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**MERGERS AND ACQUISITIONS IN HIGHER EDUCATION: A CASE STUDY
OF THE RUTGERS-UMDNJ INTEGRATION**

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A dissertation submitted to the

School of Graduate Studies

Rutgers, The State University of New Jersey

In partial fulfillment of the requirements

For the degree of

Doctor of Philosophy

Graduate Program in Planning and Public Policy

Written under the direction of

Radha Jagannathan

And approved by

New Brunswick, New Jersey

May 2018

ABSTRACT OF THE DISSERTATION

Mergers and Acquisitions in Higher Education: A Case Study of the Rutgers-
UMDNJ Integration

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Colleges and universities have faced tough decision-making, particularly when it comes to allocating resources to balance effectiveness and efficiency. Many institutions of higher education in the United States and abroad have begun to look for alternative policy solutions to increase both effectiveness and efficiency in an effort to save resources and increase their competitive advantage through mergers and acquisitions (M&As). Enhanced effectiveness can create more robust and competitive programs that will improve educational outcomes, and increased efficiency can condense duplicative programs and services, refine resource allocation, and reduce overall costs.

My review of higher education mergers indicates that a comprehensive evaluation of any merger or acquisition in United States' higher education has not been conducted in recent years. A major feature of this research is conducting an outcomes assessment which doesn't appear to have been done with other higher

education M&As. The Rutgers-UMDNJ integration has many outcomes that require evaluation to better guide policymakers, colleges, and universities about their decisions and practices regarding higher education mergers and acquisitions. The primary purpose of this study was to provide a framework for how to evaluate a higher education M&A, with a special emphasis on examining outcome trajectories. Although it may be too soon to evaluate the long-term benefits or the costs of the Rutgers-UMDNJ integration, an interim evaluation of the intended goals can help determine whether the integration has facilitated any noticeable changes three years after its implementation. Moreover, the implications for future program implementation of mergers and acquisitions in institutions of higher education can be guided and assessed through this research.

The reasons, design, implementation, effectiveness, and efficiency of the Rutgers-UMDNJ integration were evaluated. The implementation assessment revealed that the integration was implemented with fidelity to the design. The effectiveness and efficiency assessments both revealed that small and sluggish progress had been made, notably the SAT scores at the School of Arts and Sciences (SAS) and Ernest Mario School of Pharmacy (Pharm) had increased post-integration. But, many of the outcomes have yet to be fully realized three years post-integration.

Limitations in this study include expanding the number and types of individuals interviewed, the inability to evaluate graduate student admissions and human resources data, and the lack of a collaborative research database pre-

integration. Future evaluation of this case in another 5-7 years, which would be approximately 10 years post-integration, is suggested.

ACKNOWLEDGEMENTS

There are so many to thank and with limited space, I apologize if I missed anyone. This dissertation would not have been possible without so many wonderful people in my life, and I am forever thankful for your support.

First, I'd like to thank all the participants who partook in the interview process. While I cannot thank you specifically due to confidentiality, please know that without your contributions, there would be no dissertation.

I want to thank my advisor and my committee members for their invaluable feedback. My advisor and chair, Radha Jagannathan, gave me the idea to evaluate the Rutgers-UMDNJ integration, and spent countless hours reviewing and editing many drafts of my work. Henry Coleman spent many hours conversing with me, and pushing me to become more organized, think harder, and finally finish. Mike Klein was able to provide a lot of assistance in introducing me to many of the participants interviewed for this study and was a content expert about this case. Stuart Shapiro was able to assist me with understanding the theories that can be applied to this case. Thank you all for your feedback and support.

I would have never been able to be a part of this doctoral program without the support of my boss and mentor, Rob Heffernan. Bob Noland and Marc Weiner have also served as valuable supporters through my tenure at Bloustein. Thank you all for your encouragement for the past five years.

Finally, I would like to thank my parents, and my incredible family for loving me and believing in me. My husband, Nick, for his patience, love, and support. My beloved and late Aunt Tete who read and revised earlier versions of this dissertation while battling breast cancer. I love you all so very much!

I would like to dedicate this dissertation to my son, Russell. Right now, you are too little to thank (in fact, you are quite the distraction), but I hope that you know that my love for you and passion to spend more time with you inspired me to finish. May you grow up knowing that you really are my sunshine, my only sunshine, you make me happy when skies are gray (and when earlier drafts of this dissertation were marked up in red).

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CHAPTER 1: INTRODUCTION

Higher education is facing severe financial challenges. State appropriations per student in the United States for public colleges and universities are still lower in most states than before the Great Recession (Mitchell et al., 2017; Zumeta et al, 2012). States have begun to consider consolidations of public institutions of higher education in the forms of mergers and acquisitions (M&As) in an effort to expand institutional scope while reducing duplicative expenses (Skodvin, 1999). This is particularly the case among institutional M&As that involve schools with medical and/or science, technology, engineering, and mathematics (STEM) programs, which can attract additional sources of revenue (Carnevale et al., 2010; U.S. Department of Treasury & U.S. Department of Education, 2012).

