in the body of literature. This review divides the literature into three swim lanes of i) strategic management methods as they apply to capital projects; ii) project management methods as they apply towards BRM; and lastly iii) university capital project context literature related to the two other streams. This structure is summarized visually in Figure 1. The literature also contains important criticisms of planning in the university context, and a similar criticisms of performance in the project management methods literature. These criticisms mark a change in project management thinking that contributes to the BRM literature. They are noted in the figures as a red lightning bolt.

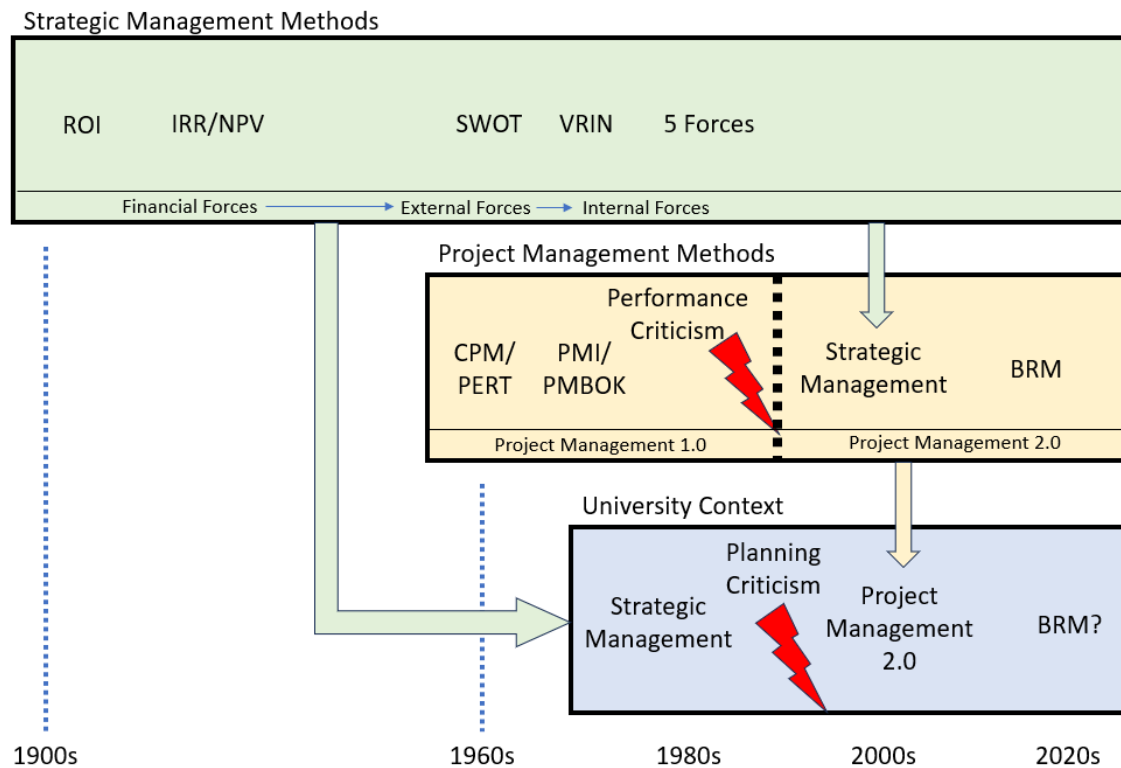


Figure 1- Literature Review Structure

2.1 Strategic Management Methods – Literature Review

This section presents an overview of the pertinent literature around strategic management as it has been applied to capital project appraisals. In brief, the academic study of strategy in the context of university capital projects has evolved from studies of strategic management in the corporate environment. This literature review starts with a high-level overview the development of strategic management in the general business environment and subsequently links this to strategic planning in the university context (See Figure 2).

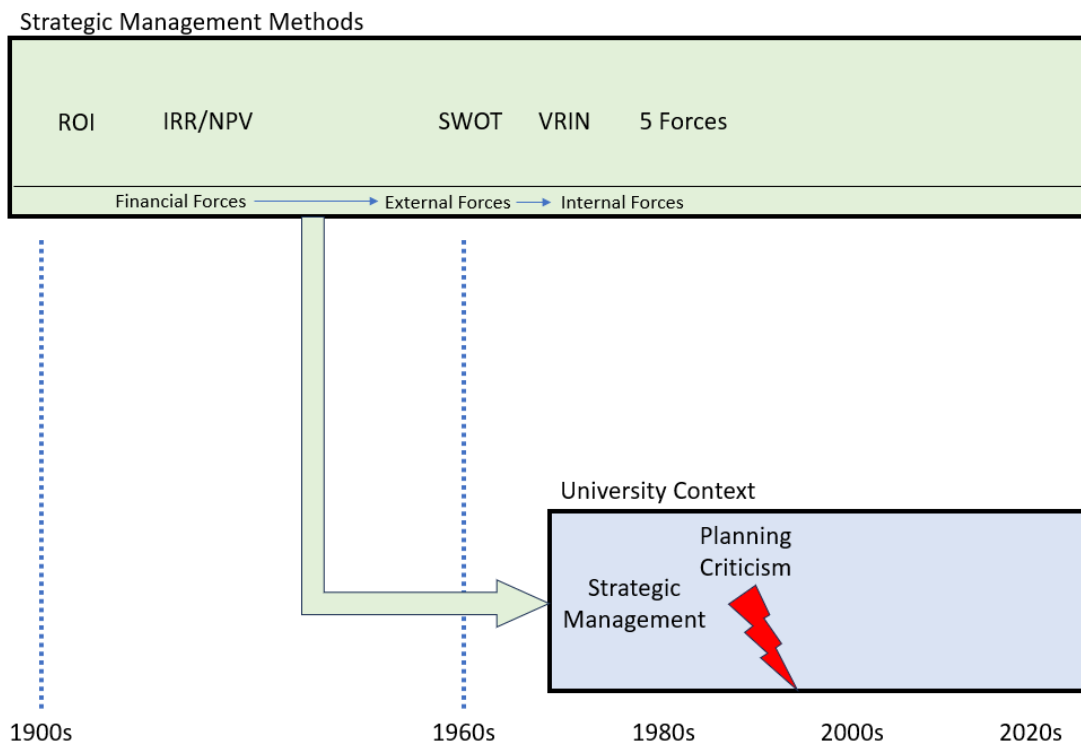


Figure 2 - Literature Review Structure: Strategic Management Methods and the University Context

“Strategy: A plan, scheme, or course of action designed to achieve a particular objective, esp. a long-term or overall aim.” (Oxford English Dictionary, n.d.)

The study of strategy dates to ancient times, as highlighted by Lawrence Freedman in his book, "Strategy: A History." Freedman presents various early interpretations of strategy, including the Greek concept of "mētis," which signifies contemplation, meditation, and planning (Freedman, 2013). Early foundational texts on strategy were often penned by generals focused on military victory, with Sun Tzu's "The Art of War" and Carl von Clausewitz's "On War" being prominent examples (Barker & Smith, 1997; Bracker, 1980).

Modern academics and business leaders began to study strategy as it relates to modern management in the mid part of the 20th century. Research in "strategic management" was simultaneously explored by several authors in the 1950's and 1960's such as Igor Ansoff, Alfred Chandler, and Peter Drucker (Bracker, 1980).

In his 1957 paper, "Strategies for Diversification," Igor Ansoff links military concepts of strategy and corporate strategies. He employed the metaphor of a military "mission" to describe the marketing objectives of a product. According to Ansoff, each product is assigned a mission it aims to achieve, such as enhancing market penetration, expanding into new markets, developing new products, or diversifying both products and markets. Within this context, Ansoff defined strategy as "a joint statement of a product line and the corresponding set of missions that the product is meant to fulfill" (Ansoff, 1957).

Writing in the 1960s, Alfred Chandler focused on examining the diversification of large corporations into more sophisticated management structures. He investigated the

historical development of American industries through detailed case studies of companies such as DuPont, General Motors, Standard Oil, and Sears Roebuck. Chandler's analysis led him to suggest that management was becoming the new "visible hand" that replaced the older "invisible hand" of market forces (Chandler, 1993). And this new force of "managerial capitalism" was best understood as a product of the strategic needs of the business. In this context, he defined strategy as "the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" (Chandler, 1993).

Peter Drucker, who wrote extensively throughout the second half of the 20th century, also had an interest in the evolving role that strategy played in the organization of corporations. In his seminal 1955 work *The Practice of Management*, he noted "Organization is not an end in itself, but a means to the end of business performance and business results" (Peter Drucker, 2007). He later developed this idea further in his work *The Theory of Business*, which will be discussed later in this literature review.

This study builds on Ansoff, Chandler, and Drucker's perspective that capital resource allocation, including the construction of buildings and infrastructure, is critical to carrying out the goals of an organization. Consequently, the investment in capital should be strategically directed towards enhancing business performance and achieving desired results. Another way to say this, relevant to Benefits Realization Management, is that capital projects are undertaken to achieve benefits of strategic value.

2.1.1 Early Strategic Value Assessments

Early study of the strategic value of capital projects focused on the project as a financial investment (Haka, 2006). The primary strategic objective of a capital construction project was to make profit. These studies were focused on accounting methods to calculate the return on investment (ROI) as a means to evaluate the viability of a capital project.

An early example is a 1924 article by Donaldson Brown of General Motors titled “Pricing Policy in Relation to Financial Control”. Brown describes a framework using ROI to assess the financial viability of constructing additional factories at General Motors (Brown, 1924). Notably, Brown had first developed the concept at DuPont, and Pierre DuPont is also credited with this evaluation method (Flesher & Previts, 2013; Haka, 2006). This is an important early intersection between the history of strategic management and its connection to project management.

Study of this type of simple ROI calculation was expanded in later literature to include more complex discounted cash flow accounting methods. Methods such as net present value (NPV) and internal rate of return (IRR) introduced more complex financial risk factors into capital project assessment. (Haka, 2006). By the 1970’s, there was evidence that these methods were being widely used by large firms to assess the financial viability of capital projects (Klammer, 1972).

2.1.2 Expanding Strategic Value Assessments to the External Environment

Later scholars expanded strategic assessment beyond financial interests of profit and risk to wider explorations of external factors. The focus of these strategic factors was to create competitive advantage.

Francis Aguilar's early work on external strategic assessments explored how corporate management could gather information in the external environment to make strategic assessments (Aguilar, 1967). He developed a systematic method to review the external environment by dividing the environment into four factors: political, economic, social, and technical. This coined the acronym “PEST”. This expanded the study of strategy from profit and risk to also include external environmental threats and opportunities (Barker & Smith, 1997).

George Steiner in 1979 synthesized a similar system of external factors for strategic analysis of weaknesses, opportunities, threats, and strengths in underlying planning. He dubbed this analysis tool with the acronym WOTS UP (Steiner, 2010). The order was later reorganized and abbreviated to SWOT (Barker & Smith, 1997).

Michael Porter further expanded the strategic analysis of external factors with his “five forces model”. The model proposed a framework that analyzes industry's competitiveness and potential profitability by examining five key forces: the threat of new entrants, the

threat of substitute products or services, the bargaining power of buyers, the bargaining power of suppliers, and the intensity of jockeying among competitors (Porter, 1979).

2.1.3 Expanding Strategic Value Assessments to Internal Resource Capacities

While Aguilar's PEST model, Steiner's SWOT analysis, and Porter's five forces model are examples of analysis of mainly external factors for strategic benefits, other models were being developed to explore the strategic value of internal resources.

Jay Barney studied the impact of internal resources as a form of competitive advantage (Barney, 1991). Barney noted that it was possible for firms to occupy the same external environment but differ in the capacities of their internal resources. Strategic analysis could be expanded to study the quantity and quality of internal resources that also could give competitive advantage, which he summarized as valuable, rare, inimitable, and non-substitutable. This forms the acronym “VRIN” (Barney, 1991). Barney summarized the synthesis of internal versus external factor analysis in his diagram shown in Figure 3.

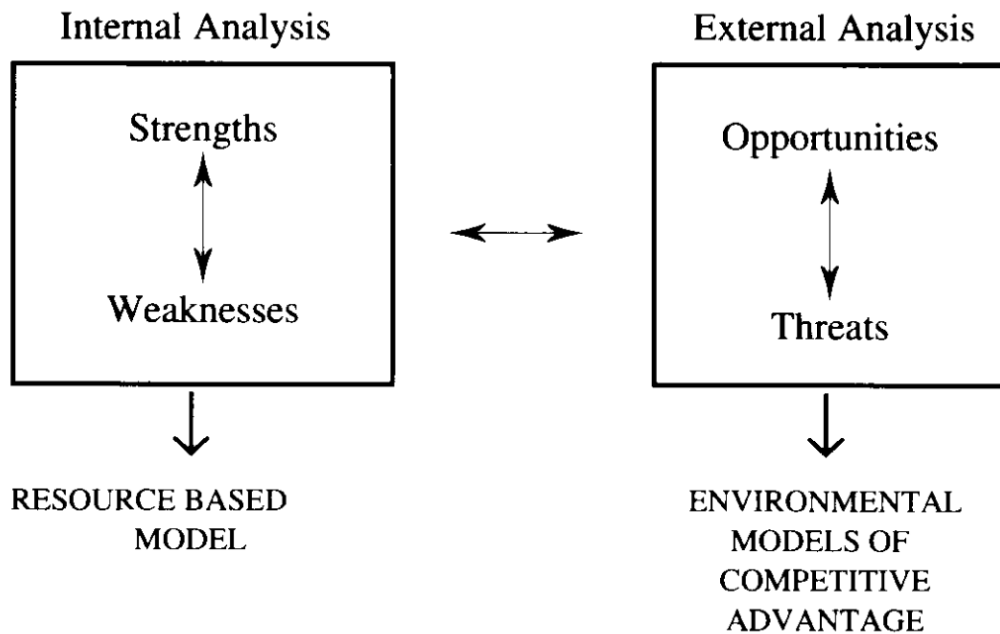


Figure 3 – Jay Barney (1991) Diagram of Internal and External Strategic Value Assessments

Another pertinent example comes from the “Balanced Scorecard” developed by Robert Kaplan and David Norton (Kaplan & Norton, 2005). This method links the major perspectives of a business strategy into a single page of metrics. These metrics are designed to view the business simultaneously from the perspective of the customer, the internal business perspective, finances, and innovation and learning. Of interest to Benefits Realization Management, the balanced scorecard approach focuses on changing behaviours internal to the organization in order to achieve strategy. Kaplan and Norton state:

“The scorecard puts strategy and vision, not control, at the center. It establishes goals but assumes that people will adopt whatever behaviours and take whatever actions are necessary to arrive at those goals. The measures are designed to pull

people toward the overall vision. Senior managers may know what the end result should be, but they cannot tell employees exactly how to achieve that result, if only because the conditions in which employees operate are constantly changing.” (Kaplan & Norton, 2005)

Peter Drucker also summarized a similar combination of strategic factors for analysis in his “theory of business”, which had the three parts of environment, mission, and core competencies (Drucker, 1994).

The combined study of all the above strategic value assessment tools, including ROI, risk (IRR), external factors (PERT, SWOT, Porter’s 5 Forces) and internal factors (VRIN, Balanced Scorecard) were developed and integrated into business culture throughout the 20th century. They are now grouped and studied in the academic literature under the general name of strategic management (Pearce II, 1981).

2.1.4 Strategic Management in the University Context

In 1981, John Pearce identified “Strategic management is increasingly being acknowledged by corporate executives as their principal approach to determining and directing the efforts of their firms for the long term.” (Pearce II, 1981). During the same period, the concept of corporate strategy began influencing those studying university governance. This is because universities were experiencing challenges due to an economic downturn and decreased government support in the early 1980s.

Philip Kotler and Patrick Murphy (1981) highlighted strategic planning as a crucial element for navigating challenging periods in university management. They made the connection to university strategy from the previous strategic management literature of Chandler and Drucker to introduce internal and external analysis as a means to build strategy (Kotler & Murphy, 1981).

Building on this same theme, George Keller published his book *Academic Strategy* in 1983, which asserted that “a new era of conscious academic strategy is being born” (Keller, 1983). Keller applied strategic concepts from earlier scholars through the use of case studies of universities. These case studies helped identify the specific strategic forces impacting universities during that period. He translated the business terminology of strategic management into a university context, using terms like “the evolving needs of students as clients”, “changing faculty roles”, and “increasing government regulation” (Peterson, 1984).

Further analysis of the Keller model was undertaken by Barker and Smith in their book *Innovative Higher Education* (1997). They compare the Keller model to a planning process described by William King and David Cleland (King & Cleland, 1987). While Keller’s model tends to focus on the topics for strategy, the King and Cleland model gives a systematic process to create the process (Barker & Smith, 1997).

Both the Keller and King models are important starting points for Benefits Realization Management in the university context, and they are further expanded later in later

sections of this study. Also important to this study is the criticism that was later levelled against strategic management in the university context.

2.1.5 Criticism of Strategic Management in University Context

Keller's work was well received when strategic planning came into the mainstream of university governance throughout the 1990's (Barker & Smith, 1997; Temple, 2018). However, this application of strategic management in the university context also gained its critics. Robert Birnbaum criticized strategic planning at universities as falling prey to "management fads" (Birnbaum, 2000). For Birnbaum, strategic management might be advertised as a "quick fix", but it is not suited to university culture. He posits that strategic planning is derived from a corporate culture that is formalized and hierarchical. In contrast, academic culture is a loosely coupled system of individual experts that are not well suited to creating or implementing strategic plans. He suggests that these practices are adopted to align with contemporary trends, which he calls fads, rather than for genuine operational benefits. To Birnbaum, this leads to a cycle of adoption and abandonment that distracts and degrades from academic activities (Birnbaum & Snowdon, 2003).

Henry Mintzberg also critiques strategic planning, arguing that the terminology is an oxymoron (Mintzberg, 1994). For Mintzberg, strategy cannot be planned, because planning requires making accurate forecasts that are not possible in academic environments. He suggests that universities fall into the "planning fallacy" by creating

strategies using planning tools. Instead, Mintzberg believes strategy must be “emergent” based on circumstances, and not planned. After a strategy is selected, the tools of strategic management are valid, but he renames them strategic programming – a term he considers more appropriate than strategic management (Mintzberg, 1994).

Larry Jones (1990) argued that the frequent failures of strategic planning at universities during the 1980s were due not to the concept of strategic management itself, but to its improper application in the academic context. He posits that strategic planning fails in a university context primarily because the leadership, personified in the university president, is reluctant to take on the role of chief planner. Additional problems include inadequate training for those involved in planning, lack of support from trustees and key stakeholders, unrealistic timelines, and insufficient communication of the institution's goals (Jones, 1990).

These general criticisms of strategic management applied to the university context have corollaries later in the literature review of problems with project management success.

2.1.6 Strategic Management Applied to University Capital Construction Projects

Academic research on strategic management's role in university capital construction projects is limited. There are a few scholars who have emphasized the importance of integrating facilities management with institutional goals. Their work advocates a need for a strategic approach in capital projects that enhance university operations and financial sustainability.

Jerome Roberson's doctoral dissertation (Roberson, 2016) identified a problem with the perception of facilities management departments in university environments, including the perception of the strategic necessity of facility management. Roberson argued that there was lack of strategic alignment between facilities management and the university's core business. He concluded that there was "generally a positive attitude towards the role of facilities management", that "facilities management was still struggling to determine the role of facilities management within the organization" (Roberson, 2016).

A simple study of South African private universities determined that about half of these universities were using some form of net present value to calculate an internal rate of return (IRR) on construction projects (Naidoo, 2011). Although there was no connection made to the strategic value of these projects, the study showed that there was some uptake in using these methods for assessing capital construction.

Senior managers of Facilities Management departments have also written articles that advance the strategic value of their departments within the university. William Daigneau, in his work "Planning and Managing the Campus Facilities Portfolio," categorizes projects into two groups: those essential for maintaining university operations and those of strategic significance that promote the institution's mission and goals (Daigneau, 2003a). Similar to Keller (1983), Daigneau extends the concept of Return on Investment (ROI) at a university beyond traditional corporate metrics to include factors like increased enrolment and teaching capacity (Daigneau, 2003b).

Daigneau also notes that the ROI of a university project may not compare favorably to a corporate ROI. Despite the lower returns, using an ROI assessment is still a valid way of measuring success, and to compare options. Daigneau proposes that this approach will develop a coherent and prioritized capital plan that is connected to the strategy of the university (Daigneau, 2003b).