According to recent reporting from Inside HigherEd, higher education M&As in the United States have nearly doubled in the last 10 years with the number of M&A transactions growing from 12 in the 2000s to 22 between 2010 and 2017 (Seltzer, 2017). Recent examples of these types of M&As include Rutgers University (Rutgers) with the University of Medicine and Dentistry of New Jersey (UMDNJ) in 2013 (New Jersey Medical and Health Sciences Education Restructuring Act, 2012), the seven Georgia State high education system mergers between 2011 and 2017 (Gardner, 2017), New York University with Polytechnic University in 2014 (New York University, 2014), and the University of Toledo with the Medical University of Ohio in 2006 (Learning Alliance for Higher Education, 2007; McGinnis et al., 2007; McKether et al., 2011). However, the research on evaluating such M&As in the United States is rather limited. The

objective of my research is to evaluate the Rutgers – UMDNJ integration as an example of an M&A where a traditional four-year university merged with a medical institution in an effort to become a more competitive institution in the higher education marketplace.

The financial crisis during and following the Great Recession was a major problem in the United States for colleges and universities. The cuts in state aid that flowed to colleges and universities have been a policy problem that has led to increased competition among colleges and universities for other sources of revenue including increasing class sizes, raising tuition and fees, and attracting more research dollars, particularly from STEM fields (Carnevale et al., 2010; U.S. Department of Treasury & U.S. Department of Education, 2012). Institutions have been faced with making tough choices, particularly when it comes to allocating resources in order to balance effectiveness and efficiency. Many institutions have sought alternative methods of raising revenue as a policy solution such as M&As to increase both effectiveness and efficiency in an effort to maximize resources and bolster their competitive advantage.

There are key differences between effectiveness and efficiency. Enhanced effectiveness (i.e., the relationship between inputs and outcomes) can create more robust and competitive programs that will improve educational outcomes, while increased efficiency (i.e., the relationship between inputs and outputs) can condense duplicative programs and services, refine resource allocation, and reduce overall costs (Arrow et al., 1961; Eastman & Lang, 2001; Kenny, 2008). Effectiveness in an organization can be measured by the

perceived outcomes and whether their “desired effects or consequences are being achieved” (Lee, Johnson, & Joyce, 2008, p. 141). A program is effective if it yields a positive outcome (i.e., a university program that raises graduation rates).

Organizational efficiency in a traditional M&A is evaluated in two different ways: through the formation of synergies (i.e., the value of the combined institution is greater than the sum of two parts) (Skodvin, 2014), and economies of scale (i.e., the reduction in the per unit cost of production when the volume of output is stable or enhanced) (Bess & Dee, 2008; Eastman & Lang, 2001; Patterson, 2000).

The concept of combining higher education institutions is not novel. The United States saw a number of higher education institutions join in the 1960s and 1970s, such as the University of Buffalo with the State University of New York (1962), the University of Kansas City with the University of Missouri (1963), the Mellon Institute with the Carnegie Institute of Technology (1966), Case Institute of Technology with Western Reserve University (1967), Vermont College with Norwich University (1972), The School of Engineering and Science at New York University (NYU School of Engineering and Science) with Polytechnic Institute of Brooklyn¹ (1974), Marymount College with Loyola University (1973), Newton College of the Sacred Heart with Boston College (1973), Western College with Miami University (1974), and Lowell State College with Lowell Technological Institute (1975) (Millett, 1976).

¹ Polytechnic Institute of Brooklyn would later be fully integrated with NYU in 2014

However, up until the Great Recession, M&As among United States' higher education institutions after the 1970s were less common, and have usually been implemented among small and/or private institutions. The majority of higher education M&As have been implemented in universities that enroll less than 1,000 students (Seltzer, 2017). Private institutions in the United States, such as New York University, have less governmental oversight than public institutions, which often results in less government intrusion, thereby and facilitating a smoother transaction. Furthermore, M&As of institutions that are small in size (e.g., number of students served) are typically easier to manage because there are fewer resources (e.g., students, faculties, classroom spaces) to restructure.

More recently, M&As have been utilized by other countries, such as Canada, China, Norway, Sweden, Finland, Denmark, Australia, Japan and the United Kingdom, as a means of improving higher education and reducing costs (Eastman & Lang, 2001; Goedegebuure & Meek, 1991; Harman & Harman, 2008; Pinheiro et al., 2016; Skodvin, 2014). However, it is rare for a large public university with a high enrollment capacity in the United States to engage in such a consolidation.

The objective of this research is to evaluate a unique case in which a large public university is involved in an M&A. A case study is an in-depth examination of a single instance of a social phenomenon (Babbie, 1999; Kohlbacher, 2005), and can have quantitative and qualitative components, as it is “not a methodological choice but a choice of what is to be studied. By whatever

methods, we choose to study the case" (Stake, 2000, p.435). It is important to note that case studies are not meant to be generalizable, as aspects can vary from one to another. However, case studies can be triangulated with other cases in order to yield generalizable results (Diekmann, 2003; Kohlbacher, 2005). The importance of this particular case study is the establishment of a framework that can be used to evaluate an M&A at other universities with the understanding that the inputs and outcomes can vary from case to case. An evaluation of the reasons for the Rutgers-UMDNJ M&A; its design, implementation, effectiveness, and efficiency will provide an opportunity to broadly understand whether M&As of this magnitude and among public institutions can be accomplished successfully.

The two universities officially integrated on July 1, 2013 (New Jersey Medical and Health Sciences Education Restructuring Act, 2012). Approximately 65,000 students and 22,000 employees were affected by the integration. The two universities had campuses located across the State of New Jersey with substantially sized campuses located in Camden, Newark, Stratford, Piscataway and New Brunswick. Nine UMDNJ colleges, schools, and institutes were integrated into Rutgers University (New Jersey Medical and Health Sciences Education Restructuring Act, 2012). The School of Osteopathic Medicine, which belonged to UMDNJ, was integrated with Rowan University and University Hospital in Newark was taken over by the State of New Jersey. The Act mandating the integrations, the New Jersey Medical and Health Sciences Restructuring Act, created a division within Rutgers University, called the School of Biomedical and Health Sciences (2012, Section 144), which also moved some

of its existing academic units and centers into the new academic division. Given the number of acronyms used in this paper, many of which are the names of schools, a glossary is available in Appendix A. My research indicates that the number of students and schools affected by the Rutgers-UMDNJ integration makes it the largest integration of higher education institutions in United States history.

My review of higher education mergers indicates that a comprehensive evaluation of any merger or acquisition in United States' higher education has not been conducted in recent years. Therefore, an evaluation of what is likely the largest consolidation in United States' higher education history is quite timely. This research will be a significant contribution to the literature on M&As in higher education, as well as the literature on the evaluation of such efforts. The Rutgers-UMDNJ integration has many outcomes that require evaluation to better guide policymakers, colleges, and universities about future decisions and practices regarding higher education M&As. The major potential benefit of the Rutgers-UMDNJ integration is the increased effectiveness and efficiency of the overall institution. However, the Rutgers-UMDNJ integration is a large investment that also carries risk. Retaining unsuccessful programs, utilizing ineffective leadership strategies, shifting responsibility for financial obligations, or allocating resources inadequately may weaken the overall effectiveness or efficiency the integration was intended to achieve. Although it may be too soon to evaluate the long-term benefits or costs of the Rutgers-UMDNJ integration, an interim evaluation of the objectives, the implementation of the integration, and any noticeable change in

outcomes three years after its implementation can be assessed through this research. The establishment of a framework used to study and evaluate an M&A in higher education is pivotal for the research community to follow and apply so that case studies can be triangulated.

Research Questions

This paper will address the following research questions:

What were the reasons for the Rutgers-UMDNJ integration? This question is important to understand the reasons for why the integration was proposed by policymakers in New Jersey, as well as leadership at Rutgers and UMDNJ. Equally important is what higher education in the State stood to gain or lose through integration. This research question will provide a narrative of why Rutgers and UMDNJ were chosen to be integrated. It is important to note that Rowan University also played a role in the integration, but will not be the focus of this research. Task force reports, strategic plans, newspaper articles, legislation and other contemporaneous documents provide important background information regarding the reasons for the integration, but there has yet to be a comprehensive review of these documents that analyzes these reasons from the perspective of various stakeholders. Additionally, interviews with policymakers and various individuals connected with the integration may contribute to a better understanding of the reasons for the integration.

How was the Rutgers-UMDNJ integration designed? The purpose of this question is to evaluate the structure of the Rutgers-UMDNJ integration. The design of the integration is a result of actions by policymakers and leadership at

each institution. This research question will provide a narrative of how Rutgers and UMDNJ were structurally integrated. Similar to the first research question, qualitative analysis using task force reports, strategic plans, newspaper articles, legislation and other contemporaneous documents will provide important background information regarding the structural design and context for why certain decisions were made. Additionally, interviews with policymakers and various individuals connected with the integration will contribute to a better understanding of the integration's design.

How was the integration of Rutgers-UMDNJ implemented? It is also essential to understand the implementation strategies undertaken to make the integration a reality, as it provides a context for understanding the changes in outcomes of interest. The implementation of the Rutgers-UMDNJ integration follows a top-down design as the policymakers and leadership at both institutions were instrumental in designing the newly integrated institution. These processes are vital for capturing not only how the integration design was implemented, but also identifying differences between the final design and the actual implementation of the design, and to assess whether certain processes were more effective than others. This research question will require qualitative research, relying heavily on interviews with policymakers and individuals from Rutgers and UMDNJ directly involved with the integration.

Was the integration effective? Analyzing the outcomes will be essential to determining the success of the Rutgers-UMDNJ integration was. Currently, the goals outlined by the document titled *Rutgers, The State University of New*

Jersey: Complex Substantive Change Request, submitted to Middle States Commission on Higher Education on December 19, 2012, and the New Jersey Medical and Health Sciences Education Restructuring Act (2012), provide a starting point for defining specific goals. These goals include the following:

- Enhance the reputation of Rutgers nationally and internationally
- Enhance educational opportunities for the residents of the State
- Strengthen recruitment of top faculty and students
- Retain the brightest high school students (reduce “brain drain”)
- Increase federal research funds
- Create a climate that fosters highly productive and innovative multidisciplinary projects
- Strengthen partnerships between higher education and the healthcare industry in New Jersey
- Increase opportunities to promote and facilitate economic growth in the State of New Jersey, including attracting businesses to the state and creating jobs to keep New Jersey workers in the state

These documents will provide a springboard for questions during the interview process and for determining whether these objectives are comprehensive and accurate. Interviews with policymakers and individuals from both Rutgers and UMDNJ who were directly involved with the integration will be used to define the outcomes to be measured in this study. The plan for measuring these outcomes will follow a mixed methods approach, having both quantitative and qualitative components.