Donald Guckert wrote for the Association of Physical Plant Administrators (APPA) about the need to understand the value of a project as the total cost of ownership (TCO) (Guckert, 2006). TCO includes long term operational costs, as well as the cost of decommissioning the building. Echoing Daigneau's broader approach to calculating Return on Investment (ROI), Guckert recommends employing the Total Cost of Ownership (TCO) to guide project managers beyond the traditional constraints of scope, schedule, and budget. To Guckert, this approach encourages a facilities managers to adopt an attitude of stewardship, ensuring that capital project decisions are aligned with the overarching goals of the institution (Guckert, 2006).

2.2 Project Management Methods – Literature Review

This section gives a general overview of the literature around project management methods as they build towards Benefits Realization Management. It starts with an outline of foundational project management techniques, tracing their progression through to the criticisms around performance that spurred the development of subsequent methodologies, including BRM. The narrative adopts Raymond Levitt's terminology,

described later, which refers to the initial tools as "Project Management 1.0" and the later techniques as "Project Management 2.0" (Levitt, 2011). The discussion concludes by examining how project management has undergone a parallel evolution within the context of university capital projects (see Figure 4).

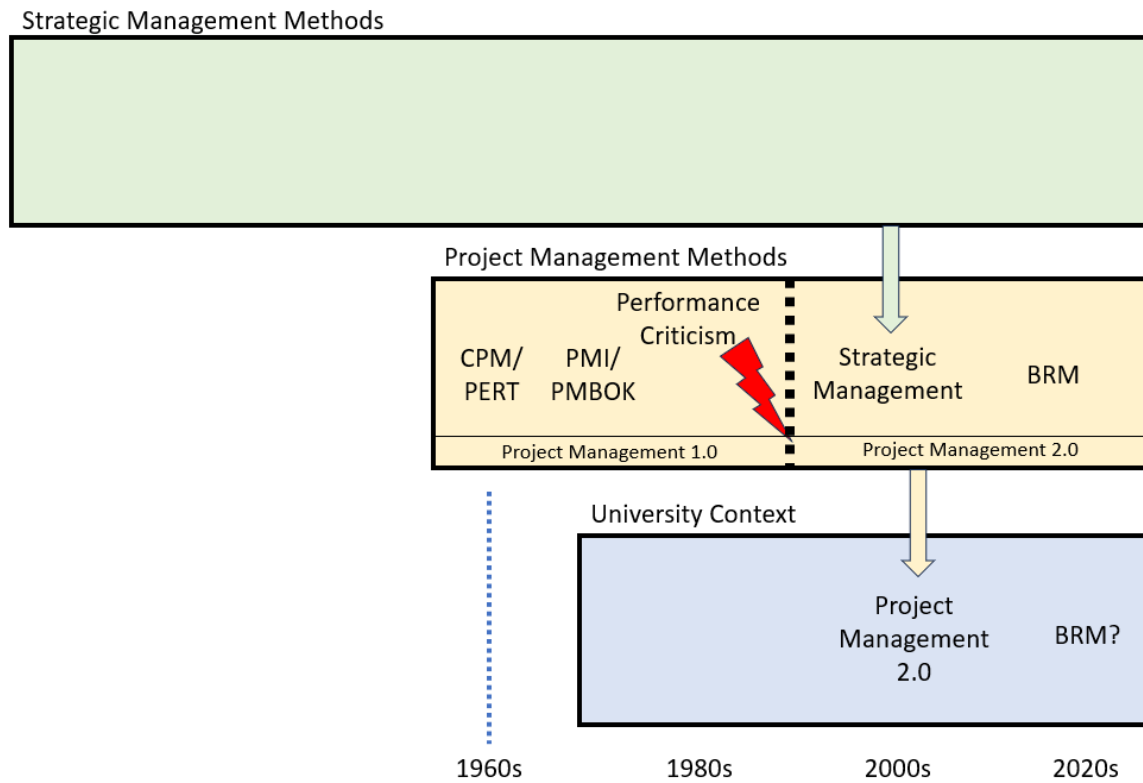


Figure 4 - Literature Review Structure: Project Management Methods and the University Context

2.2.1 Development of Project Management Methods

“Project: A temporary endeavour undertaken to create a unique product, service, or result.” (PMI Lexicon of Project Management Terms, n.d.)

Large capital projects have operated under some form of project management since early history. Writers on the history of project management such as Mark Kozak-Holland and Peter Morris, argue that the fundamental functions of project management have been present in many large capital projects throughout history (Kozak-Holland, 2011; Morris, 2013). In his book *The History of Project Management*, Kozak-Holland (2011) posits that historical projects, like current day projects, had the constraints of budget and schedule, and that they were intended for some economic return. These challenges compelled people at the time to develop special tools and techniques to better manage projects (Seymour & Hussein, 2014).

An early academic example is the writing of Frederick Taylor on *Scientific Management* (1911). Taylor sought to create a systematic system of productivity management based on scientific observation. “The true function of the engineer is, or should be, not only to determine how a physical problem may be solved, but also how they may be solved most economically” (Taylor, 1911).

Morris shows that by the late 1800’s, the “scientific management” of projects had resulted in the development of significant project management tools (Morris, 2013). First,

the Gantt chart was created by Henry Gantt in 1917 to assist the US Army project to build the Frankfort Arsenal in Philadelphia (n.d.)(Historic American Engineering). Second, and notable to this study, the formal systems of project accounting methods, now called return on investment (ROI), were developed by Pierre DuPont and Donaldson Brown (Brown, 1924; Flesher & Previts, 2013; Haka, 2006).

Project Management continued to develop more complex tools and methods along the line of “scientific management” through the mid portion of the 20th century (Carayannis et al., 2005). The DuPont corporation again played a role in development of the “Critical Path Method” abbreviated CPM (Vanhoucke, 2013). CPM required the breakdown of project deliverables into constituent components that could be organized in sequence and estimated for schedule and cost. This was called a Work Breakdown Structure or WBS (Garel, 2013). The “Program Evaluation and Review Technique”, or PERT, was developed shortly thereafter as a tool for the US military. PERT was a further development of CPM, adding estimating tools “to create an integrated management control systems that would focus decision making ... on program costs only in relation to program performance” (Morris, 1994).

The Space Race and Cold War prompted an increased application of these tools in many large projects. This burst of intense and well-funded project management activity created a pool of experts who began to formalize their ability to efficiently utilize these tools through estimating and work sequencing (Carayannis et al., 2005; Garel, 2013; Morris, 2013; Vanhoucke, 2013). The Project Management Institute (PMI) was established in

1969 to organize these experts into a professional association (*History of Project Management Institute* | PMI, n.d.). The formation of the Project Management Institute (PMI) is regarded by scholars as a key event in the spread of project management techniques and also in establishing project management as a contemporary professional field (Garel, 2013; Levitt, 2011).

During the latter part of the 20th century, the best-practices of WBS, CPM, PERT, and others, were standardized and widely disseminated through the PMI's key publication, the Project Management Body of Knowledge (PMBOK) (PMI, 2013). The PMBOK has served to centralize the conceptualization of project management as discussed by Levitt (2011). The value of the PMBOK to gather and synthesize these best-practices was documented by scholars such as Garel (2013), Kozak-Holland (2011), Levitt (2011), and Seymour and Hussein (2014). The PMBOK guide further organized these practices into five core process groups: initiating, planning, executing, monitoring and controlling, and closing, as outlined by Ricardo Vargas (Vargas, 2001). Consequently, PMI has played a crucial role in establishing a range of project management tools and techniques within these process groups, providing a structured approach to project management.

2.2.2 Problems with Project Management Success

As project management evolved into a formal professional field, the academic literature became more interested in defining and studying project success (Zwikael & Smyrk, 2012). The PMI methodologies promoted the view of project management as a system

that has inputs, processes, and outputs. From this, the conventional project practices were to view success by measuring of the “iron triangle” of scope, schedule, and budget (Dvir & Lechler, 2004; Ika & Pinto, 2022; Zwikael & Smyrk, 2012).

Studies based on the iron triangle measures of success showed that there is a significant rate of project failure, especially large capital projects. As stated at the beginning of this study, the McKinsey Institute revealed “98 percent of megaprojects suffer cost overruns of more than 30 percent; 77 percent are at least 40 percent late.” (Changali et al., 2015). Bent Flyvbjerg’s introduction to *The Oxford Guide to Megaprojects* states “Of such projects, 70-90% have cost overruns, depending on project type. For some projects, such as the Olympics, 100% have cost overruns. Overruns of up to 50% in real terms are common, and over 50% not uncommon.” (Bent Flyvbjerg, 2017).

The high incidence of project failures has led to scrutiny of the original PMI / PMBOK conception of project management. Scholars like Ika and Pinto (2022), Serra and Kunc (2015), and Fernandes and Sullivan (2021), have expressed the need to explore alternatives to the traditional "iron-triangle" framework for assessing projects. Their studies mark a shift in how success is perceived, moving to include more comprehensive and additional long-term strategic benefits, such as community and environmental outcomes (Fernandes & O’Sullivan, 2021; Ika & Pinto, 2022; Serra & Kunc, 2015).

Raymond Levitt also interprets the issues with project failure as indicative of the need to shift project management thinking to accommodate changing circumstances. He observes

that initial project management planning tools, such as CPM and PERT, were developed to address the challenge of organizing and synchronizing very large teams of specialists towards a shared objective. He points out that many of the military projects that produced these methodologies benefited from both centralized planning and centralized execution. This high level of control in a military environment did not require project management to have agility or to apply principles of strategic management. Levitt suggests that project management is moving away from these older, centralization-based tools towards newer, agile, and strategically oriented project management approaches (Levitt, 2011).

Raymond Levitt has called this progression “Project Management 2.0”, building on the PMI foundations of “Project Management 1.0”. He frames the problem in terms of strategy: “The breakdown in communications between strategy makers and strategy implementers is one reason that many well-formulated strategies are ultimately not successfully implemented. But project management, appropriately adapted to ensure a two-way communication between strategy makers and strategy implementers, can be used as a language to drive successful execution of even the most challenging corporate strategies.” (Levitt, 2011).

2.2.3 Criticism of Planning in Project Management 1.0.

As part of the transition from Project Management 1.0 to Project Management 2.0, several scholars have critiqued the heavy value placed on extensive planning in the traditional project management processes (Denicol et al., 2020; Ika & Pinto, 2022; Mintzberg, 1994). They call this the “planning fallacy”. This critique highlights that

conventional planning methodologies, like PERT, rely on a series of estimates, each associated with its own set of errors and risks. When aggregated, these estimates lead to a phenomenon Albert Hirschman described as the "hiding hand," which obscures the true variability and unknown factors associated with estimates (Hirschman, 2011). This effect creates an illusion of certainty, making a project's outcomes appear guaranteed. Such an approach fosters overconfidence in the planning process and discourages adequate consideration of potential risks and uncertainties (Flyvbjerg, 2016). Kristian Kreiner (2020) interprets the hiding hand as "Hirschman's metaphor for our ability to neglect such consistent experiences and, therefore, to remain able to be surprised when history repeats itself." (Kreiner, 2020).

In an interesting counterpoint, Hirschman posited that the hiding hand has an advantage. By hiding risk and uncertainty under the "planning fallacy", stakeholders will be moved to approve a project which otherwise would seem too risky relative to the return on investment. Hirschman suggests that this initial underestimation of risks eventually encourages more innovative project management strategies as the project progresses (Hirschman, 2011). However, subsequent studies by Bent Flyvbjerg (2016) criticize Hirschman's optimistic interpretation a positive value to the hiding hand:

"In reality, the exact opposite happens of what the principle states: instead of project success being secured by 'creative error' and 'beneficial ignorance'—where higher-than-estimated costs are outweighed by even higher-than-estimated benefits—the average project is in fact undermined by a double whammy of

substantial cost overruns compounded by substantial benefit shortfalls.”

(Flyvbjerg, 2016)

The notion that issues in traditional project management processes may result in “substantial benefit shortfalls” is a topic of interest to this study and may be reflected in some of the observations later described. It is notable that the Flyvbjerg (2016) and Hirschman’s (2011) discussion around the planning fallacy and hiding hand are paralleled in Birnbaum’s (2000) and Mintzberg’s (1994) criticisms of strategic management in universities.

Dov Dvir and Thomas Lechler (2004) also investigated the effects of planning on project success, as well the effects of change during the project. Their research showed that conventional planning, while focused on schedule or budget, lacked focus on the strategic value to the end user (Dvir & Lechler, 2004). Lechler later expanded these ideas into a book published by PMI called *Mindset for Creating Project Value* (Byrne & Lechler, 2011), which was a predecessor to PMI’s later literature on Benefits Realization Management (PMI, 2019).

2.2.4 Expanding Project Management 2.0 to Include Strategy

As a reaction to the limitations of defining success solely through the iron triangle in Project Management 1.0, newer project management methodologies were devised to incorporate strategic benefits into the criteria for success. One relevant advancement in connecting project planning to strategy is the work of George Gibson (1995) with the

Construction Industry Institute (CII). Gibson studied the impact of pre-project planning on project success. He defines pre-project planning as “the process of developing sufficient strategic information for owners to address risk and decide whether to commit resources to maximize the chance for a successful project” (Gibson et al., 1995). Gibson and CII developed a systematic method to evaluate the quality of the preplanning effort, called the Project Definition Rating Index (PDRI) (Construction Industry Institute, 2013). The PDRI measures the factors that underlie the scope definition of a project, including the business strategies of the owner (See Figure 5). Gibson and Yu-Ren Wang assert that the quality of pre-project planning, measured as the combined score for all elements (lower scores being better), has a direct correlation with the success factors of cost and schedule (Wang & Gibson, 2008).

SECTION I – BASIS OF PROJECT DECISION							
CATEGORY Element	Definition Level					Score	
	0	1	2	3	4		5
A. BUSINESS STRATEGY (Maximum Score = 214)							
A1. Building Use Requirements	0	(1)	12	23	33	44	1
A2. Business Justification	0	1	(8)	14	21	27	8
A3. Business Plan	0	(2)	8	14	20	26	2
A4. Economic Analysis	0	2	6	(11)	16	21	11
A5. Facility Requirements	0	2	(9)	16	23	31	9
A6. Future Expansion/Alteration Considerations	0	(1)	7	12	17	22	1
A7. Site Selection Considerations	0	1	(8)	15	21	28	8
A8. Project Objectives Statement	0	(1)	4	8	11	15	1
CATEGORY A TOTAL							41
B. OWNER PHILOSOPHIES (Maximum Score = 68)							
B1. Reliability Philosophy	0	1	(5)	10	14	18	5
B2. Maintenance Philosophy	0	(1)	5	9	12	16	1
B3. Operating Philosophy	0	(1)	5	8	12	15	1
B4. Design Philosophy	0	1	6	10	(14)	19	14
CATEGORY B TOTAL							21
C. PROJECT REQUIREMENTS (Maximum Score = 131)							
C1. Value-Analysis Process	0	(1)	6	10	14	19	1
C2. Project Design Criteria	0	1	7	13	(18)	24	18
C3. Evaluation of Existing Facilities	0	2	7	13	(19)	24	19
C4. Scope of Work Overview	0	1	(5)	9	13	17	5
C5. Project Schedule	0	2	6	(11)	15	20	11
C6. Project Cost Estimate	0	2	8	(15)	21	27	15
CATEGORY C TOTAL							69
Section I Maximum Score = 413					SECTION I TOTAL		131

Definition Levels

0 = Not Applicable

2 = Minor Deficiencies

4 = Major Deficiencies

1 = Complete Definition

3 = Some Deficiencies

5 = Incomplete or Poor Definition

Figure 5 – Construction Industry Institute (2013) - PDRI Sample Evaluation Sheet

While the PDRI method focused on the project initiation, researchers like Zwikael and Smyrk (2012) were focusing on a broader understanding of final project outcomes. As critics of the conventional iron triangle success metrics, they proposed a project evaluation process that was focused on the “worth” of the outcomes of a project. Similar

to Daigneau (2003a) and Guckert (2006), success is measured by a project's expression of organizational value and strategic benefit (Zwikael & Smyrk, 2012).

PMI also expanded its understanding of planning at the start of the project including more than the original "Project Management 1.0" tools. Scholars such as Terry Williams (2019) had been exploring recent connections made between the PMBOK and the importance of front-end planning (Williams et al., 2019). He notes that PMI has created a systematic method for "Program and Portfolio Management" (*The Standard for Portfolio Management*, 2024), which are defined as "the centralized management of one or more portfolios to achieve strategic objectives (*PMI Lexicon of Project Management Terms*, n.d.)." He notes that the expansion into strategic management also expands the definitions of project success to include a suite of new project success factors – many of which are focused on the needs of the stakeholders. This, in turn, has fuelled the recent study of the project benefits, and management of the realization of those benefits (Williams et al., 2019).

2.2.5 Emergence of Benefits Realization Management.

As part of the move towards Project Management 2.0 tools, Benefits Realization Management begins to be referenced in project management literature as a planning tool for Information Technology (IT) projects (Aubry et al., 2021; Ika & Pinto, 2022).

As early as 1999, Roger Atkinson (1999) wrote on the inadequacy of the iron triangle approach in measuring IT project success upon completion. Among other factors, he

focused on the need for project managers to see their projects in terms of the benefit they bring to the success of the business, which he defined as success factors measured one to two years after project completion (Atkinson, 1999).

John Thorp wrote about the apparent lack of profit and productivity gains from IT investments in his book *The Information Paradox* (2003). He criticized the idea of IT projects being a “silver bullet” to solve management problems and argued that the relationship between project outcomes and benefits was complex and required focused management. He advocated the need to identify and measure benefits as a distinct element in the project management of IT projects (Thorp, 2003).

Gerald Bradley, in the preface to one of the first books on the subject of BRM, *Benefit Realisation Management: A practical guide to achieving benefits through change* (2006), noted that the roots of this model were in IT projects. These IT projects sought to provide a more detailed understanding of their ROI, recognizing that IT initiatives often drive broader organizational changes well beyond the scope of immediate project outputs. Bradley defined BRM as “the process of organizing and managing so that potential benefits, arising from investment in change, are actually realized” (Bradley, 2006).

John Ward (1996) also studied the benefits delivered by IS/IT projects and connected this to concepts of strategic management (Ward & Daniel, 2012; Ward & Peppard, 2002) . Ward wrote a summary of his model of BRM in his 2012 book *Benefits Management: How to Increase the Business Value of Your IT Projects* (Ward & Daniel, 2012). Ward

and Daniel defined BRM as “The process of organizing and managing such that the potential benefits arising from the use of IS/IT are actually realized” and then elaborates: “The purpose of the benefits management process is to improve the identification of achievable benefits and to ensure that decisions and actions taken over the life of the investment lead to realizing all the feasible benefits (Ward & Daniel, 2012).”

Studies and a model for BRM also emerged in various publications from PMI. Thomas Lechler and John Bryne’s *Mindset for Creating Project Value* (Byrne & Lechler, 2011) was written to respond to the critique of planning, and strongly advocated connecting the project’s outputs to strategic business values.

In 2016, PMI published a series of reports that connected project management to the concepts of strategic management, and introduced benefits management as a methodology (PMI, 2019). This also included the creation of the *Benefits Realization Management Framework* (*Benefits Realization Management Framework*, 2016), which provided the basic foundation to define BRM in the context of PMI’s “Program and Portfolio Management” (*The Standard for Portfolio Management*, 2024) referenced earlier.

In the next year, the 2017 *PMI Pulse of the Profession* report (PMI, 2017) presented a survey that showed a correlation between conventional project success and the maturity of the organization’s BRM activities, as defined by the BRM Framework. In 2019, PMI published a practical model for applying BRM in the *Benefits Realization Management*:

A Practice Guide (PMI, 2019). This guide defined BRM as the “The day-to-day organization and management of the effort to achieve and sustain potential benefits arising from the investment in portfolios, programs, and projects” (PMI, 2019).

2.2.8 Brief Description of the BRM Project Management Method

As part of the literature review, the following is a summary of the Benefits Realization Management method, selected from a combination of sources.

Ward and Daniel defined a business benefit as “an advantage on behalf of a particular stakeholder or group of stakeholders” (Ward & Daniel, 2012). Benefits Realization Management (BRM) can be simply summarized as “the process of organizing and managing so that potential benefits, arising from investment in change, are actually realized.” (Bradley, 2006)

The BRM process is described in similar terms as the PMI project management phases of initiating, planning, executing, monitoring, and controlling, and closing (Fernandes & O’Sullivan, 2021; PMI, 2013). Ward and Daniel (2012) elaborate on this five-phase process more specifically to BRM, which is summarized in Table 1 (Fernandes & O’Sullivan, 2021; Ward & Daniel, 2012).