Was the Rutgers-UMDNJ integration efficient? The Rutgers-UMDNJ integration is expected to yield efficient outcomes as well. The two dominant ways in which organizational efficiency in a traditional M&A is evaluated are through the formation of synergies (i.e., the value of the combined institution is greater than the sum of two parts) (Skodvin, 2014), and economies of scale (i.e., the reduction in the per unit cost of production when the volume of output is stable or enhanced) (Bess & Dee, 2008; Eastman & Lang, 2001; Patterson, 2000). In higher education mergers, resulting synergies are often measured by diversification strategies. Analyses of economies of scale in higher education “relate the size (usually measured by the number of students) to the cost per unit of size” (Patterson, 2000, p. 259).

While some objectives in the legislative documents may relate to the effectiveness assessment, others are better measures for evaluating efficiency. Interviews with policymakers and individuals from both Rutgers and UMDNJ who were directly involved with the integration will be used to define which of these objectives can be used to measure efficiency, and if others should be added. The plan for assessment will also follow a mixed methods approach, having both quantitative and qualitative components.

Which, if any, of the existing M&A theories provide a useful framework for the Rutgers-UMDNJ integration? Research on evaluating M&As in higher education is scarce, but the field is developing. Theoretical frameworks that can be connected to existing knowledge about M&As in higher education are also limited. Thus, there is a growing need to evaluate theories

that can be used in M&A higher education research. The current study provides a valuable opportunity to identify potentially relevant theories that can be used in examining the Rutgers-UMDNJ integration, but can also be applied more broadly to M&As in higher education. The aim of this research question is to establish linkages to similar existing bodies of work. While the research is limited, there has been some work evaluating M&As in higher education using resource dependence theory (Eastman & Lang, 2001; Harman & Meek, 2002; Pfeffer & Salanick, 1978; Pinheiro et al., 2016). There has also been research evaluating M&As in the private sector, as evidenced by monopoly theory (Harman & Harman, 2008; Jenson, 1984; Scott, 1982; Trautwein, 1990), empire building theory (Trautwein, 1990, Walsh, 1988, You et al., 1986), and transaction cost theory (Arrow, 1969; Ketokivi & Mahoney, 2016; Pi, 2013; Tong, 2010; Williamson, 1979, 1985, 1999). As M&As in higher education that involve public institutions are highly political, political theories may also be relevant. These political theories include advocacy coalition framework theory, and multiple streams theory. Each of the theories will be defined, discussed, and finally evaluated to determine which, if any, of them are applicable to the Rutgers-UMDNJ integration and/or more broadly to M&As in higher education.

The primary purpose of this study was to provide a framework for how to evaluate a higher education M&A, with a special emphasis on examining outcome trajectories. Although this case study will differ from others on M&As in higher education in various ways, there may be elements that can be triangulated with other cases. These elements may be replicable enough to yield greater

generalizability. Therefore, the research questions in this study will be addressed with the intention of providing information that may be useful for researchers studying M&As in higher education and/or other institutions considering a merger or acquisition. It is also important to note that even though there is abundant literature describing the goals, process, and structure of M&As in higher education, the literature lacks a thorough program evaluation of a merger or acquisition's actual outcomes. The current study addresses this gap by providing a framework for how to evaluate M&As in higher education.

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Categories of Mergers and Acquisitions

The phrase 'mergers and acquisitions' (or M&As) is typically used to describe two distinct but similar approaches for consolidation, and each individual term is often used interchangeably. Mergers and acquisitions in higher education combine two or more institutions to form a single new institution with a single governing body and single chief executive (Eastman & Lang, 2001; Kastor, 2010). Additionally, at least one institution and potentially all merging institutions relinquish autonomy and separate legal identity where all assets, liabilities, legal obligations, and responsibilities of the merging institutions are transferred to a single successor institution (Eastman & Lang, 2001; Goedegebuure, 1992; Harman & Harman, 2003; Harman & Meek, 1992).

Mergers and acquisitions can take different forms. Briefly, a merger is simply a combination of two or more entities and, in higher education these entities are typically two or more institutions of higher education. A consolidation is when two separate institutions form a completely new consolidated institution (Buono & Bowditch, 1989; Eastman & Lang, 2001). This type of merger is presumed to have two or more institutions with somewhat equal qualities and is meant to increase efficiency by utilizing the best aspects of each institution. However, this type of institutional merger is rare as it is difficult to find equally matched schools that find it beneficial to merge (Eastman & Lang, 2001; Harman & Harman, 2003; Harman & Meek, 2002; Pinheiro et al., 2016).

Most mergers in higher education are considered to be acquisitions, where one institution takes over all or most of the other institution. However, mergers are often regarded as synonymous with acquisitions for the purpose of keeping the peace with the stakeholders involved, particularly from the institution being acquired (Harman & Meek, 2002). According to Eastman and Lang (2001), there are three common types of acquisitions that occur in higher education: a pure acquisition, a transformative acquisition, and a semi-autonomous acquisition.