2.2.8 Table 1 – BRM Process Summarized

<ul style="list-style-type: none"> ● Phase 1: Initiate - Identify and structure benefits. <ul style="list-style-type: none"> ○ Identify the strategic drivers that determine investment objectives for the project. ○ Identify the benefits that will result by achieving the objectives and how they will be measured. ○ Establish which stakeholders in the organization owns the benefit. ○ Identify changes required by the stakeholders to realize the benefit. ○ Produce a business case that justifies the risks and resources expended in return for the benefits. ○ Build a map of the benefits showing how the benefits are related (benefits dependency map – see Figure 10).
<ul style="list-style-type: none"> ● Phase 2: Plan Benefits Realization <ul style="list-style-type: none"> ○ Finalize the identification of all benefits, including their measurements and related organizational change requirements. ○ Obtain agreement of all stakeholders to responsibility and accountabilities. ○ Summarize all the work of Phase 1 and 2 in a written benefits plan, focusing on benefits as an ROI business case.
<ul style="list-style-type: none"> ● Phase 3: Execute <ul style="list-style-type: none"> ○ Project manage the implementation of the benefits with the project team throughout the design, procurement, and construction.
<ul style="list-style-type: none"> ● Phase 4: Monitor and Control <ul style="list-style-type: none"> ○ Engage the project team in the continuous measurement of the benefits at each stage in the project execution. ○ Implement changes as required to maximize the benefit realization. ○ Identify Lessons Learned.
<ul style="list-style-type: none"> ● Phase 5: Close and Establish Potential for Further Benefits <ul style="list-style-type: none"> ○ Perform final measurements, at least one year after construction completion. ○ Review Lessons Learned. ○ Identify additional improvements. ○ Identify future benefits.

2.2.6 Studies of Benefits Realization Management

Although Benefits Realization Management is a relatively recent method, it has already generated some academic literature that presents both its successes and areas of criticism.

Marnewick and Labuschagne conducted an early study on the adoption of benefits realization in 2010. They noted that while many organizations were not tracking their benefits, they were beginning to use benefits management in an unstructured way, and this was improving project success outcomes (Marnewick & Labuschagne, 2010).

Later, Carlos Serra and Martin Kunc (2015) researched the effect of Benefits Realization Management (BRM) on the success rates of project management across projects in the United States, UK, and Brazil. Their findings indicate a positive relationship between the adoption of BRM practices in project management and the generation of strategic value for businesses within those projects (Serra & Kunc, 2015).

More recently, Amgad Badewi analyzed the responses from 130 firms who had implemented Enterprise Resource Planning (ERP) into an organization (Badewi, 2022). An ERP system centralizes many aspects of an organizations operation using a single IT system in order to obtain efficiencies and improve performance. Badewi found that BRM framework was a more important factor for project success than the project management framework. Also noteworthy, Badewi found that the use of benefits for the business case, which he calls the “benefits case”, did not have an impact on project success. Badewi

interprets this to mean that a normal business case may hold greater credibility as a neutral process, and that “benefits cases” are undervalued (Badewi, 2022).

Gabriela Fernandes and David O’Sullivan (2021) conducted a study on the application of Benefits Realization Management (BRM) within a university setting, focusing on two specific collaborations between universities and industry in Portugal, involving the University of Minho and Bosch Car Multimedia Corporation. The research revealed that BRM facilitated the alignment of university researchers with the private sector's interests. However, conflicts persisted in areas where the benefits were not shared, notably in disputes over patent rights arising from collaborative efforts. The findings supported the importance of shifting from traditional project success metrics towards more strategic evaluations that BRM embodies. (Fernandes & O’Sullivan, 2021).

Richard Breese, a project manager with experience of early implementations of BRM in the UK, noted some personal reflections on issues inherent with BRM (2012). While generally supporting the value of BRM in programme and portfolio management, he noted that defining and measuring benefits can be fraught with bias and is not inherently “neutral”. Also, benefits may be affected by a multitude of factors outside the project. This means that the application of benefits as project performance indicators may be over-simplified. He suggests that future development of BRM project management models must evolve away from rigid scientific methods that attempt to be “neutral” and move towards models that reflect the true complexity of benefits management (Breese, 2012).

Similar to Breese’s observations, a study conducted by Monique Aubry (2021) highlighted the complexity and subjectivity inherent in establishing benefits as part of the BRM. This study, though positively inclined overall towards the value of BRM, cautioned that the human complexities of emotion and politics created “hidden challenges” to implementation (Aubry et al., 2021).

A joint research paper titled “Benefits management: Lost or found in translation” written by several BRM researchers (Breese et al., 2015), questioned the low uptake in interest in BRM in project management research. Their literature review noted that despite the positive evidence, the uptake for BRM has been low by both scholars and by practitioners. By interpreting existing literature through abductive reasoning, the writers suggested that the expansion of Benefits Realization Management (BRM) has occurred via diffusion rather than through direct deduction (Breese et al., 2015). In other words, BRM has spread from one place to another as a collection of related activities that brought value – not as a an applied systematic methodology.

2.2.7 Project Management Literature in the University Context

While Project Management is generally and widely associated with all capital construction projects, literature specific to capital construction projects in the university context is sparse (Pramen & Fernane, 2017). Noted previously the Fernandes and O’Sullivan (2021) study of BRM at a university is a rare example. There also a few

studies of university projects which tend to focus on the project management performance metrics of scope, schedule, and budget, also known as the “iron triangle”.

For example, Shrestha Pramen and James Fernane (2017) studied the performance of design-build project method against design-bid-build delivery method, using university project data from universities in 10 different states. They compared the cost, schedule, and scope performance data against other similar studies. Their study concluded that the design-build projects performed better in the university environment. They also noted that there were no other studies of this type using university project data (Pramen & Fernane, 2017).

Nathaniel Olatunde and Oluwaseyi Alao (2017) conducted an analysis of the "iron triangle" performance of university capital projects within Nigeria, encompassing both public and private institutions. Their study revealed that 65% of the projects exceeded their budget, while at least 80% did not meet their scheduled timelines. The performance discrepancy between public and private universities was minimal. The researchers concluded that, similar to studies of other emerging nations, their study supports the broader findings highlighted by researchers like Flyvbjerg (2017), indicating a prevalent underperformance of public sector projects, including university projects (Olatunde & Alao, 2017).

Research by Majed Alzara highlighted that university projects in Saudi Arabia experienced significant delays, ranging from 50% to 150% beyond their planned schedule

(Majed Alzara et al., 2016). The study also discussed a project management approach developed by Dean Kashiwagi, known as the Best Value Procurement/Performance Information Procurement System (BVA/PIPS) (Kashiwagi & Byfield, 2002). Although BVA/PIPS was not exclusively designed for university capital projects, Alzara's findings suggested its potential to mitigate delays in such projects (Majed Alzara et al., 2016).

4.6 Gaps in the Literature

Broadly speaking, this literature implies a gradual evolution in university capital projects from methodologies associated with Project Management 1.0 to those of Project Management 2.0. Benefits Realization Management (BRM) is a recent area of research, and there are noticeable gaps in the literature regarding its use in university capital projects. This literature review has established links between the broader body of work on strategic management and BRM, and further attempts to relate these concepts to discussions specific to universities.

However, the literature is very sparse on the direct implementation of BRM in the context of university capital projects. As an example, the Fernandes & O'Sullivan (2021) research is a study of BRM specific to the university context, but not related to capital projects. Conversely, the studies pertaining to university capital projects (Majed Alzara et al., 2016; Olatunde & Alao, 2017; Pramen & Fernane, 2017) do not reference BRM.

The purpose of this study is to provide early observations to begin to fill this gap, and to provide a direction for more intense future study of this specific area of knowledge.

3. MODEL: BENEFITS REALIZATION MANAGEMENT APPLIED TO A UNIVERSITY CONTEXT

This section will outline the Benefits Realization Management model, as it may be applied to a university capital project context. The model presented is a combination of the methods presented by Ward and Daniel (Ward & Daniel, 2012) and PMI (PMI, 2019). This description synthesizes examples of the model's application in the university context, as a lead-up to the content of the survey.

This research aims to explore whether there is any supportive evidence for the existence of Benefits Realization Management (BRM) in university capital construction projects. Although the term BRM might not be widely recognized in this context, it's possible that the methodology, or components thereof, may be employed under different terminologies. Recognizing that BRM is based on essential principles from prior strategic management and project management literature (Bradley, 2006; Ward & Daniel, 2012), this study was structured to find evidence of three core BRM concepts in the university context. The following sections are structured on these core concepts:

Core concept #1 - Realization of Strategy in the University Context: Benefits can only be defined within the context of the organization's existing strategy. This section outlines the methods universities commonly use to create their strategy.

Core concept #2 - Realization of Return on Investment in the University Context: Capital Projects are created to deliver benefits that justify the investment. This section

provides a list of common appraisal methods that universities employ to measure a return on investment from capital projects.

Core concept #3 - Realization of Change in the University Context: The delivery of benefits results in a transformation of an organization's capabilities. This transformation necessitates change across multiple levels of the organization, including adjustments to physical infrastructure, operational processes, staffing, and organizational culture. This section delineates the essential steps involved in this implementation of Benefits Realization Management (BRM) as part of a change management processes.

3.1 Core Concept #1: Strategy in the University Context

The first key concept of Benefits Realization Management is that benefits exist in the context of strategy. The sources of strategy in a university context are derived from the strategic management section of the literature review. Keller (1983) and Peterson (1984) list the major factors of university strategy to be (1) traditions, values, and aspirations, (2) academic and financial strengths and weaknesses, (3) leadership abilities and priorities, (4) environmental trends, (5) market conditions, and (6) the competitive situation (Keller, 1983; Peterson, 1984). King and Cleland created Figure 6, which shows how a typical university would structure its strategic plans.

A System of Plans for an Educational System [Source: Cleland and King (1983), p. 49]

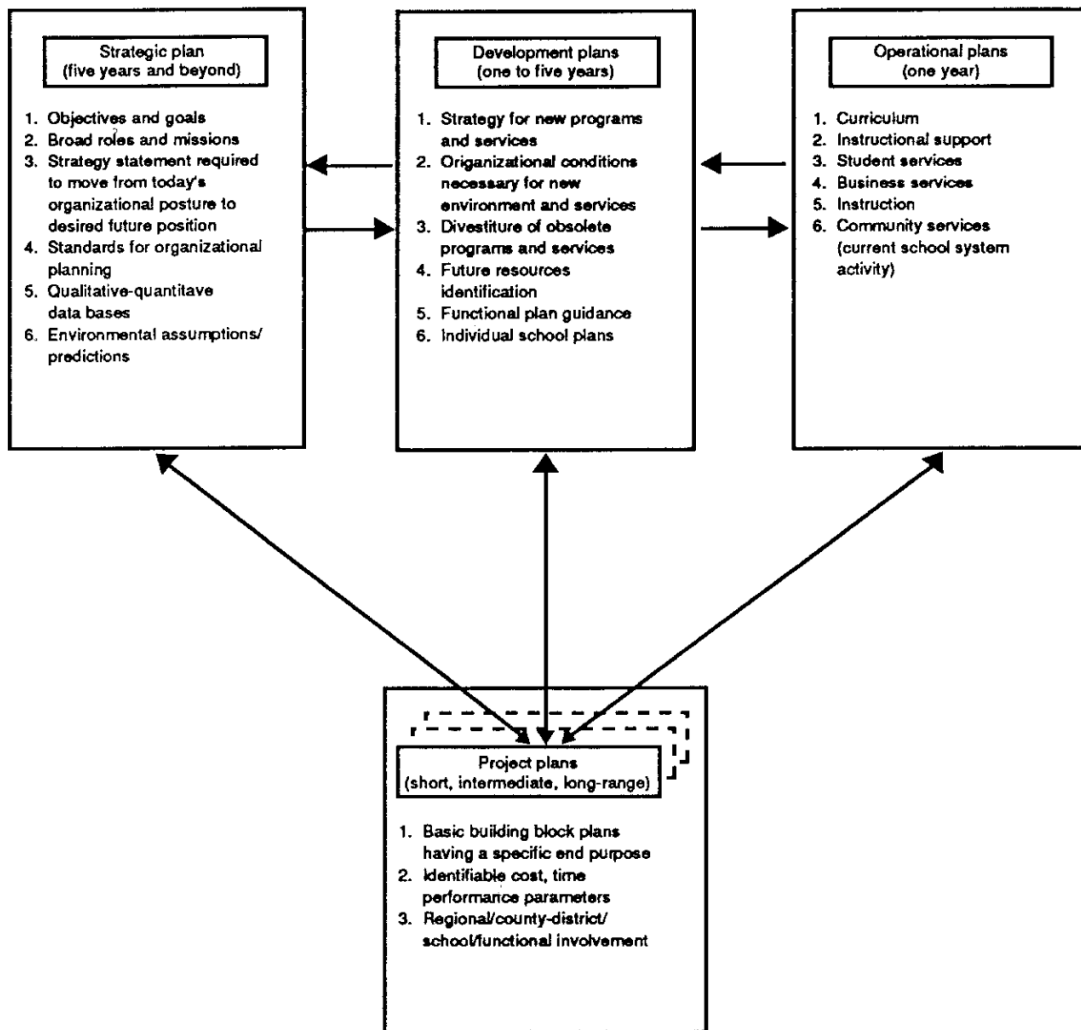


Figure 6 - (King and Cleland, 1983) - Sample Strategic Planning Document Structure at a University

During the strategic planning process, the planning tools identified in the literature review may often be brought to bear, including this common sampling:

- Balanced Scorecard (Kaplan & Norton, 2005)
- Porter's Five Forces (Porter, 1979)

- Strength Weakness Opportunity Threat (SWOT) analysis (Steiner, 2010)
- Valuable Rare Inimitable, Non-substitutable (VRIN) analysis (Barney, 1991)

The resulting strategic planning documents can readily be found on most university websites. One study of Turkish universities identified that the contents of these planning documents frequently revolve around common themes of preparing students for the workforce (59%), research functions (33%), and community service (18%) (Ozdem, 2011). In the context of BRM, these themes become the building blocks that connect university strategy to specific benefits delivered by capital projects.

3.1.1 Strategic Planning and University Stakeholders

Universities often have a diverse range of stakeholders. Their needs and constraints form a significant consideration in the realization of any strategic objectives. Ward and Daniel (2012) emphasize the need to conduct extensive stakeholder analysis as part of the preparation for BRM implementation. A common tool is the Power / Interest Stakeholder Analysis Grid (PMI, 2013). Examples are shown in Figure 8 and Figure 9 of the Core Concept #3 section. A key factor in this analysis is to assess each stakeholder's benefits from the project against the degree of change they will have to undertake to realize those benefits. There is also the possibility that the project will impose new constraints on some stakeholders in a university, and they will lose benefits as a result. Stakeholders may also have different levels of risk tolerance and risk capacity. This analysis will be critical to the change management portions of the BRM process (Ward & Daniel, 2012).

3.1.2 Strategic Planning and University Culture

While there is no specific reference in any of the BRM literature to university culture, the strength and impact of university culture is implied in the strategic planning and stakeholder analysis. The university culture acts as a stakeholder, with its own power and interests, as well as risk tolerance and capacity.

Peter Drucker is often credited, without citation, for the popular saying “Culture eats strategy for breakfast (*Culture Eats Strategy for Breakfast – Quote Investigator®*, 2017).” Mintzberg, who was critical of the “planning fallacy” in the literature review (Mintzberg, 1994), also dedicates considerable weight to the power that culture, which he calls “ideology” (Mintzberg, 1989). However, defining this culture is made difficult by its essentially diverse and heterogenous nature. Burton Clark, a sociologist who studied academic culture, summarized as follows:

“The basic trend in academic culture is fragmentation, brought about by a proliferation of parts that operate under the centrifugal force of a growing number of differing needs and interests (Clark, 1980).”

PMI has loosely referenced some tools to help Project Managers understand culture, such as mind-mapping (Byrnes, 2010) and SWOT (Maculley, 2003). Direct observation and practical experience will likely play the most crucial roles in understanding university culture (PMI, 2013).

3.2 Core Concept #2: Return on Investment in the University Context

Upon establishing a strategic context, the second key concept of Benefits Realization Management (BRM) is that a project's value must be assessed by the return on investment against those benefits. Universities commonly use the same strategic management tools as private industry, like net present value (NPV) to calculate an internal rate of return (IRR). However, the minimum acceptable ROI in a university, also called the "hurdle", can be significantly lower than a corporate ROI (Daigneau, 2003b). In general, the methods used by universities to evaluate capital construction projects fall into the categories of financial appraisals, risk and impact appraisals, strategic business analyses, a strategic alignment analysis. Most of these methods have already been discussed in detail in the literature review, and are summarized in the following.

3.2.1 Financial Appraisal Methods:

1. Simple Payback, which calculates the time needed to recoup the initial investment.
2. Net Present Value (NPV), which discounts future cash flows to their present value to reflect the time value of money.
3. Internal Rate of Return (IRR), which is the profit of an investment represented by reducing the net present value of all cash flows to zero using a discount rate. The discount rate can then be meaningfully compared to other market investments, such as bonds and stocks.
4. Profitability Analysis creates a model that projects the success of an investment.

5. Lifecycle Cost Analysis, which evaluates the total cost of ownership (TCO) across an asset's life, including acquisition, operation, maintenance, and disposal.

3.2.2 Risk and Impact Appraisal Methods:

Risk appraisal methods aim to evaluate project outcomes against potential risks, employing various tools including:

1. The "Risk Register" identifies and prioritizes real and potential risks the project may have on university strategy.
2. "Scenario Analysis" models the impacts of different possible project outcomes against the university strategy.
3. "Sensitivity Analysis" determines the effect of varying key factors as they impact the future strategic goals of the university.
4. "Decision Trees" graphically represent how decisions about the key project factors will, when combined in every possible combination, produce different outcomes for the university.
5. Sustainability certifications like Leadership in Energy and Environmental Design (LEED), Energy Star, and the WELL Building Standard, are also forms of risk and impact appraisals for the environmental and health impacts presented by the project.

3.2.3 Strategic Business Analysis

Strategic business appraisals ensure a project's alignment with an organization's strategic management. These tools have already been covered previously, and include tools like SWOT analysing, VRIN, market analysis, competitive forces analysis, etc.

3.2.4 Strategic Alignment Analysis

Strategic alignment appraisal methods verify that a project's deliverables align with the strategic objectives of an organization (Keller, 1983; King & Cleland, 1987). Usually, universities will have a list of strategic goals, sometimes called a strategic register, that has goals in these common key areas:

1. Academic Goals, which focus on educational outcomes including teaching quality and departmental growth.
2. Research Goals, targeting specific research objectives such as the expansion of key research areas or the creation of new research capabilities.
3. Financial Goals, aimed at economic efficiency and growth, including enrolment, student housing, and ancillary functions.
4. Community outreach goals, including collaboration and contribution to the surrounding environs of the university, or to a specific community partnership around the world.

5. Social, Ethical, and Sustainability Goals, such as promoting student and faculty diversity, providing opportunities for lower income students, and climate change commitments.

All the above methodologies are examples of how universities can appraise capital projects for a return on their investment.

3.3 Core Concept #3 - Realization of Change in the University Context

The third critical concept of Benefits Realization Management (BRM) is its distinct approach to altering stakeholder involvement. This approach aims to both harmonize and encourage stakeholders to embrace the change required to achieve the return on investment. Figure 7 below from Ward and Daniel (2012) highlights the connection between identifying and measuring benefits, and the organizational change that is required to realize those benefits.

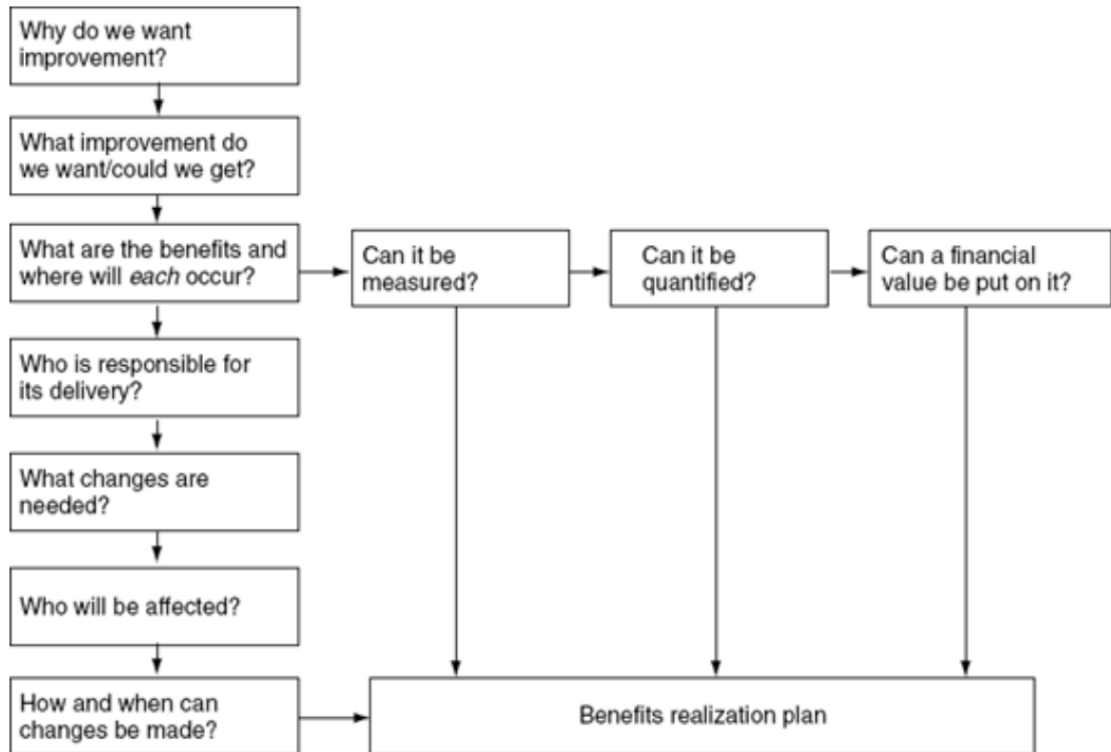


Figure 7 - Ward and Daniel (2012) - Key Questions in Developing a Benefits Plan Showing Change Management

3.3.1 Identification of Stakeholder Ownership of Benefits

The success of identifying benefits largely hinges on correctly identifying the perceived benefits by each stakeholder, and then engaging their commitment to achieving the project's objectives in a collaborative and informed manner. Since the entire project effort will involve changing some significant part of the organization, considerable time and effort must be invested by management into this activity.

3.3.2 Benefit Typologies

To systematize the identification of benefits, they can be divided into four categories: tangible, qualitative, emergent, and “disbenefits”.

Tangible benefits in university operations are quantifiable and encompass areas such as enrollment, research funding, alumni donations, and residence occupancy. These aspects are directly measurable in terms of the growth and financial sustainability of an institution.

Qualitative benefits cannot be easily measured but are crucial for institutional growth. Examples include enhancing a university's reputation, community impacts, student engagement, and faculty and staff development.

Emergent benefits represent strategic value that, while not precisely predictable, may materialize as a result of the project. They can be viewed as positive risks, enhancing the likelihood of advantageous outcomes for the university as a result of capital projects. These emergent benefits could result in unforeseen scientific breakthroughs, the creation of innovative technologies, or opportunities for the university to adapt to future demographic or cultural changes.

“Disbenefits” refers to the avoidance of potential disadvantages through the completion of a capital projects. The opposite of emergent benefits, “disbenefits” involve the

avoidance of risk. The most common example is facilities renewal projects, also called Deferred Maintenance (DM) projects, which mitigate the unplanned loss of capacity due to unplanned building system shutdowns. Additional examples of projects that are created to avoid “disbenefits” are climate change adaptations, health and safety projects, and projects that demolish unproductive or unnecessary physical assets.

3.3.3 Benefit Identification Process

In the most general terms, the identification process should answer the following questions about each benefit:

1. Why it matters: The significance of benefits is determined by their contribution to strategic objectives of the university.
2. Where the benefit occurs in the institutional environment: Benefits realization occurs within the broader institutional environment, usually in the department that is most closely associated to the end-product. Benefits are not realized by the project itself, nor are they realized by the project team. For example, a brand-new residence building has no benefit sitting empty, regardless of whether it was delivered under budget and on time. The benefits are only realized when the Residence Department fills the building with students.
3. How the benefit can be measured: Measurement can be through quantitative methods, such as growth in enrolment income. Or benefits can be measured using qualitative methods, such as student experience indicators or the advancement of research.

4. Who is responsible for delivery: Accountability for delivering benefits is assigned to specific stakeholders who will also be responsible for change within their community. This will usually include the stakeholders identified in the second point above.
5. Risk: The benefit is subject to analysis to determine the feasibility of its attainment considering all constraints. This risk assessment includes evaluating the key stakeholder's capability for change.

The risks identified in the benefits register also need to be mitigated within the university context. Ward and Daniel (2012) suggest the use of stakeholder management tools, adjusted from the PMI PMBOK (2013). This includes the use of a benefits vs change stakeholder matrix (Figure 8) and a stakeholder analysis (Figure 9).

Benefits received	High	<p>NET BENEFITS</p> <p>Should champion the project – but must be aware of implications for others and use their influence</p> <p><i>Collaborators</i></p>	<p>BENEFITS BUT...</p> <p>Will be positive about benefits but concerned over changes needed – ensure sufficient enabling changes are identified to offset any resistance</p> <p><i>Compromisors</i></p>	
	Low	<p>FEW BENEFITS BUT...</p> <p>Must be kept supportive by removing any inertia/apathy that may influence others</p> <p><i>Accommodators</i></p>	<p>NET DISBENEFIT</p> <p>Likely to resist changes – must ensure all aspects of resistance dealt with by enabling projects</p> <p><i>Resistors</i></p>	
		Low	Changes required	High

Figure 8 - Ward and Daniel (2012) – Stakeholder Assessment Matrix for Benefits vs Change

Stakeholder group	Perceived benefits or disbenefits	Changes needed	Perceived resistance	Commitment (Current & Required)				
				Anti	None	Allow it to happen	Help it happen	Make it happen
Finance director	Improved cash control and info	New KPIs and Controls	None				C → R	
Finance controller and accounts staff	Fewer errors, better control	New systems and procedures	Extensive retraining			C	Action → R	
Operations director	Reduced stock costs	New planning processes	None				C → R	
Production manager and staff	Fewer production problems	New systems and technology	Fear of new technology and lack of skills			C	Action → R	
Purchasing manager and buyers	None	Inventory-driven procurement system	Reduced discretion and tougher KPIs		C		Action → R	
Product managers	Better cost info and accurate grower payments	New grower system and inventory KPIs	Risk that grower needs will not be met			C	Action → R	
Production planners	None – fewer planners needed	More automated scheduling	Fear of job losses	C			Actions → R	

Figure 9 - Ward and Daniel (2012) – Sample Stakeholder Analysis for Change Management

3.3.4 Plan Benefits Realization to Include University Stakeholder Change

After the benefits are identified, the benefits next need to be structured into a plan. Both Ward and Daniel (2012) and PMI (2019) provide examples of creating a Benefits Register. The register is a simple enumeration of all the benefits with their details such as measurements, ownership, and risk.

Upon completion of the register, a Benefit Dependency Network (Ward & Daniel, 2012) or Benefit Map (PMI, 2019) can be created to show how the benefits may be interrelated in the context of the project (see Figure 10). Within a university setting, this plan would

pinpoint the necessary changes to Departments and their operations in order to fully achieve the intended benefits towards the broader university strategy.

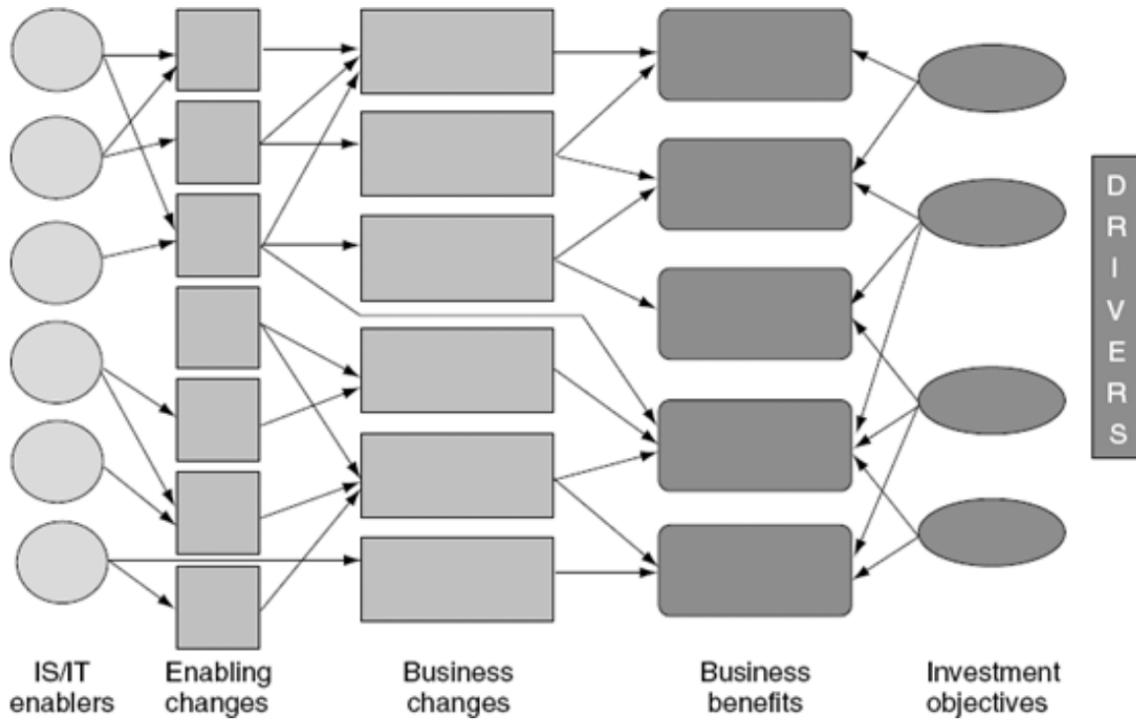


Figure 10 - Ward and Daniel (2012) - Benefits Dependency Network

3.3.5 Measurement of Benefits in a University Context

The strategic management literature significantly underscores the importance of regular performance measurement as a pathway to attaining enhanced performance, as highlighted by Kaplan and Norton (2005). Similarly, the project management literature, through the works of Shenhar and Dvir (2007) and Ika and Pinto (2022), reinforces the critical role of evaluating key success indicators linked to strategy.

BRM also emphasizes measurement of benefits during the phases of execution, monitoring and controlling, and closing. Project management must constantly be measuring progress towards the benefit at all stages. Measurement must continue until at least one or two years after the end of the capital project (Ward & Daniel, 2012). The need for this type of continuous and long-term measurement of success is a common theme of the literature on “Project Management 2.0” tools like BRM (Ika & Pinto, 2022; Levitt, 2011).

For an example in the university context, consider that a key benefit to a new engineering building is to increase enrollment. The measurement of this benefit could be calculated as the number of classrooms and seats in the building. This metric is set at the initiation of the project by the project team, including the faculty and related administration as a key stakeholder. This measurement is used to calculate the ROI and justify the project budget. Ownership of the benefit is assigned to the related engineering faculty and administration. Next, this benefit is measured by the project team (which includes faculty and administrators) throughout the design and construction. After the building has been used for two years, an actual measurement of increased enrollment is made. The project team would look at how well the building performed to support the benefit, as well as also look at how the faculty and administration managed the to realize the increase in enrollment.

In summary, the key to the BRM process is to remain focused on the need to implement a complete series of institutional changes, including the construction of a new capital

project, so that the benefits will be fully realized and sustained (Thorp, 2003; Ward & Daniel, 2012).

4. METHODOLOGY

A preliminary review of the existing literature revealed very little study of this topic, so an exploratory research design methodology was chosen. Applied to this study, the exploratory research method starts with a thorough review of existing literature and the collection of insights from subject matter experts. Subsequently, a survey tool was developed to facilitate data collection. The gathered data was then analyzed to identify trends or other indicators that may provide answers to the research questions.

4.1 Expert Consultation

While the literature review has been summarized previously, it is also notable that several experts were also consulted as part of the initial exploration into this research. The Association of Physical Plant Administrators (APPA) organizes a research program called Center for Facilities Research (CFaR) which seeks to consolidate research in educational facilities management (Glazner, 2016). This research was selected to be supported by CFaR by providing access to other experts in the field of capital construction at universities. Various senior leaders in facilities management from across the United States and Canada were solicited for their views on this subject. These conversations were conducted informally, and under agreement of anonymity. They helped guide the direction of this research project and the design of the survey. They also helped identify pertinent literature sources.

4.2 Research Design

This study conducted a survey to provide preliminary information on the use of Benefits Realization Management methodology in university capital projects. This survey was structured around answering two questions:

1. Is there evidence that universities are using Benefits Realization Management methods in their capital construction projects?

In the context of the BRM model described earlier, evidence of BRM methods could be tested by looking for the presence of the three core concepts of the BRM model. See the Data Collection Methodology below.

2. Is there evidence that universities are facing challenges in obtaining strategic benefits from their capital construction projects?

This question can be measured by expert opinion. To obtain an expert opinion, the survey sample needs to be collected from an expert population. Details on the method to obtain a sample from the expert population is described in the “Population and Sample” section.

4.3 Data Collection Methodology

Informed by the literature review, the study created a survey to gather data from universities around the three core components of Benefits Realization Management:

1. Strategy: Benefits can only be defined within the context of the organization's existing strategy.
2. Return on Investment (ROI): Capital Projects are created to deliver benefits that justify the investment.
3. Change Management: The delivery of benefits results in a transformation of an organization's capabilities. Transformation necessitates change across multiple levels, including changes to physical infrastructure, operational processes, staffing, and organizational culture.

The first two concepts, namely strategy and ROI, suggest that an organization is involved in strategic management practices. Additionally, the third core concept, change management, indicates the organization's engagement in project management activities. The relative maturity of an organization's implementation of BRM therefore depends on the organization having both a strong strategic management practices and project management practices (Bradley, 2006). Exploring university practices around strategy, ROI, and change management on capital projects could help answer research question one "Is there evidence of the utilization of Benefits Realization Management practices in university capital projects to enhance benefits delivery?"

The following questions were assembled, with their correlating relationship to strategy, ROI, and Change:

Questions	Strategy	ROI	Change
Do you have previous experience with Benefits Realization Management (BRM)?	Yes	Yes	Yes
How important is an investment appraisal to the approval of a capital project at your organization?	Yes	Yes	No
How often does your institution require capital projects to have a MEASURED benefit?	Yes	Yes	No
Select the five most common benefits that your institution expects in return for an investment:	Yes	Yes	No
What investment appraisal tools does your institution use to evaluate the approval of capital projects?	Yes	Yes	No
How often does your institution measure the benefits AFTER a capital project has been completed?	No	Yes	Yes
How often does your institution measure the benefits DURING the capital project process?	No	Yes	No
Does your institution consider internal change-management as part of the capital project process?	No	No	Yes

To this list was added one question to provide a direct assessment by the participants to answer question #2: “Is there evidence indicating a problem in achieving the strategic benefits of capital projects for the universities that initiate them?”

Questions	Strategy	ROI	Change
One year after completion, do you think capital projects realize the benefits that justified their investment?	Yes	Yes	Yes

Lastly, three questions were asked to determine the relevance of the participants to the desired population of university project experts:

Questions	Strategy	ROI	Change
In the past five years, on how many capital projects have you been a participant?	No	No	No
In the past five years, what is the combined value of all the capital projects in which you directly participated?	No	No	No
In the past five years, what roles have you had working directly on capital projects at your institution?	No	No	No

4.4 Population and Sample

The target population for this study is professionals directly engaged in the planning and implementation of capital projects at universities. This population has been selected for their direct and applied expertise in university capital project delivery. In most cases, this will be project managers and other mid-level to senior leaders in a university facilities management department or capital development department. Also encompassed in the target population are mid-level and senior leaders from various academic or administrative departments who possess the necessary planning and implementation experience as project sponsors, clients, or end-users.

To obtain a sample of this population, this survey was presented at the 2023 annual conference of the Eastern Region Association of Physical Plant Administrators (ERAPPA). ERAPPA, a regional chapter of APPA, encompasses all university facilities

managers along the eastern seaboard of the USA as far south as Delaware, and the entire eastern half of Canada, as far west as Ontario. This event attracts facilities management experts from many of the universities in this geographic region, and therefore is likely to have a high concentration of the target population.

The sample was taken on September 27th, 2023, from a group of volunteers who attended an education session titled “Capital Project Management - Are Strategic Benefits Realized?” and who agreed to respond anonymously to the survey questions during the presentation. The sample had 23 participants and is summarized in the Results section.

4.5 Ethical Considerations

In conducting the study, the following ethical considerations were made to ensure the integrity and respectfulness of the research process. Transparency was maintained throughout the process by clearly communicating to participants the nature and purpose of the study, ensuring they were fully aware of what was involved. This included indicating that the session was part of a research study both verbally and in writing, as well informing participants that there would be an optional and voluntary interactive component.

In line with this, informed consent was obtained at the beginning of the session, by providing participants with an understanding of the research and the purpose of the survey instrument. The software “Slido” was used which allowed participants to answer the survey anonymously in real time on their mobile devices or computers. To protect

participant privacy and encourage candid responses, anonymity was guaranteed; no identifying information was collected, nor was a roll call taken. None of the participants were required to sign-in to the “Slido” system, and all their responses were coded with a non-identifying number.

Lastly, recognizing the importance of autonomy, participants were given the right to withdraw from any part of the study. This meant they had the freedom to choose which questions to answer, resulting in some questions not being answered by everyone.

5. RESULTS

The summary of the survey results is divided into four main parts. The first part includes the questions that identify the sample as part of the desired expert population. The second part looks at how strategic appraisals are used, giving insights into the use of strategic management at the institution. The third set of questions asks about the benefits universities seek and if they track these benefits. The last part directly asks about their experience with the core principles of benefits realization management.

Table 2 - Population Characteristics of Sample Data Results

Poll Question	Poll Option	Count	Total Votes	Results
In the past five years, what roles have you had working directly on capital projects at your institution?				
	Sponsor: Senior leader who approves a project at a senior level	4	19	21%
	Manager: Responsible to the sponsor to implement the project (planning, design or construction)	15	19	79%
	Designer: Architect / Engineer / Other Technical Designer	2	19	11%
	Contractor: Construction Manager / General Contractor / Subcontractor	2	19	11%

	Builder: Supervisor, Foreperson, Tradesperson (Internal to Institution)	0	19	0%
	Do not have a direct role in capital projects.	0	19	0%
In the past five years, on how many capital projects have you been a participant?				
	1-2	3	22	14%
	3-10	9	22	41%
	More than 10	10	22	45%
Weighted Average Response:	7			
In the past five years, what is the combined value of all the capital projects in which you directly participated?				
	Less than \$5M	5	23	22%
	\$5M-\$25M	5	23	22%
	\$25M-\$100M	7	23	30%
	\$100M - \$500M	5	23	22%
	More than \$500M	1	23	4%
Weighted Average Response:	\$110M			

Table 3 - BRM Data Results

Poll Question	Poll Option	Count	Total Votes	Results
Do you have previous experience with Benefits Realization Management (BRM)?				
	No, this is my first time hearing about BRM.	17	23	74%
	Yes, I have been part of a project that used BRM.	0	23	0%
	I know about BRM, but I have not been part of a project that used it.	5	23	22%
	I have used something similar to BRM, but we did not use that name.	1	23	4%
One year after completion, do you think capital projects realize the benefits that justified their investment?				
	Almost all the benefits are realized (80% or more)	3	22	14%
	Most of the benefits are realized (50% - 80%)	9	22	41%
	Some of the benefits are realized (20% - 50%)	10	22	45%
	Few of the benefits are realized (less than 20%)	0	22	0%

Does your institution consider internal change-management as part of the capital project process?				
	Almost Always (More than 80%)	0	19	0%
	Often (50% to 80%)	1	19	5%
	Sometimes (20% to 50%)	6	19	32%
	Rarely (less than 20%)	12	19	63%

Table 4 - Appraisal Data Results

Poll Question	Poll Option	Count	Total Votes	Results
What investment appraisal tools does your institution use to evaluate the approval of capital projects?				
	Financial business cases (Cost-Benefit analysis, Net Present Value, Payback Period etc.)	9	21	43%
	Strategic business analysis (SWOT, market analysis, competitive forces, etc.)	4	21	19%
	Alignment with institutional strategy (measurable progress against strategic goals, social and ethical deliverables, etc.)	18	21	86%
	Impact / Risk Appraisal (risk plans, scenario analysis, etc.)	6	21	29%
	Other appraisal tool not listed	0	21	0%

	Rarely use any appraisal tools.	1	21	5%
How important is an investment appraisal to the approval of a capital project at your organization?				
	Very High Importance - Investment appraisals are always created. They must be rigorously evaluated by multiple levels of the organization before final approval.	1	20	5%
	Moderate Importance - Investment appraisals are usually created for most projects. They are evaluated at the senior level before approval.	10	20	50%
	Minor Importance - Investment appraisals are sometimes requested. They may or may not be reviewed before approval.	8	20	40%
	Low importance - Investment appraisals are rarely created. They are not required for approval.	1	20	5%

Table 5 - Benefit Data Results

Poll Question	Poll Option	Count	Total Votes	Results
Select the five most common benefits that your institution expects in return for an investment:				
	Increase Enrollment	12	20	60%

	Increase Research Capacity	8	20	40%
	Increase Residence Occupants	7	20	35%
	Improve Reputation	11	20	55%
	Improve Student Experience	16	20	80%
	Improve Energy Efficiency / Reduce GHGs	16	20	80%
	Adapt to future demographic or cultural change.	5	20	25%
	Enable a significant Scientific or Technological Breakthrough	1	20	5%
	Adapt to Climate Change	6	20	30%
	Avoid Building System Failure	12	20	60%
How often does your institution require capital projects to have a MEASURED benefit?				
	Almost always have metrics (80%+)	0	18	0%
	Often have metrics (50% - 80%)	1	18	6%
	Sometimes have metrics (20% - 50%)	6	18	33%
	Rarely have metrics (less than 20%)	11	18	61%
How often does your institution measure the benefits AFTER a capital project has been completed?				