A pure acquisition happens when one institution fully absorbs the other, leaving the acquiring institution fundamentally unchanged (Eastman & Lang, 2001). Often this type of acquisition involves one large institution taking over a much smaller school or institution. A good example of a pure acquisition is the Polytechnic and NYU merger in 2014, which will be discussed shortly in further detail. Another type of acquisition in higher education is a transformative acquisition. A transformative acquisition is where one institution fully absorbs the other, but the acquiring institution is fundamentally changed as a result (Eastman & Lang, 2001). Dalhousie University and the Technical University of Nova Scotia in Nova Scotia, Canada is an example of a transformative acquisition, which will also be discussed. This type of acquisition happens more frequently with large-scale institutional mergers, as there are more compromises to be made than in a pure acquisition.

Semi-autonomous acquisitions are similar to transformative acquisitions. However, in the former, the acquired institution maintains some autonomy.

Although the acquiring university will have chief responsibility for the newly formed institution, a certain amount of local autonomy is still awarded to the acquired university (Eastman & Lang, 2001). Rutgers-UMDNJ's integration is closer to a semi-autonomous acquisition as UMDNJ (now RBHS – Rutgers Biomedical and Health Sciences) has been given its own chancellor who is responsible for overseeing RBHS units. One complication of this acquisition is in the geographical characteristics of the body being acquired. In higher education, the role of location is important. The newly formed RBHS is located physically on both the New Brunswick and Newark campuses, which are about 30 miles apart, each of which has its own separate chancellor. However, it is important to note that the word “integration” is often used to describe Rutgers’ acquisition of UMDNJ in an effort to appease all parties involved.

Mergers and acquisitions are often described as horizontal, vertical, or as a diversification. A horizontal M&A involves combining institutions from the same field that provide similar offerings (Eastman & Lang, 2001; Goedegebuure, 1992; Malatesta & Smith, 2014; Skodvin, 2014). Often, horizontal M&As are associated with the goals of increasing an institution’s scale, and reducing potential competition (Malatesta & Smith, 2014; Pfeffer, 1972; Walter & Barney, 1990). An example of a horizontal integration is the creation of Linnaeus University in Sweden through the merger of University College Kalmar and Vaxjo University in 2010, where both had similar academic profiles (Geschwind et al., 2016).

Vertical M&As, on the other hand, involve integrating similar institutions that provide different offerings (Eastman & Lang, 2001; Goedegebuure, 1992;

Malatesta & Smith, 2014; Skodvin, 2014). Vertical M&As are often employed as a way to extend an institution's organizational control (Pfeffer & Salancik, 1978). For example, an institution that provides undergraduate programs in engineering may want to merge with an institution that provides graduate programs in engineering in an effort to expand the institution's degree offerings in the same field. An example of a vertical integration is the merger of the University of Toronto and the Ontario Institute for Studies in Education (OISE), where both institutions were focused on the area of education, but one offered programs for undergraduates (University of Toronto) and the other institution offered programs to graduates (OISE) (Eastman & Lang, 2001).

A diversification is an integration of academic institutions that are oriented toward different academic fields (Skodvin, 2014). Diversification is often employed during an acquisition and can occur when one institution acquires another with the intent of taking on different programs, activities, and/or services (Malatesta & Smith, 2014). This strategy can be used to bolster strong universities by expanding both their scope and scale, but is also used to prevent weak institutions from shutting down (Harman & Harman, 2003; Millet, 1976). The acquisition of Polytechnic University by NYU in 2014 is a good example of higher education diversification. While NYU and Polytechnic University had a formal partnership since 2008 and a less formal partnership dating back to the 1970s, NYU did not have an engineering school since 1973, when Polytechnic University became its own university (New York University, 2016). However, it became apparent that Polytechnic University would serve both institutions better

together rather than separately (New York University, 2016). The idea behind this integration was that NYU would be built up by incorporating engineering programs which it initially lacked, and would also help a struggling Polytechnic University (New York University, 2016).

Mergers and acquisitions in higher education can be implemented voluntarily or by force. A voluntary merger occurs when the institutions initiate their own merger (Skodvin, 1999, 2014; Goedegebuure, 2012). Forced mergers, on the other hand, are mandated by an outside source, which is usually the government (Pinherio et al., 2016; Skodvin, 1999, 2014). Voluntary M&As are often preferred, as they are usually easier to organize and tend to be more successful than forced M&As (Harman & Harman, 2003; Kyvik & Stensaker, 2016; Pinherio et al., 2016). Two cases that occurred in Norway can demonstrate the differences between voluntary and forced M&As. The merger of the University of Tromsø and Tromsø University College in Norway in 2009 was a voluntary merger, and the University of Tromsø and Finnmark University College in 2013 was a forced acquisition (Arbo & Bull, 2016). While the acquisition in 2013 is still a work in progress, the voluntary merger has been found to be a more streamlined and cooperative process than the forced acquisition (Arbo & Bull, 2016). Many parties involved in the University of Tromsø and Finnmark University College acquisition are still dissatisfied with the process, which has affected different areas within the institutions including IT systems, procurement services, and student admissions (Arbo & Bull, 2016). However, this comparison

may only reflect the short-term effects of a forced acquisition, which may very well be capable of producing positive long-term outcomes.

Theoretical Frameworks

Theories in public policy and planning are usually based on the relationships between individuals and how power interacts with those relationships.

Furthermore, these theories attempt to provide a rational and reliable account of reality. The systematic process of an agenda setting theoretical framework, in particular, is based on the linkage between human action and the root cause of that action (Anderson, 2010). However, as important as theories in planning and public policy are, it is easy for them to become confusing to various audiences including empirical researchers, students, and other individuals working in planning and/or public policy. Therefore, theoretical frameworks are often used to organize in a prescriptive manner so they can be better understood and utilized (McLendon, 2003; Sabatier & Weible, 2014). Essentially, theoretical frameworks in public policy are used to provide guidance in understanding policy formation and implementation. It is important to note that theoretical frameworks provide a structure for clarifying, ordering, and systematizing policy formation (Sabatier & Weible, 2014). Theoretical frameworks are also able to provide a shared platform by linking, supporting, and organizing multiple theories and case studies.

It has been argued that the policy processes of formation and implementation in higher education have been largely ignored by researchers (McLendon, 2003). However, given the generalizable nature of the agenda

setting frameworks, researchers do not need to reinvent the wheel. Much of higher education policy can and does fall into many agenda setting frameworks such as multiple streams theory and advocacy coalition framework theory, which have been applied to other areas of policy research.

Multiple Streams Theory. Kingdon's multiple streams theory (MST) describes the process of agenda setting as defined by three streams: problems, policies (sometimes referred to as solutions), and politics (i.e., policy actors such as the Presidential administration, Congress, and other officials) (Kingdon, 1995). The streams are largely independent of one another, but when they do come together at certain critical times, this is called coupling. Often, a policy window, an opportunity for proposals to be pushed, emerges when the streams are coupled (Kingdon, 1995). The policy window aspect is integral to the timing of when policies can be implemented. Policy windows open quickly when a crisis develops, which allow policy entrepreneurs, key advocates who are willing to invest their resources to promote a position or policy, to push their pet proposals (Kingdon, 1995).

Kingdon's multiple streams theory has been widely applied for understanding how an item gets on the agenda and whether it is later implemented, and has been specifically used in framing higher education policy research (Anderson, 2010; McLendon, 2003). Kingdon's theory is considered to be incremental, as it can be applied to policies that are developed over a long period of time (Anderson, 2010), as it happened with the Rutgers-UMDNJ integration.

Advocacy Coalition Framework Theory. The advocacy coalition framework theory (ACF) examines the impact of how belief systems, political institutions, and other environments interact to shape the behavior of policy actors and the long-term policy changes influenced by these actors (McClendon, 2003; Sabatier & Weible, 2014). Advocacy coalitions are composed of people from various public (government) and private organizations who share a set of common beliefs (which are hierarchical in nature - deep core beliefs, policy core beliefs, and secondary beliefs) and engage in a significant amount of coordinated activity over time (McClendon, 2003; Sabatier & Weible, 2014). The link between the beliefs and their interactions allows them to create networks that push policy problems onto the agenda in the hopes of making policy changes. Advocacy coalition framework is considered an evolutionary and incremental process where policy change occurs over an extended period of time using many small changes as opposed to a series of large jumps (McClendon, 2003; Sabatier & Weible, 2014). Therefore, it can be assumed that ACF is typically applied to policies that develop over a longer period of time as opposed to a policy that is created as a result of a crisis.

Monopoly and Empire-Building Theories. Several theoretical frameworks have been used to specifically describe M&As. While theoretical frameworks in private sector mergers are limited because the literature is more applied to business, it is important to address the theories available, as M&As are a common occurrence in the private sector. Monopoly and empire-building theories both appear to be somewhat popular in examining M&As in the private

sector literature. Monopoly theory views M&As as planned in an effort to gain market power (Harman & Harman, 2008; Trautwein, 1990). However, there have been several studies that refute monopoly theory in practice (Jensen, 1984; Scott, 1982). The support for monopoly theory has been found to be rather weak. For example, Jensen (1984) found that a competitor's stocks did not fall if a merger was challenged or cancelled, which should not happen under monopoly theory.

Empire-building theory, on the other hand, has a stronger support in the literature. According to this theory, mergers are planned by managers who want to enhance their own utility rather than the values of their stockholders (Trautwein, 1990). Several studies have pointed to corporate decision-making processes in which decisions were made that directly benefited directors and managers in a corporation (Trautwein, 1990; Walsh, 1988; You et al., 1986). However, research on empire-building theory is somewhat limited and requires expansion.

Resource Dependence Theory. A commonly used framework in studying M&As in both the private sector and public sector is resource dependence theory (RDT). Resource dependence theory is a framework used for understanding organizational and environmental relations (Drees & Heugens, 2013), but has agenda setting qualities. Resource dependence theory was formalized by Pfeffer and Salancik (1978), who theorized that organizations are dependent upon external resources that affect an organization's behavior. Organizations would not survive if they did not secure these resources and were

not responsive to the demands of the environment. Resource dependence theory suggests that organizations must secure resources from the marketplace that are critical for growth and survival (Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Pinherio et al., 2016). The scarcity of these resource dependencies leads to the formation of inter-organizational arrangements such as mergers, acquisitions, and alliances.