	Almost Always (80%+)	0	19	0%
	Often (50% - 80%)	0	19	0%
	Sometimes (20% - 50%)	4	19	21%
	Rarely (less than 20%)	15	19	79%
How often does your institution measure the benefits DURING the capital project process?				
	Almost Always (80%+)	0	18	0%
	Often (50% - 80%)	1	18	6%
	Sometimes (20% - 50%)	0	18	0%
	Rarely (less than 20%)	17	18	94%

5.1 Data Analysis Techniques

The data gathered in this survey was first carefully reviewed to identify the overall trends. During this process, the responses to multiple-choice questions were simplified into binary categorical data in preparation for statistical analysis. A stepwise linear regression analysis was then conducted using Minitab statistical software to predict the realization of benefits as the dependent variable of interest. This step aimed to understand if there was any statistically support trend in the data that might affect the achievement of benefits.

5.2 Statistical Analysis

In addition to observational findings, which are explained in the following section, a statistical examination of the data was conducted to see if any survey factors could reliably predict outcomes related to benefit realization. The focus was on determining if

capital projects achieve the expected benefits one year after completion, as justified by their initial investment. This is captured in the dependent variable of “benefits realized”, answered by the question: “One year after completion, do you think capital projects realize the benefits that justified their investment?”.

To perform the first round of analysis, all samples with incomplete data were removed. This means only people who answered all the survey questions were included, leaving 13 samples for further regression. A histogram was created for the dependent variable, “Benefits Realized”, which revealed a marginally normal distribution. This was due to the coarsely granular nature of the survey, where only four possible values for “Benefits Realized” were collected.

An initial stepwise linear regression was conducted using Minitab software, where only variables with an alpha-to-enter of 0.15 were permitted to remain in the model. After the regression, three variables entered the model as shown in Table 5 - Regression #1. The variable with the greatest statistical importance is the practice of measuring benefits after the project is completed, showing a positive impact on the realization of benefits. Conversely, employing strategic alignment in evaluations and prioritizing deferred maintenance (DM) were associated with a negative impact on the realization of benefits.

Table 5 - Regression #1 Results

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	78.0	17.6	4.42	0.002	
Measure After	1.533	0.415	3.70	0.005	1.15
Appraisal Alignment					
1	-30.0	15.8	-1.90	0.091	1.08
Benefit DM					
1	-28.3	10.4	-2.73	0.023	1.15

However, this model had an adjusted standardized coefficient of determination of 55%, which was less than a typical target level of 70%. Both the “measurement after appraisal” and “DM benefit” are statistically significant, with P-values less than 0.05. The “alignment with strategy” appraisal method is not significant.

A closer inspection of the dataset revealed that there was only a single instance where both DM and Alignment equaled 0. This means that there was an almost universal application of alignment strategies among DM projects in this sample. Therefore, it is possible there is collinearity between these two variables, despite the low Variance Inflation Factor (VIF). The "Appraisal Alignment" response was removed from the model, in part to remove any possibility of collinearity, and in part because the P-Value was greater than 0.05. This adjustment resulted in only small changes to the coefficients (See Table 6 - Regression #2), and a decrease in the adjusted coefficient of determination to 41%.

Table 6 – Regression #2 Results

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	49.7	10.5	4.72	0.001	
Measure After	1.362	0.454	3.00	0.013	1.10
Benefit DM					
1	-24.0	11.3	-2.12	0.060	1.10

To ensure a comprehensive understanding of the effect of the “Measure After Appraisal” and “Deferred Maintenance (DM) Benefit” variables, the full dataset was revisited to maximize the number of samples by using only these variables as regressors. After removing empty cells, the dataset grew to 19 samples. The histogram of the 19 samples was a better fit to a standard distribution, but still heavily granular. Upon regression, this model demonstrated only a slight adjustment in the coefficients, reaffirming the statistical significance of "Measure After" and "Benefit DM" as predictors of benefits realization (see Table 7 - Regression #3). However, the coefficient of determination reduced further, down to 30%.

Table 7 - Regression #3 Results

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	49.7	10.5	4.72	0.001	
Measure After	1.362	0.454	3.00	0.013	1.10
Benefit DM					
1	-24.0	11.3	-2.12	0.060	1.10

Examining the residuals from all three regression models revealed that the granular measurement of the realized benefits, and the resulting absence of a standard distribution of the responses, reduced the accuracy of all the models.

The statistical analysis indicated a potential positive relationship between the measurement of benefits and their realization, and a negative relationship in the application of deferred maintenance benefits and appraisals involving strategic alignment. However, for statistical confidence, additional response data with finer details are necessary to develop a model capable of achieving a 70% coefficient of determination target threshold, and to further reduce the possibility of collinearity.

The full analytic outputs of all three regressions can be found in Appendix “A” - Complete Linear Regression Reports.

6. DISCUSSION

6.1 Research Questions Observed

The survey findings offer insights into the research questions posed by this study:

1. Is there evidence that universities are using Benefits Realization Management methods in their capital construction projects?

Regarding knowledge of Benefits Realization Management (BRM), a substantial 74% of respondents were unaware of the concept, highlighting a significant gap in awareness and understanding of BRM.

The practice of project appraisal appeared limited, with only 5% of respondents stating that appraisals were always conducted, necessitating input from all stakeholders. A slim majority of 50% deemed appraisals of major importance, necessitating high-level approval such as from the board of governors; 40% viewed appraisals to be of minor importance and only sometimes requested.

When appraising capital projects, strategic alignment emerged as the most frequently utilized method, employed by 86% of respondents. Financial Return on Investment (ROI) was the second most common appraisal method, utilized by 43% of respondents. The use of Strategic Business Analysis tools was 19%.

As for the establishment of metrics for benefits on capital projects, these were rarely established; the weighted average response is 21% of projects have metrics. When metrics are set, there was a general lack of follow-up measurements; only an average of 13% measured progress during the project, and an average of 15% conducted measurements after the project's completion.

Lastly, the presence of any change management process was low, with a weighted average of 21% of projects having an associated change management process.

One notable outlier to the general trend is the 86% general use of the strategic alignment method to project appraisals. This implies that many institutions might be preparing for a future BRM process, either intentionally or abductively.

Overall, these indicators point towards a low utilization of BRM methods on university capital projects.

2. Is there evidence that universities are facing challenges in obtaining strategic benefits from their capital construction projects?

On average, this sample population showed that typical university capital projects achieve 55% of their projected benefits. Only 14% of participants indicated that more than 80% of the intended benefits are realized. This data is evidence that universities are experiencing a problem in achieving strategic benefits.

In addition to identifying that this problem exists, a regression analysis on the data suggested a positive link between the measurement of benefits after a project is completed and their attainment. Prioritizing deferred maintenance (DM) benefits and employing strategic alignment assessments may negatively influence the success in achieving benefits. These findings may help direct further study to understand the challenge of achieving benefits on university capital projects.

6.2 Interpretation of Results

In addition to providing preliminary information to answer the two research questions, this study's results also shed light on the challenges universities face in achieving the strategic benefits promised by their capital projects. The average benefits realization rate of 55% highlights a significant gap between the goals for the capital projects and the outcomes achieved. Translating this into financial terms, this implies that university capital construction projects may experience an average 45% decline in their return on investment (ROI) throughout the project's duration. This represents a significant risk to the university, both financially and to the achievement of the broader university strategy.

This problem may remain unobserved due to the infrequent development of metrics at the project's outset (with only 22% of projects establishing metrics). When metrics are established through an appraisal method at project initiation (50% consider appraisals to be moderately important, 5% consider them very important), success is seldom later

evaluated, either during the project process (13%), or one year following its completion (15%).

While inadequate project management approaches, including the absence of Benefits Realization Management (BRM), may contribute to this shortfall, it is also possible that the initial strategic appraisals are misaligned or excessively optimistic. The regression analysis suggested collinearity between the deferred maintenance variable and the strategic alignment variable. This could mean that either or both variables contribute negatively to benefit realization.

If the strategic alignment approach has a negative relationship to realizing benefits, this result might not surprise critics of strategic planning in higher education such as Birnbaum (2000) and Mintzberg (1994). Given the low rate of benefit realization, and the observation that 86% of universities surveyed use strategic alignment appraisals, there is evidence to suggest that further research into the value of the strategic alignment on capital projects may produce interesting results.

Similar to the case with strategic alignment, placing a high priority on deferred maintenance (DM) benefits could have a negative relationship with realizing benefits. This issue could stem from underlying project management difficulties, or it might suggest that the realization of DM benefits is more complex than originally expected at the start of the project. Considering that deferred maintenance projects are generally infrastructure projects, this phenomenon could be analogous to infrastructure project

studies the resulted in the concepts of the "hiding hand" (Hirschman, 2011) and the "planning fallacy" (Jones, 1990; Mintzberg, 1994).

Determining the root cause of these problems was not the intent of this study, however the results suggest avenues for further exploration. First, the general lack of an understanding of Benefits Realization Management (74%) may indicate that universities have been slow to adopt BRM or other "Project Management 2.0" tools into their management norms. Second, the measurement of benefits after project completion may have a positive impact on the delivery of project benefits. While it is unlikely that measurement alone is causal to success, the discipline of creating metrics and following up with measurements may indicate the presence of a wider array of best-practice strategic management methods for capital projects.

6.3 Comparison with Previous Research

As noted in the literature review, there are very few research studies conducted on university capital project management in relation to Benefits Realization Management. It is very difficult to make a direct comparison to any university capital project research that would inform this study. However, the outcomes of this study do have some comparators in the general literature review.

Assuming universities may be slower to adopt Project Management 2.0 methods like BRM, this study can be indirectly compared to initial investigations into the broad adoption of BRM. The 2010 study by Marnewick and Labuschagne revealed that,

although many organizations were not tracking benefits, a small number of BRM practices were gradually making their way into general practice with positive outcomes (Marnewick & Labuschagne, 2010). Similarly, Breese and colleagues' observations in 2015 suggest that the spread of BRM concepts and the adoption of its practices might be gradually occurring abductively across institutions (Breese et al., 2015).

The negative correlation of benefits to strategic alignment assessments and deferred maintenance benefits may have some comparators in the literature. In addition to the Birnbaum (2000) and Mintzberg (1994) criticism of strategic planning, noted earlier, a distant comparison could also be made to Breese (2015) and Aubry's (2021) research on the human complexities and "hidden challenges" involved in identifying benefits.

Also, this study suggests a positive correlation between measuring performance and the achievement of success. This finding is reflected extensively in the existing literature on project management success (Kashiwagi & Byfield, 2002; Shenhar & Dvir, 2007; Wang & Gibson, 2008; Zwikael & Smyrk, 2012).

6.4 Limitations of the Study

As a preliminary exploration, this study is limited by the small sample size relative to the large population of universities that complete capital projects. Also, the small sample size of the survey limits the depth and scope of statistical analysis that can be conclusively conducted. There is also a lack of granularity in data that restricts this study from achieving robust statistical results.

A further limitation surrounds the challenges associated with data collection on this subject, especially in instances where the findings might not align with the interests of the universities that provide the data. This limitation was recognized early in the process after a few failed attempts to gather information directly from universities. The final survey maintained the anonymity of respondents in order to obtain candid feedback. However, the anonymous approach complicates the examination of direct cause-and-effect relationships inside the dataset, as well as the assessment of biases or regional variations within the data. Anonymity also makes it difficult to obtain any follow-up data.

6.5 Implications for Further Research

This study serves as an early exploration into Benefits Realization Management within the context of university capital projects. Its purpose is to offer a broad overview of the current status of BRM in this context and to locate potential problem areas that could benefit from additional research. As a collection of preliminary observations, the study has successfully identified two directions for future research.

First, the significant gap in achieving benefits presents a valuable opportunity for further investigation. By enlarging the sample size and utilizing multiple samples, the model of the factors affecting benefits realization could improve. The outcomes of this research could offer practical insights for project managers and senior leaders in universities. For example, a direct relationship between measuring benefits and benefit realization could support resources that identify and measure benefits.

Additionally, this study could assist in the choice of assessment tools, such as evaluating the effectiveness of strategic alignment as an assessment method, and the impact of deferred maintenance (DM) projects.

Second, the study revealed that there is a small quantity of universities who are successfully achieving benefits. This creates a promising avenue to study the methods employed by these universities. Such an inquiry could yield a compilation of best practices specifically designed for the unique environment of university capital projects.

7. CONCLUSION

This study provides initial observations on the application of Benefits Realization Management (BRM) within university capital construction projects. The study finds that while universities are utilizing strategic management tools to assess capital projects, they are often not identifying and measuring project benefits. This conclusion is further supported by the observation of a lack of awareness of BRM among respondents. An analysis of this preliminary information suggests that there may be a linkage between post-project benefit measurements and the successful realization of benefits. This study also suggests that certain practices, like prioritizing deferred maintenance benefits and employing strategic alignment assessments, might have a negative impact on benefit achievement. These insights offer guidance to direct future research towards refining the predictive model for benefits realization. Additionally, this future research may equip project managers and senior leaders with best practice tools designed to significantly enhance the realization of project benefits and mitigate the associated risks to the institution.

REFERENCES

- Aguilar, F. J. (1967). *Scanning the business environment*. Macmillan.
- Ansoff, H. I. (1957). Strategies for diversification. *Harvard Business Review*, 35(5), 113–124.
- Atkinson, R. (1999). Project management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6), 337–342. [https://doi.org/10.1016/S0263-7863\(98\)00069-6](https://doi.org/10.1016/S0263-7863(98)00069-6)
- Aubry, M., Boukri, S. E., & Sergi, V. (2021). Opening the Black Box of Benefits Management in the Context of Projects. *Project Management Journal*, 52(5), 434–452. <https://doi.org/10.1177/87569728211020606>
- Badewi, A. (2022). When frameworks empower their agents: The effect of organizational project management frameworks on the performance of project managers and benefits managers in delivering transformation projects successfully. *International Journal of Project Management*, 40(2), 132–141. <https://doi.org/10.1016/j.ijproman.2021.10.005>
- Barker, T. S., & Smith, H. W., Jr. (1997). Strategic planning: Evolution of a model. *Innovative Higher Education*, 21(4), 287–306. ProQuest Central. <https://doi.org/10.1007/BF01192277>
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Benefits Realization Management Framework*. (2016). Project Management Institute.
- Bent Flyvbjerg. (2017). *The Oxford Handbook of Megaproject Management*. Oxford University Press.
- Birnbaum, R. (2000). *Management Fads in Higher Education: Where They Come From, What They Do, Why They Fail*. Wiley.
- Birnbaum, R., & Snowdon, K. (2003). Management fads in higher education. *The Canadian Journal of Higher Education*, 33(2). ProQuest Central; Publicly Available Content Database. <https://ezproxy.library.dal.ca/login?url=https://www.proquest.com/scholarly-journals/management-fads-higher-education/docview/221216209/se-2?accountid=10406>

- Bracker, J. (1980). The Historical Development of the Strategic Management Concept. *Academy of Management Review*, 5(2), 219–224. <https://doi.org/10.5465/AMR.1980.4288731>
- Bradley, G. (2006). *Benefit Realisation Management: A practical guide to achieving benefits through change*. CRC Press.
- Breese, R. (2012). Benefits realisation management: Panacea or false dawn? *International Journal of Project Management*, 30(3), 341–351. <https://doi.org/10.1016/j.ijproman.2011.08.007>
- Breese, R., Jenner, S., Serra, C. E. M., & Thorp, J. (2015). Benefits management: Lost or found in translation. *International Journal of Project Management*, 33(7), 1438–1451. <https://doi.org/10.1016/j.ijproman.2015.06.004>
- Brown, D. (1924). Pricing policy in relation to financial control. *Management and Administration*, 7(3), 283–286.
- Byrne, J. C., & Lechler, T. G. (2011). *Mindset for Creating Project Value*. Project Management Institute.
- Byrnes, C. (2010). *Mind mapping*. PMI® Global Congress 2010, North America, Washington, DC. Newtown Square, PA. <https://www.pmi.org/learning/library/mind-mapping-advantage-think-creatively-6554>
- Carayannis, E. G., Kwak, Y. H., & Anbari, F. T. (2005). *The Story of Managing Projects: An Interdisciplinary Approach*. Bloomsbury Academic.
- Chandler, A. D. (1993). *The visible hand*. Harvard university press.
- Changali, S., Mohammad, A., & Nieuwland, M. van. (2015). *The construction productivity imperative*.
- Clark, B. R. (1980). *Academic Culture*. Higher Education Research Group, Institution for Social and Policy Studies, Yale University, 1732 Yale Station, New Haven, CT 06520. <https://eric.ed.gov/?id=ED187186>
- Construction Industry Institute. (2013). *PDRI: Project Definition Rating Index – Building Projects*. Construction Industry Institute.
- Culture Eats Strategy for Breakfast – Quote Investigator®*. (2017, May 23). <https://quoteinvestigator.com/2017/05/23/culture-eats/>
- Daigneau, W. A. (2003b). Implementing a Capital Plan. *Business Officer*, 36(12), 18–24.

- Daigneau, W. A. (2003a). *Planning and Managing the Campus Facilities Portfolio*. Association of Higher Education Facilities Officers.
- Denicol, J., Davies, A., & Krystallis, I. (2020). What Are the Causes and Cures of Poor Megaproject Performance? A Systematic Literature Review and Research Agenda. *Project Management Journal*, 51(3), 328–345. <https://doi.org/10.1177/8756972819896113>
- Drucker, P. F. (1994). The Theory of the Business. (Cover story). *Harvard Business Review*, 72(5), 95–104.
- Dvir, D., & Lechler, T. (2004). Plans are nothing, changing plans is everything: The impact of changes on project success. *Research Policy*, 33(1), 1–15. <https://doi.org/10.1016/j.respol.2003.04.001>
- Fernandes, G., & O’Sullivan, D. (2021). Benefits management in university-industry collaboration programs. *International Journal of Project Management*, 39(1), 71–84. <https://doi.org/10.1016/j.ijproman.2020.10.002>
- Flesher, D. L., & Previts, G. J. (2013). Donaldson Brown (1885-1965): The Power of an Individual and His Ideas Over Time. *Accounting Historians Journal*, 40(1), 79–101. <https://doi.org/10.2308/0148-4184.40.1.79>
- Flyvbjerg, B. (2016). The Fallacy of Beneficial Ignorance: A Test of Hirschman’s Hiding Hand. *World Development*, 84, 176–189. <https://doi.org/10.1016/j.worlddev.2016.03.012>
- Freedman, L. (2013). *Strategy: A History*. OUP USA.
- Garel, G. (2013). A history of project management models: From pre-models to the standard models. *International Journal of Project Management*, 31(5), 663–669. <https://doi.org/10.1016/j.ijproman.2012.12.011>
- Gibson, G. E. Jr., Kaczmarowski, J. H., & Lore, H. E. Jr. (1995). Preproject-Planning Process for Capital Facilities. *Journal of Construction Engineering and Management*, 121(3), 312–318. [https://doi.org/10.1061/\(ASCE\)0733-9364\(1995\)121:3\(312\)](https://doi.org/10.1061/(ASCE)0733-9364(1995)121:3(312))
- Glazner, S. (2016). APPA’s Center for Facilities Research (CFaR). *Facilities Manager*, 32(4), 62–63.
- Guckert, D. J. (2006). *Aligning Project Decisions with the Total Cost of Ownership*. 4.

- Haka, S. F. (2006). A Review of the Literature on Capital Budgeting and Investment Appraisal: Past, Present, and Future Musings. In *Handbooks of Management Accounting Research* (Vol. 2, pp. 697–728). Elsevier.
[https://doi.org/10.1016/S1751-3243\(06\)02010-4](https://doi.org/10.1016/S1751-3243(06)02010-4)
- Hirschman, A. O. (2011). *Development Projects Observed*. Brookings Institution Press.
- Historic American Engineering. (n.d.). *Frankford Arsenal, South of Tacony Street between Bridge Street & tracks of former Pennsylvania Railroad, Philadelphia, Philadelphia County, PA* (Pennsylvania -- Philadelphia County -- Philadelphia) [Still image]. Retrieved February 14, 2024, from
<https://www.loc.gov/pictures/item/pa1439/>
- History of Project Management Institute | PMI*. (n.d.). Retrieved February 14, 2024, from
<https://www.pmi.org/about/learn-about-pmi/history-of-pmi>
- Ika, L. A., & Pinto, J. K. (2022). The “re-meaning” of project success: Updating and recalibrating for a modern project management. *International Journal of Project Management*, 40(7), 835–848. <https://doi.org/10.1016/j.ijproman.2022.08.001>
- Jones, L. W. (1990). Strategic planning: The unrealized potential of the 1980s and the promise of the 1990s. *New Directions for Higher Education*, 1990(70), 51–57. <https://doi.org/10.1002/he.36919907008>
- Kaplan, R. S., & Norton, D. P. (2005). *The balanced scorecard: Measures that drive performance* (Vol. 70). Harvard business review US.
- Kashiwagi, D., & Byfield, R. E. (2002). Selecting the best contractor to get performance: On time, on budget, meeting quality expectations. *Journal of Facilities Management*, 1(2), 103–116. ProQuest Central.
<https://doi.org/10.1108/14725960310807872>
- Keller, G. (1983). *Academic Strategy: The Management Revolution in American Higher Education*. JHU Press.
- King, W. R., & Cleland, D. I. (1987). *Strategic planning and management handbook*.
- Klammer, T. (1972). Empirical Evidence of the Adoption of Sophisticated Capital Budgeting Techniques. *The Journal of Business*, 45(3), 387–397.
- Kotler, P., & Murphy, P. E. (1981). Strategic Planning for Higher Education. *The Journal of Higher Education*, 52(5), 470–489. <https://doi.org/10.2307/1981836>
- Kozak-Holland, M. (2011). *The History of Project Management*. Multi-Media Publications.

- Kreiner, K. (2020). Conflicting Notions of a Project: The Battle Between Albert O. Hirschman and Bent Flyvbjerg. *Project Management Journal*, 51(4), 400–410. <https://doi.org/10.1177/8756972820930535>
- Levitt, R. E. (2011). Towards project management 2.0. *Engineering Project Organization Journal*, 1(3), 197–210.
- Maculley, J. (2003). A Closer Look. *PM NETWORK*, 17(7), 54–59.
- Majed Alzara, Kashiwagi, J., Kashiwagi, D., & Al-Tassan, A. (2016). Using PIPS to Minimize Causes of Delay in Saudi Arabian Construction Projects: University Case Study. *Procedia Engineering*, 145, 932–939. <https://doi.org/10.1016/j.proeng.2016.04.121>
- Marnewick, C., & Labuschagne, L. (2010). *Benefits management in practice: An exploratory investigation*. 14.
- Mintzberg, H. (1989). *Mintzberg on Management: Inside Our Strange World of Organizations*. Simon and Schuster.
- Mintzberg, H. (1994). Rethinking strategic planning part I: Pitfalls and fallacies. *Long Range Planning*, 27(3), 12–21. [https://doi.org/10.1016/0024-6301\(94\)90185-6](https://doi.org/10.1016/0024-6301(94)90185-6)
- Morris, P. W. G. (1994). *The Management of Projects*. Thomas Telford.
- Morris, P. W. G. (2013). *Reconstructing Project Management*. John Wiley & Sons.
- Naidoo, M. (2011). Managing capital investments at South African private universities. *Problems and Perspectives in Management*, 9(1), 85–94.
- Olatunde, N. A., & Alao, O. O. (2017). Quantitative appraisal of cost and time performance of construction projects in public and private universities in Osun State, Nigeria. *Journal of Engineering, Design and Technology*, 15(5), 619–634. ProQuest Central. <https://doi.org/10.1108/JEDT-11-2016-0081>
- Ozdem, G. (2011). An Analysis of the Mission and Vision Statements on the Strategic Plans of Higher Education Institutions. *Educational Sciences: Theory and Practice*, 11(4), 1887–1894.
- Pearce II, J. A. (1981). An Executive-Level Perspective on the Strategic Management Process. *California Management Review*, 24(1), 39–48. <https://doi.org/10.2307/41164941>

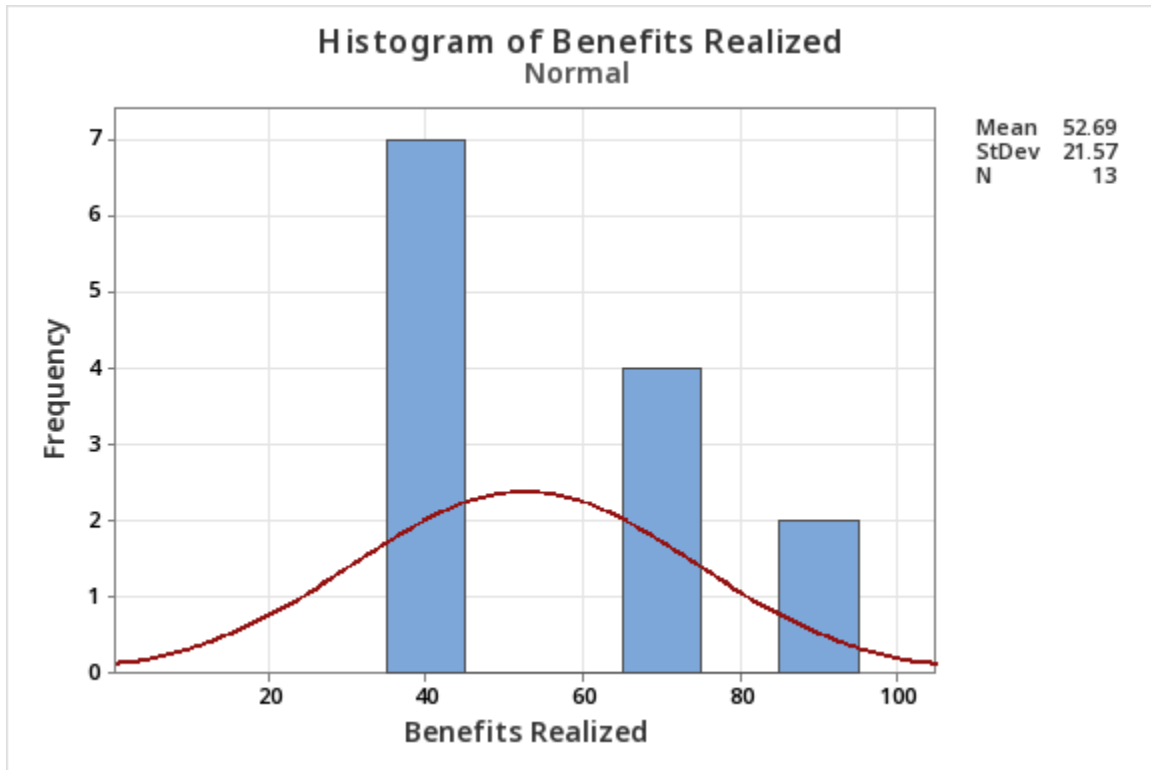
- Peter Drucker. (2007). *The Practice of Management: Vol. Rev. ed.* Routledge.
<http://ezproxy.library.dal.ca/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=e000xna&AN=473934&site=ehost-live>
- Peterson, M. (1984). Review of Academic Strategy: The Management Revolution in Higher Education [Review of *Review of Academic Strategy: The Management Revolution in Higher Education*, by G. Keller]. *The Journal of Higher Education*, 55(5), 662–665. <https://doi.org/10.2307/1981829>
- PMI. (2013). *A Guide to the Project Management Body of Knowledge: PMBOK Guide*. Project Management Institute.
- PMI. (2017). *PMI Pulse of the Profession® 2017*. <https://www.pmi.org/learning/thought-leadership/pulse/pulse-of-the-profession-2017>
- PMI. (2019). *Benefits Realization Management: A Practice Guide*. Project Management Institute.
- PMI Lexicon of Project Management Terms*. (n.d.). Retrieved February 14, 2024, from <https://www.pmi.org/pmbok-guide-standards/lexicon>
- Porter, M. E. (1979, March 1). How Competitive Forces Shape Strategy. *Harvard Business Review*. <https://hbr.org/1979/03/how-competitive-forces-shape-strategy>
- Pramen, S., & Fernane, J. D. (2017). Performance of Design-Build and Design-Bid-Build Projects for Public Universities. *Journal of Construction Engineering and Management*, 143(3), 04016101. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001241](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001241)
- Roberson, J. (2016). Aligning Facility Management with an Organization’s Core Business [Ph.D., Capella University]. In *ProQuest Dissertations and Theses* (1868427966). ProQuest Central; ProQuest Dissertations & Theses Global. <https://ezproxy.library.dal.ca/login?url=https://www.proquest.com/dissertations-theses/aligning-facility-management-with-organizations/docview/1868427966/se-2?accountid=10406>
- Serra, C. E. M., & Kunc, M. (2015). Benefits Realisation Management and its influence on project success and on the execution of business strategies. *International Journal of Project Management*, 33(1), 53–66. <https://doi.org/10.1016/j.ijproman.2014.03.011>
- Seymour, T., & Hussein, S. (2014). The History Of Project Management. *International Journal of Management & Information Systems (Online)*, 18(4), 233. ABI/INFORM Collection.

- Shenhar, A. J., & Dvir, D. (2007). *Reinventing Project Management: The Diamond Approach To Successful Growth And Innovation*. Harvard Business Review Press.
- Steiner, G. A. (2010). *Strategic Planning*. Simon and Schuster.
- Taylor, F. W. (1911). *Scientific Management*. Routledge.
- Temple, P. (2018). Academic Strategy: The Management Revolution in American Higher Education, by George Keller (1983) Can strategy work in Higher Education? *Higher Education Quarterly*, 72(2), 170–177. <https://doi.org/10.1111/hequ.12160>
- The Standard for Portfolio Management*. (2024). Project Management Institute.
- Thorp, J. (2003). *The information paradox: Realizing the business benefits of information technology*. McGraw-Hill Ryerson.
- Vanhoucke, M. (2013). *Project Management with Dynamic Scheduling: Baseline Scheduling, Risk Analysis and Project Control*. Springer Science & Business Media.
- Vargas, R. V. (2001). A new approach to PMBOK guide 2000. *Paper Presented at Project Management Institute Annual Seminars & Symposium, Nashville, TN. Newtown Square, PA: Project Management Institute.*
<https://www.pmi.org/learning/library/chronologically-structured-approach-controlling-closing-process-7931>
- Wang, Y.-R., & Gibson, G. E. (2008). A Study of Preproject Planning and Project Success Using ANN and Regression Models. *ISARC Proceedings*, 688–696.
- Ward, J., & Daniel, E. (2012). *Benefits Management: How to Increase the Business Value of Your IT Projects*. John Wiley & Sons.
- Ward, J., & Peppard, J. (2002). *Strategic Planning for Information Systems*. Wiley.
- Williams, T. M., Vo, H., Edkins, A., & Samset, K. (2019). *A Systematic Literature Review: The Front End of Projects*.
- Zwikael, O., & Smyrk, J. (2012). A General Framework for Gauging the Performance of Initiatives to Enhance Organizational Value. *British Journal of Management*, 23(S1), S6–S22. <https://doi.org/10.1111/j.1467-8551.2012.00823.x>

APPENDIX A

COMPLETE LINEAR REGRESSION REPORTS

REGRESSION #1



Method

Categorical predictor coding (1, 0)

Stepwise Selection of Terms

α to enter = 0.15, α to remove = 0.15

Regression Equation

Appraisal

Alignment Benefit DM

Alignment	Benefit DM	Regression Equation
0	0	Benefits Realized = 78.0 + 1.533 Measure After
0	1	Benefits Realized = 49.7 + 1.533 Measure After
1	0	Benefits Realized = 48.00 + 1.533 Measure After
1	1	Benefits Realized = 19.67 + 1.533 Measure After

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	78.0	17.6	4.42	0.002	
Measure After Appraisal Alignment	1.533	0.415	3.70	0.005	1.15
1 Benefit DM	-30.0	15.8	-1.90	0.091	1.08
1	-28.3	10.4	-2.73	0.023	1.15

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
14.6566	65.36%	53.81%	*

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	3	3647.4	1215.8	5.66	0.019
Measure After	1	2938.9	2938.9	13.68	0.005
Appraisal Alignment	1	771.4	771.4	3.59	0.091
Benefit DM	1	1605.6	1605.6	7.47	0.023
Error	9	1933.3	214.8		
Total	12	5580.8			

Fits and Diagnostics for Unusual Observations

Benefits					
Obs	Realized	Fit	Resid	Std Resid	
1	90.0	63.3	26.7	2.23	R
5	65.0	65.0	-0.0	*	X
6	35.0	63.3	-28.3	-2.37	R

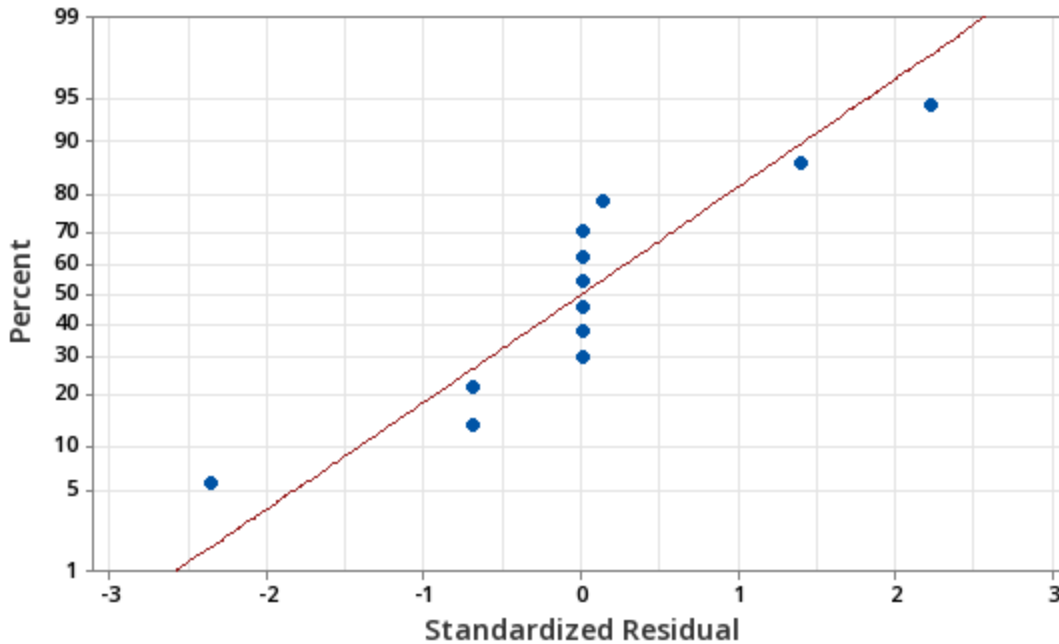
R Large residual

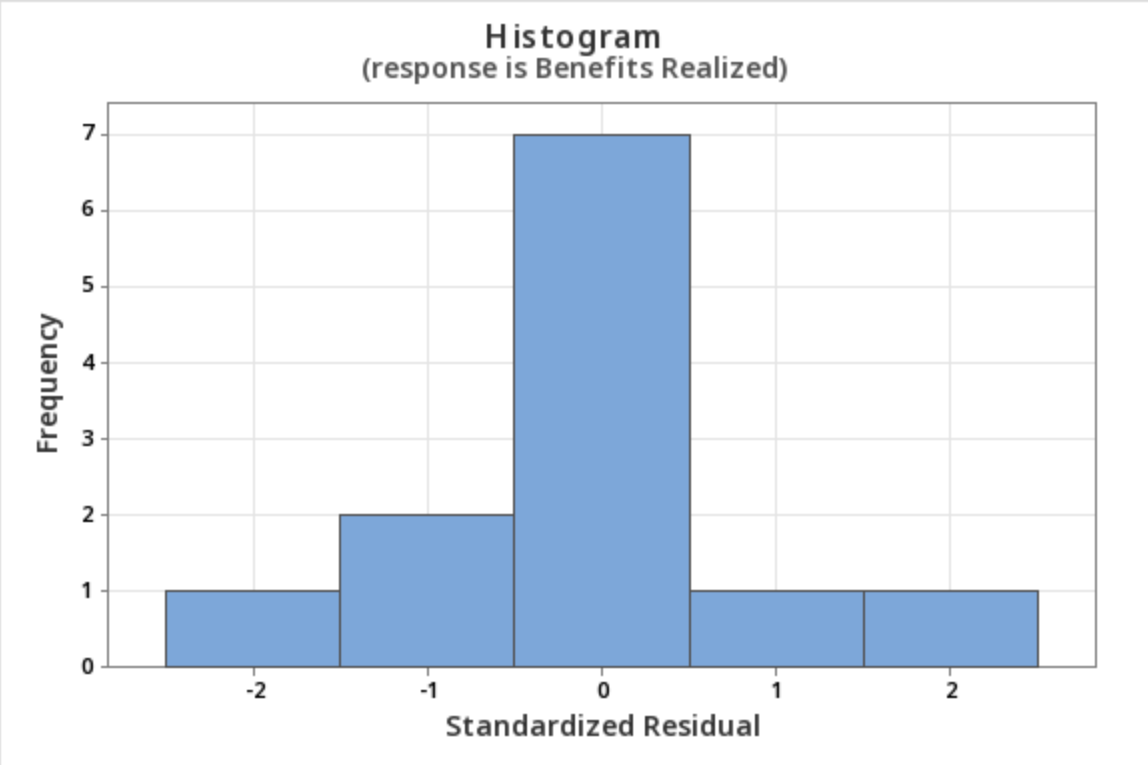
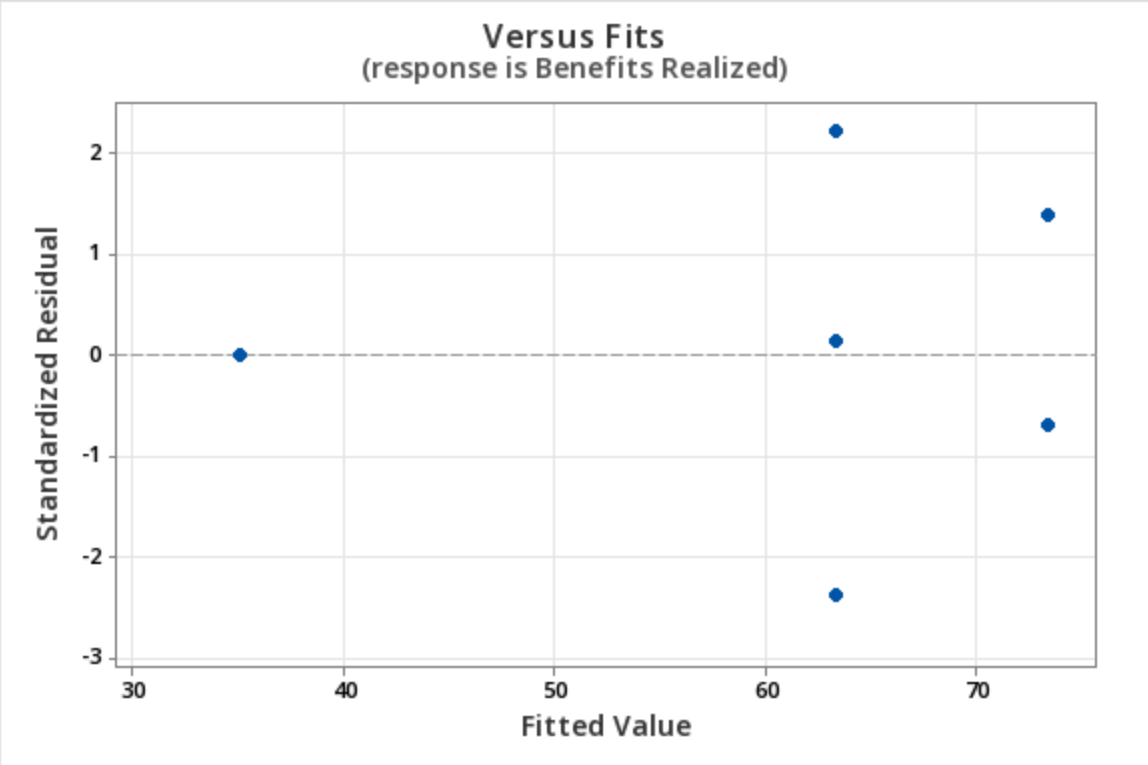
X Unusual X