Resource dependence theory has been used to understand why organizations, particularly in the private sector, form inter-organizational arrangements. Private sector organizations depend on resources such as labor, capital, and materials. If an organization lacks a needed resource, they may form an inter-organizational arrangement with another organization to gain those necessary resources (Boyd, 1990; Hillman et al., 2009; Pfeffer & Salancik, 1978). An example of this behavior in the private sector would be the acquisition of Scientific Atlanta by Cisco Systems in 2006. Cisco Systems, a multinational technology company that designs, manufactures, and sells networking equipment, noticed that its competitors were broadening their corporate toolboxes and saw this acquisition as an opportunity to enter into consumer networking, an area in which Cisco Systems was not involved at the time (Brueller et al., 2014).

Resource dependence theory has also been used to examine private sector M&As in recent years due to the increased resource dependencies as a result of globalization, limited credit supply due to the global credit crisis, and raw

materials/energy shortages caused by geopolitical shifts in production (Davis & Cobb, 2010; Drees & Heugens, 2013; Malatesta & Smith, 2014).

Competition among higher education institutions has also grown because of the globalized knowledge-based economy (Benner & Geschwind, 2016). Therefore, RDT has been used frequently when analyzing M&As in higher education. Similar to private sector companies, institutions of higher education are resource holders, and the rising costs of higher education have created a need to reduce them (Eastman and Lang, 2001; Harman & Meek, 2002; Pinheiro et al., 2016).

Resource dependence theory has been used specifically to study how universities often use corporate strategies when faced with fiscal declines. The term *academic capitalism* has frequently been used to describe how universities use “market and market-like behaviors on the part of universities and faculty” (Slaughter & Leslie, 1997, p.11). Furthermore, Slaughter and Leslie (1997) found that policy changes and the decline of state support stimulate academic capitalism among colleges and universities. According to Skodvin (1999), institutions are driven to merger by fear of weakened access to resources such as the decreasing amount of state aid, upon which all public institutions rely. Birnbaum (1991) also found it was essential that colleges and universities insulate resources from the marketplace to protect their assets. Therefore, mergers occur when institutions need to secure more resources and protect them from competition.

Initially, all institutions involved in a merger benefit from greater revenue. Although merged institutions stand to gain a greater portion of state aid compared to separate institutions, this additional state aid is likely to dissipate over time and be redirected to other state initiatives such as K-12 education and healthcare (Zumeta et al., 2012). However, mergers can help institutions expand their domain by increasing the number of resources in the form of more students, grants and other resources according to RDT (Eastman & Lang, 2001).

Resource dependence theory is a rather popular organizational theoretical framework in the literature, but it has its limitations. It has been suggested that RDT has not been as rigorously explored and tested as it could be (Drees & Heugens, 2013; Hillman et al., 2009). Furthermore, RDT has not always produced consistent results (Drees & Heugens, 2013), which brings into question the theory's reliability.

Transaction Cost Theory. Transaction cost theory (TCT) which can also be referred to as transaction cost economics is a constructive stakeholder theory that is most commonly applied in the field of economics (Ketokivi & Mahoney, 2016). Transaction costs can be defined as the costs for the economic system operation (Arrow, 1969; Williamson, 1975, 1985), which includes contract costs, labor, and regulation (Williamson, 1975). Transaction cost theory is used to better understand how individuals make decisions that yield efficient outcomes (Ketokivi & Mahoney, 2016; Williamson, 1999). Transaction cost theory is focused on promoting exchange relationships “where the transacting partners are bilaterally dependent” (Williamson, 1999, p. 91). This is somewhat similar to RDT

where competition is a driving factor; TCT, on the other hand, is primarily interested in preserving relationships among involved parties to become a stronger entity.

Transaction cost theory is applicable to M&As, as institutions organize themselves to minimize transaction costs (Pi, 2013; Tong, 2010). While most of this research has been applied to private sector M&As, many of the themes can be relevant to M&As in higher education. For instance, Pi (2013) argues that all companies involved in an M&A must pay transactional costs such as “costs for negotiation and contracting, costs for transferring property rights, and after merger, costs for framework developing, costs for situation analysis, costs for integration designing and implementing” (p.72). According to TCT, companies would minimize transaction costs enough to more than offset the transaction costs of merging. For instance, companies would only need one human resources department, one legal department, one public relations department, and so on. These costs would also be applicable to cases in higher education, as many universities have similar departments to corporations such as human resources, accounting, and legal, and may even have overlapping academic programs. In the Rutgers-UMDNJ case, this would be nursing programs and biological sciences.

This study will empirically evaluate whether the case at hand fits within the bounds of the mentioned frameworks. Multiple frameworks may be used to examine the Rutgers-UMDNJ case, but some may be more applicable than others. This assessment will be further discussed later in this research.