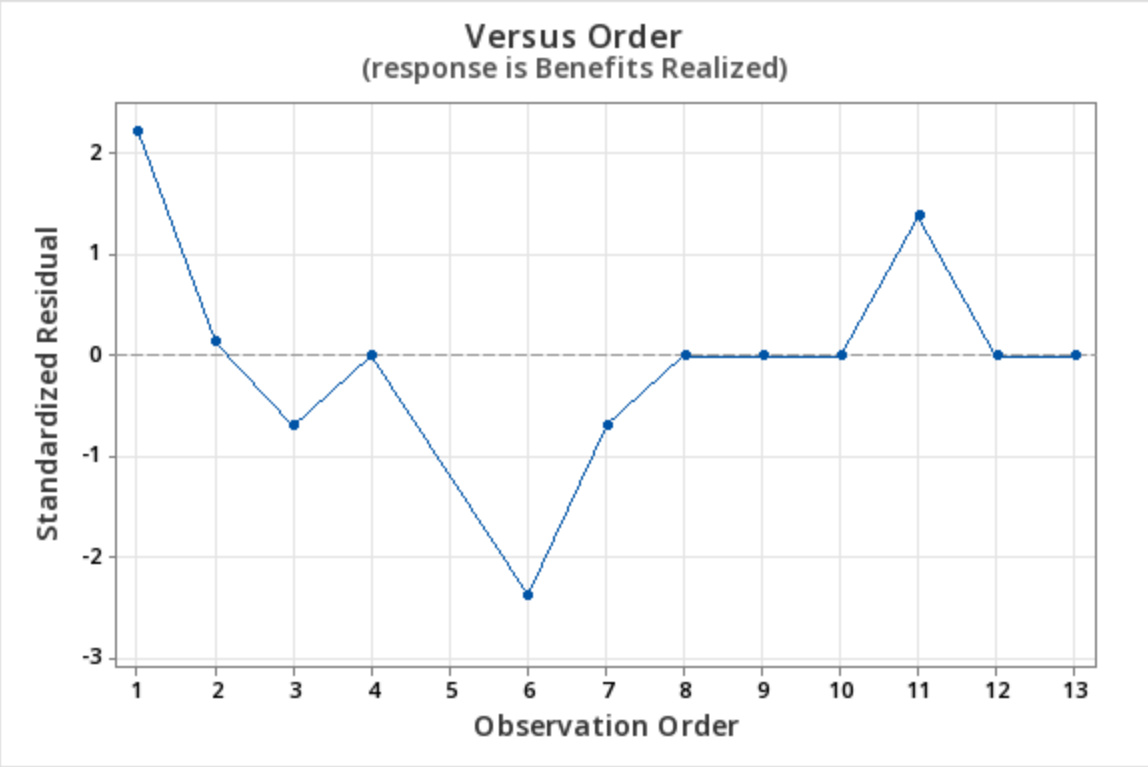
Pareto Chart of the Standardized Effects
(response is Benefits Realized, $\alpha = 0.15$)



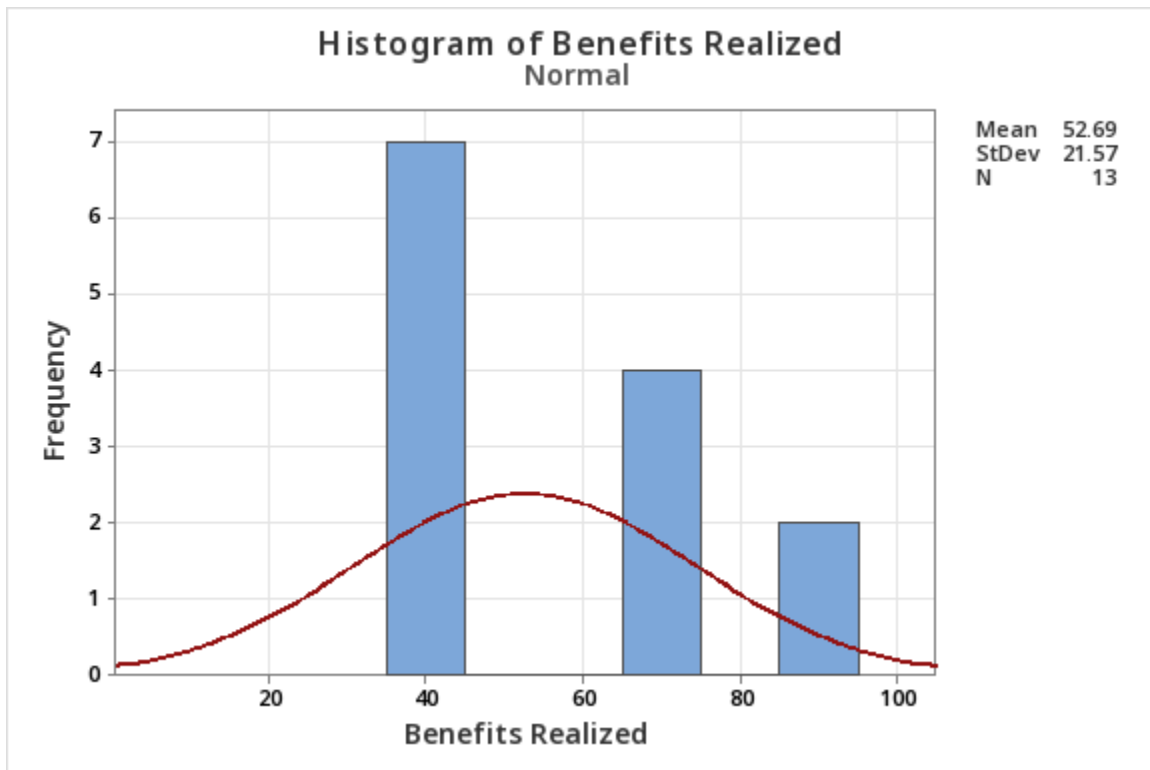
Normal Probability Plot
(response is Benefits Realized)







REGRESSION #2:



Method

Categorical predictor coding (1, 0)

Stepwise Selection of Terms

α to enter = 0.15, α to remove = 0.15

Regression Equation

Benefit DM

$$0 \quad \text{Benefits Realized} = 49.7 + 1.362 \text{ Measure After}$$

$$1 \quad \text{Benefits Realized} = 25.67 + 1.362 \text{ Measure After}$$

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	49.7	10.5	4.72	0.001	
Measure After Benefit DM	1.362	0.454	3.00	0.013	1.10
1	-24.0	11.3	-2.12	0.060	1.10

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
16.4462	51.53%	41.84%	3.24%

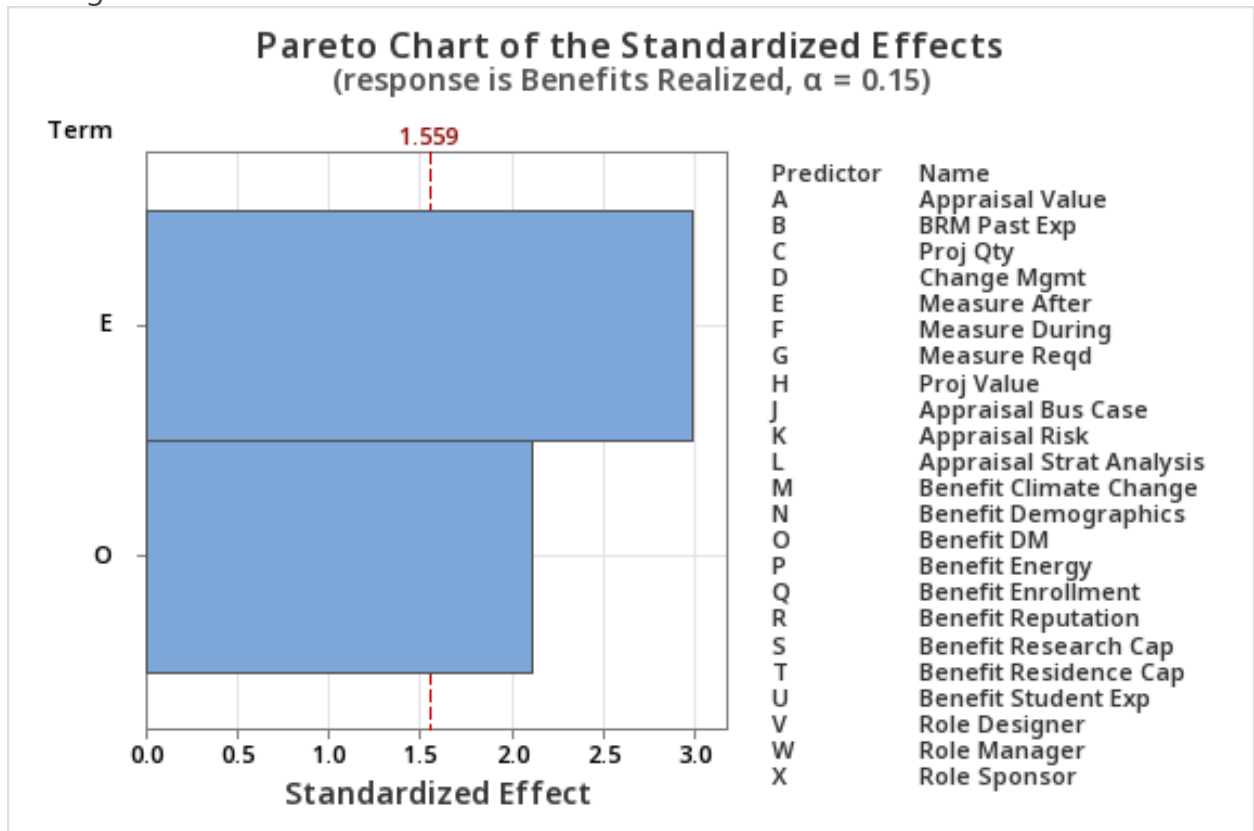
Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	2	2876	1438.0	5.32	0.027
Measure After	1	2434	2434.4	9.00	0.013
Benefit DM	1	1214	1214.4	4.49	0.060
Error	10	2705	270.5		
Total	12	5581			

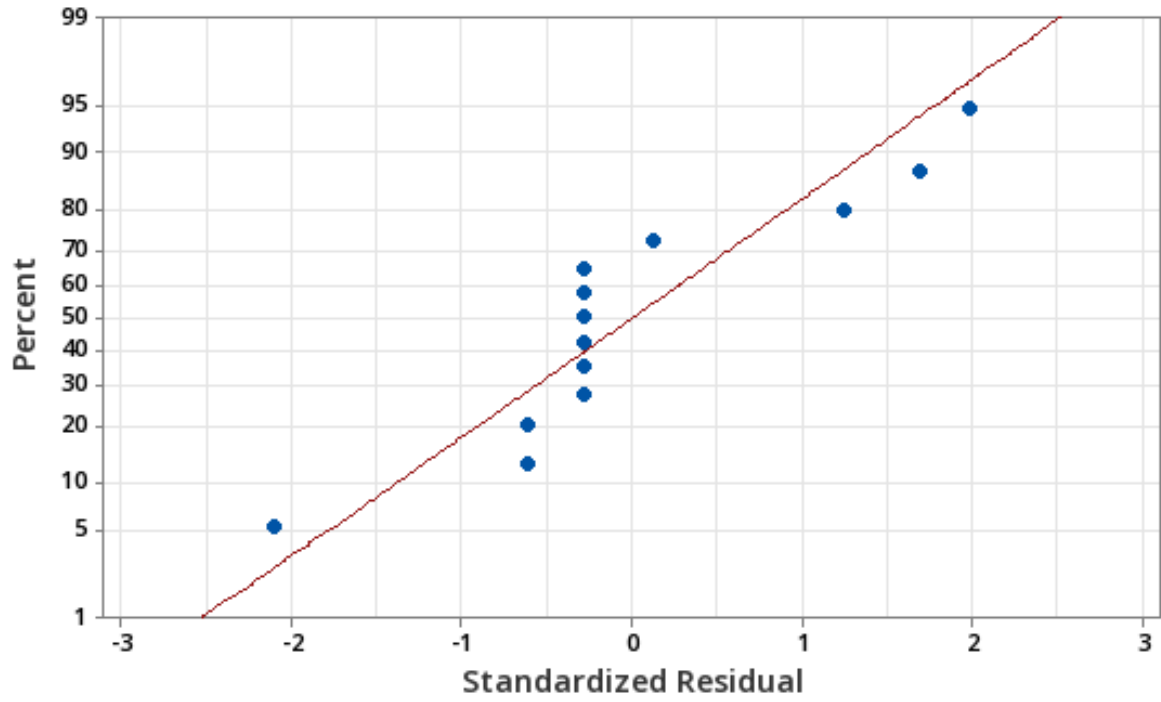
Fits and Diagnostics for Unusual Observations

Benefits				
Obs	Realized	Fit	Resid	Std Resid
6	35.00	63.33	-28.33	-2.11 R

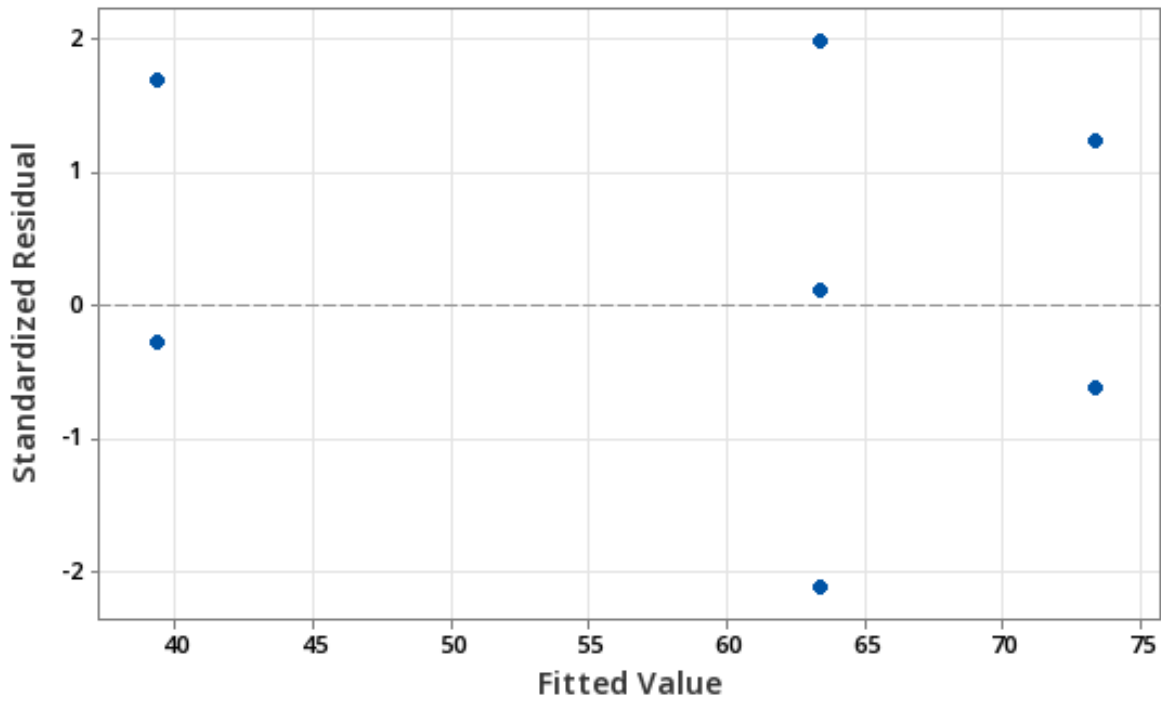
R Large residual



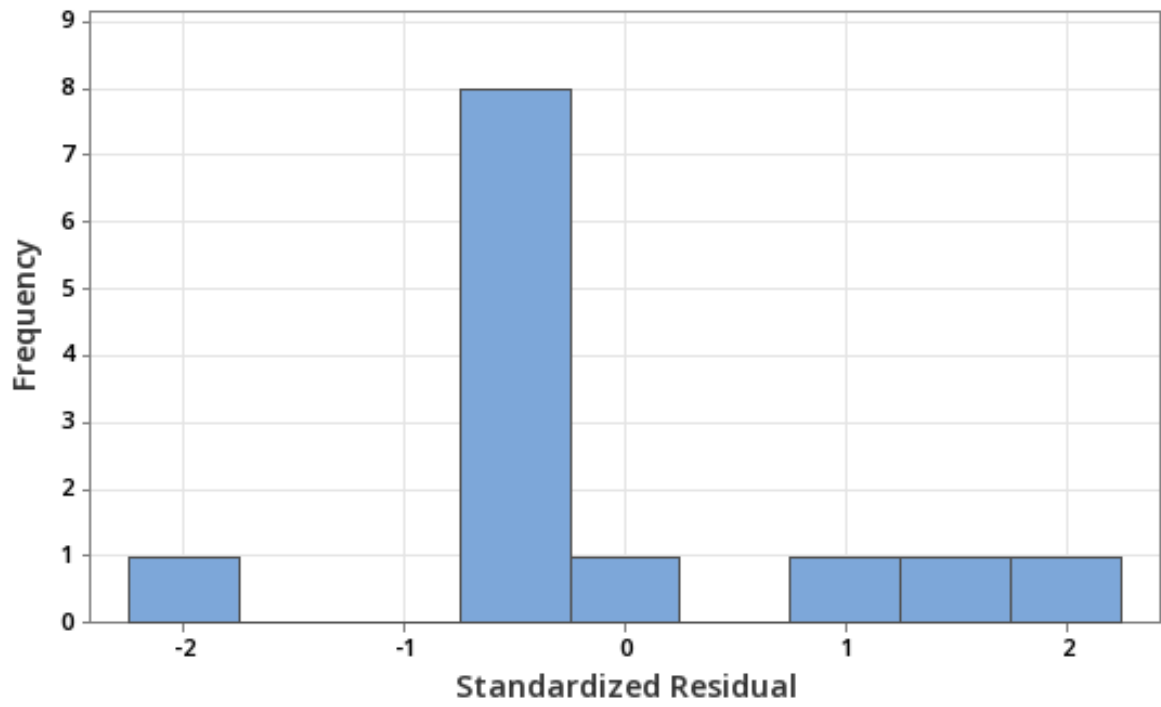
Normal Probability Plot
(response is Benefits Realized)



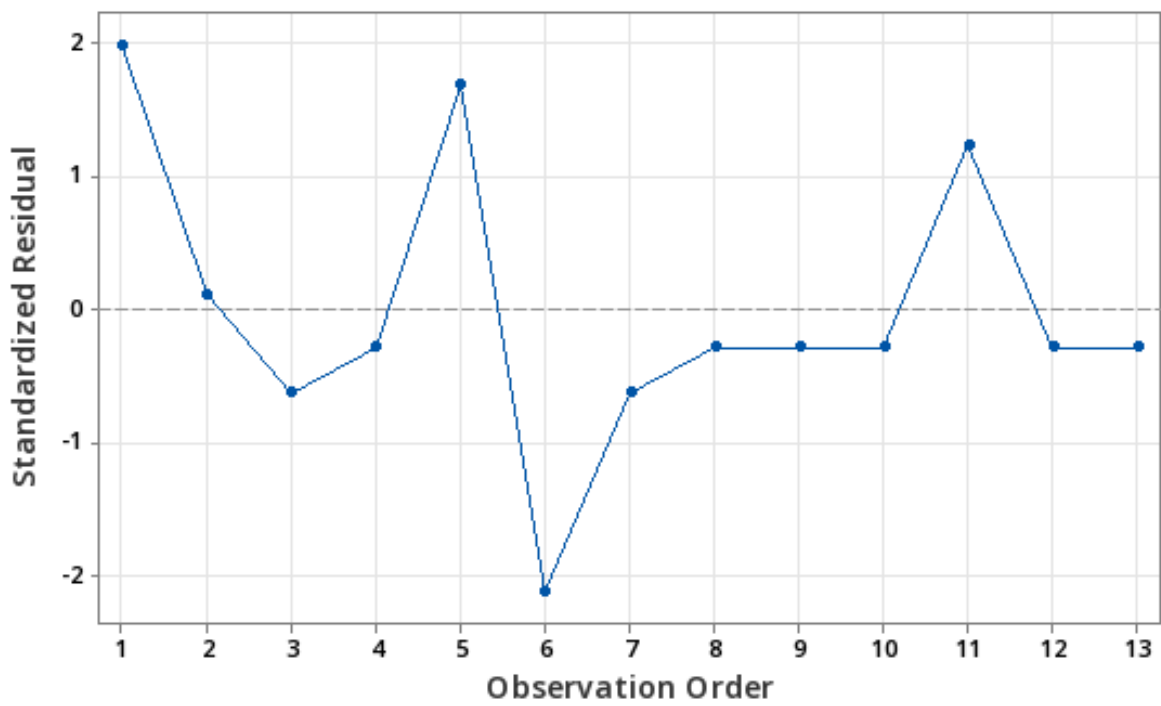
Versus Fits
(response is Benefits Realized)



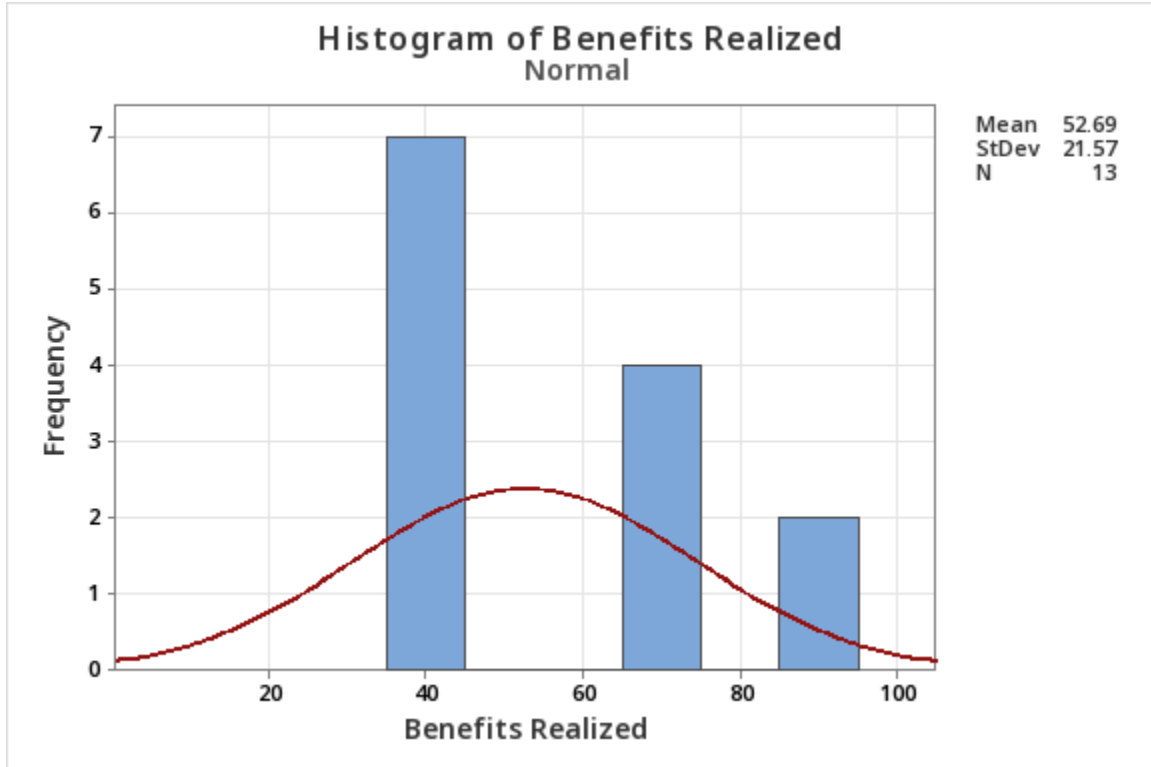
Histogram
(response is Benefits Realized)



Versus Order
(response is Benefits Realized)



REGRESSION #3:



Method

Categorical predictor coding (1, 0)

Stepwise Selection of Terms

α to enter = 0.15, α to remove = 0.15

Regression Equation

Benefit DM

$$0 \quad \text{Benefits Realized} = 48.50 + 1.150 \text{ Measure After}$$

$$1 \quad \text{Benefits Realized} = 31.00 + 1.150 \text{ Measure After}$$

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	48.50	7.18	6.75	0.000	
Measure After	1.150	0.391	2.94	0.010	1.18
Benefit DM					
1	-17.50	8.25	-2.12	0.050	1.18

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
15.9467	37.88%	30.12%	13.60%

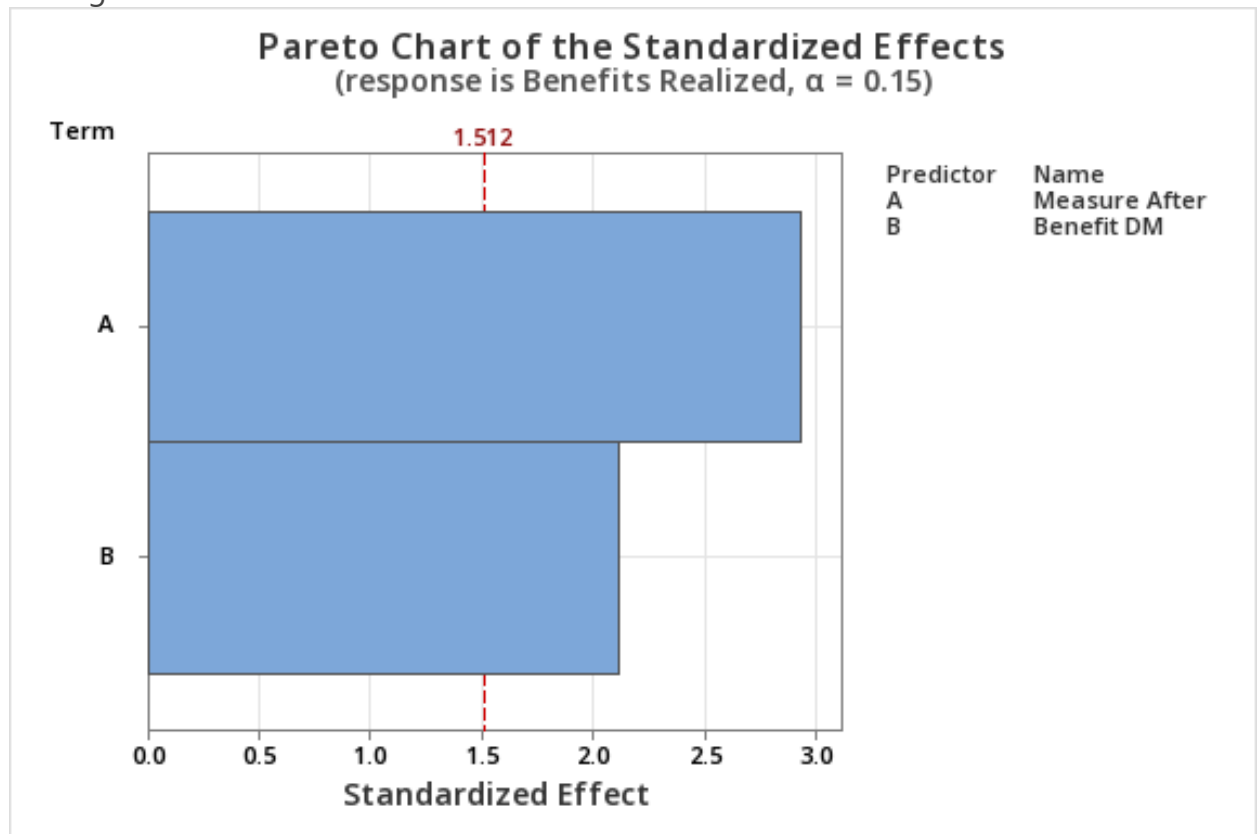
Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	2	2481	1240.6	4.88	0.022
Measure After	1	2204	2204.2	8.67	0.010
Benefit DM	1	1143	1143.3	4.50	0.050
Error	16	4069	254.3		
Total	18	6550			

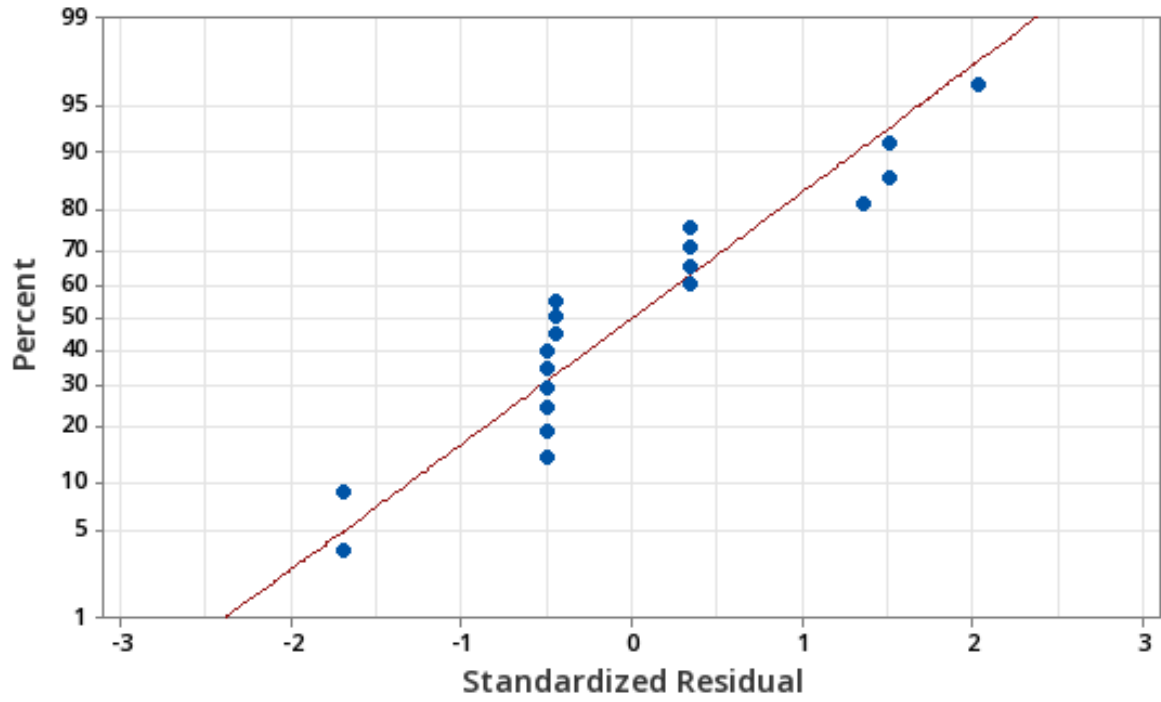
Fits and Diagnostics for Unusual Observations

Obs	Benefits				Std Resid
	Realized	Fit	Resid	Resid	
1	90.00	60.00	30.00	2.03	R

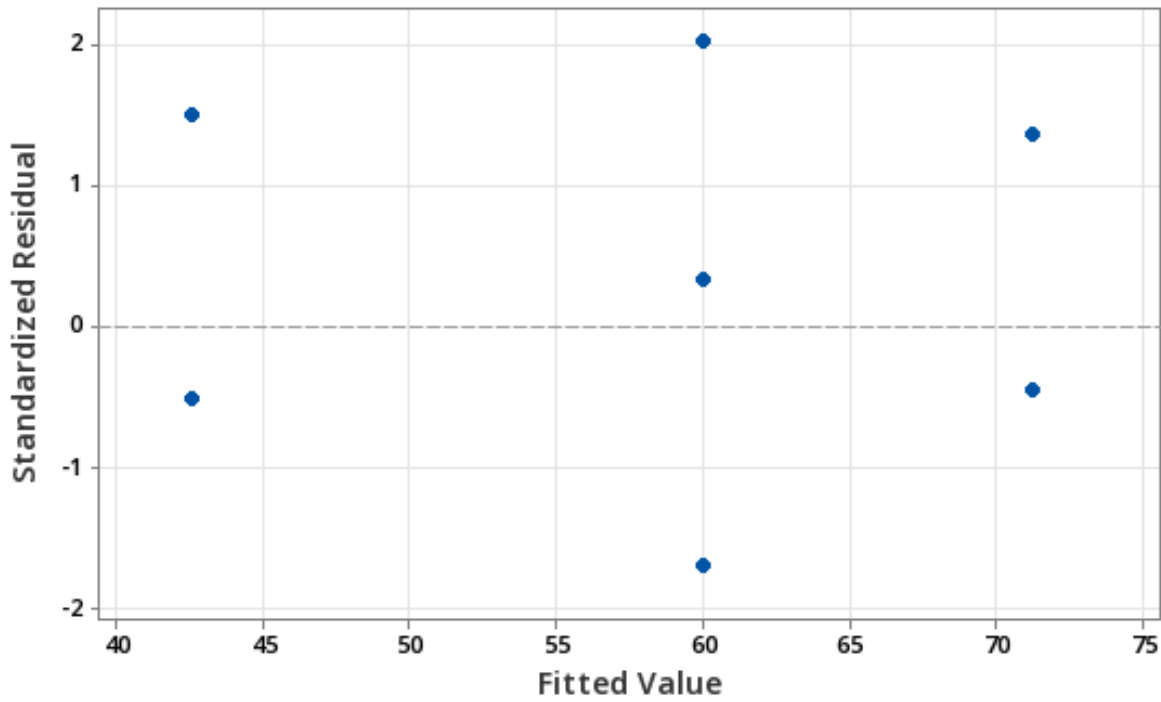
R Large residual

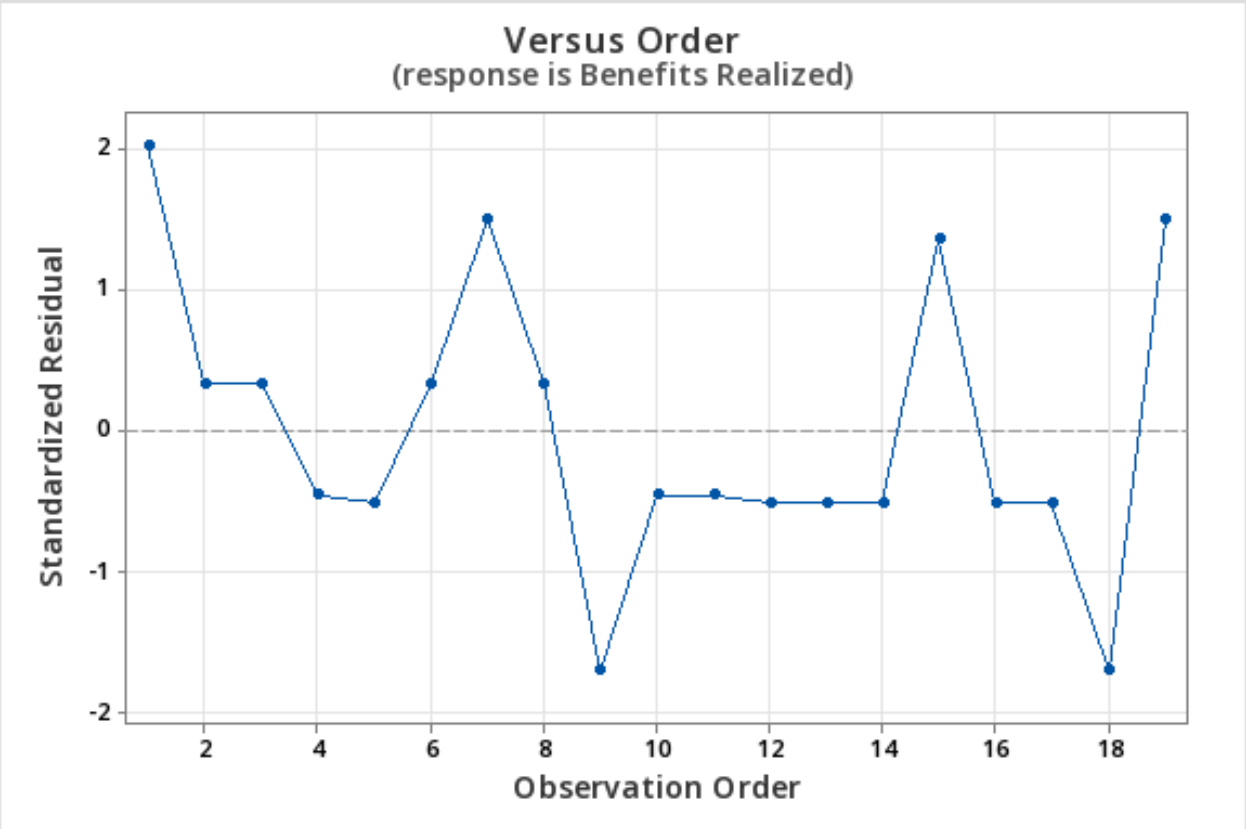
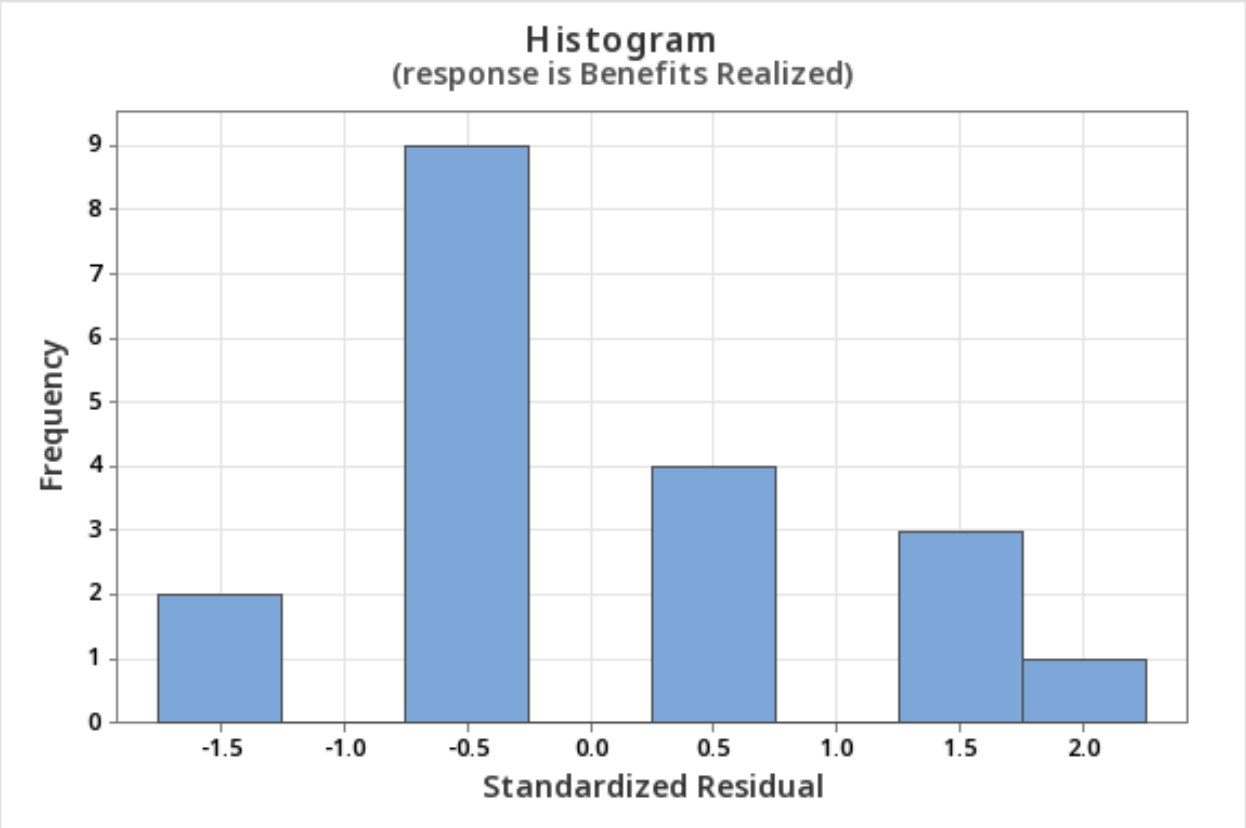


Normal Probability Plot
(response is Benefits Realized)



Versus Fits
(response is Benefits Realized)





APPENDIX B

ASU IRB - NOT HUMAN SUBJECTS RESEARCH DETERMINATION



NOT HUMAN SUBJECTS RESEARCH DETERMINATION

[Kenneth Sullivan](#)

480/965-4213
Kenneth.Sullivan@asu.edu

Dear [Kenneth Sullivan](#):

On 4/2/2024 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Examining Benefits Realization Management in University Capital Projects Early Observations of Current Practices
Investigator:	Kenneth Sullivan
IRB ID:	STUDY00019923
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• IRB Wizard Results , Category: IRB Protocol;

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by Arizona State University is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether the activities would change the determination, contact the IRB at research.integrity@asu.edu to determine the next steps.

Sincerely,

IRB Administrator