Review of Empirical Literature

The process of an institutional merger or acquisition is very complex and varies on a case by case basis. Mergers and acquisitions in higher education can be expensive and embarrassing failures. For example, the failed merger of Stanford and the University of California at San Francisco hospitals resulting in a whopping \$176 million after 28 months of planning (Kastor, 2001). Another example is the hospital and medical school merger of NYU with Mount Sinai, which ultimately failed after 10 years of planning (Kastor, 2010). Regardless of whether a merger fails or succeeds, the work involved also incorporates different policy actors, policy windows, and policy solutions that are driven by external social, economic, and political forces. Therefore, evaluating M&As that have been accomplished and the aspects that made the consolidation possible are important to study and understand. The cases that will be carefully addressed include the Ontario Institute for Studies in Education (OISE) and Faculty of Education at the University of Toronto (FEUT), Dalhousie University (Dal) and Technical University of Nova Scotia (TUNS), Medical University of Ohio (MUO) and University of Toledo (UT), and New York University (NYU) and Polytechnic (Poly). These cases will provide context on how each merger or acquisition has both similar and unique characteristics.

Ontario Institute for Studies in Education and the Faculty of Education at the University of Toronto. The first two cases are Canadian based and were studied extensively by Eastman and Lang (2001). Eastman and Lang (2001) mainly use RDT to frame the cases, and largely argue that the

motivations for the Ontario Institute for Studies in Education (OISE) and Faculty of Education at the University of Toronto (FEUT) integration were driven by the desire to absorb more resources in the marketplace. Key members of the administration at the University of Toronto and policymakers in the Ontario government saw the financial issues at OISE as an opportunity to strengthen the University of Toronto's education programs as well as save tax payers money.

The Ontario Institute for Studies in Education and FEUT were public institutions located two blocks from one another in Toronto, Canada and had focused on programs for education. The Ontario Institute for Studies in Education had research and graduate studies programs in education, while FEUT had programs for initial and continuing teacher education. The two schools, which overlapped in many areas, merged on July 1, 1996 to form Ontario Institute for Studies in Education of the University of Toronto (OISE/UT) (Millar & Hilyard, 2007; Eastman & Lang, 2001).

The Ontario Institute for Studies in Education was highly reliant on government resources and the Ontario government was interested in methods to cut higher education costs to all institutions. The Ontario Institute for Studies in Education had a \$4 million deficit two years prior to the merger, and was not projected to make up for the deficit in the upcoming year. The President of the University of Toronto, Robert Prichard, saw this as a policy window to combine the two neighboring education schools (Eastman & Lang, 2001). Due to the debt and the reliance on governmental resources, OISE feared being shut down and

agreed to merge with relatively little resistance, including support from the Ontario government (Eastman & Lang, 2001).

The merger of OISE and FEUT was somewhat of a cross between complementary and similar services. The programs, one practitioner-focused and the other research-focused, had different missions, but the programs did have some general services overlap (Millar & Hildyard, 2007). Faculty were trained differently to teach in the two separate tracks, research and practice, which resulted in the retention of each school's programs and faculty (Eastman & Lang, 2001). However, administration and staff positions were consolidated to retain greater revenue for OISE/UT (Easton & Lang, 2001). The consolidation of the two programs was estimated to save taxpayers \$10 million over the following 10 years, which made OISE/UT more competitive as it was able to trim the operating costs from running two separate schools, yet maintain the quality and quantity of the programs (Eastman & Lang, 2001). This projection, as is the case with many M&As in higher education, has not been empirically validated.

The Ontario Institute for Studies in Education had considerable trouble leading up to the merger with FEUT. The community at OISE was highly decentralized and had lacked a coherent mission since the 1970s (Eastman & Lang, 2001). The lack of organization caused problems within the institution, which were further aggravated by budget cuts made by the government of Ontario (Eastman & Lang, 2001). Therefore, the merger with FEUT was a means of survival for OISE, to retain its programs and faculty. Despite not fully

losing its name recognition, it had experienced concessions in the form of losses in administration and staff positions (Eastman & Lang, 2001).

Leadership from OISE, FEUT, the Ontario government, and other key stakeholders had most of the input in implementing the merger. However, during the merger, OISE and FEUT had struggled with establishing their goals with OISE focusing on teacher education and FEUT focusing on educational research (Eastman & Lang, 2001). Culture was also different between the two institutions, as OISE had a very liberal focus and FEUT was more conservative (Eastman & Lang, 2001). In order to mediate institutional differences, the province of Ontario had an active role in the negotiations of the merger (Eastman & Lang, 2001). This included consulting parties from both institutions involved at all stages of negotiation and included individuals from OISE to be members of the Board to ensure adequate representation throughout the formal negotiation process (Eastman & Lang, 2001).

There were measurable benefits and costs that emerged from the OISE-FEUT merger. The merger was able to save taxpayers money by consolidating many duplicative services. Also noteworthy is that OISE/UT is still operating as an institution focused on education nearly 20 years after the merger. Faculty jobs and many staff jobs were also retained, but there were some costs. Approximately 115 staff jobs were cut, which mostly affected staff at OISE (Eastman & Lang, 2001). Also problematic was that the transition process was not very clear as many staff were unsure of what their adjusted workloads were and whether they would be reassigned to another office or job, both of which led

to greater job dissatisfaction (Eastman & Lang, 2001). This state of confusion, depending on its duration, could also lead to more short-term costs as many jobs may not be done correctly. However, the costs and benefits have not been thoroughly measured and lack a thorough assessment.

Dalhousie University and the Technical University of Nova Scotia.

The second M&A case Eastman & Lang (2001) applying RDT is the merger of Dalhousie University (Dal) and Technical University of Nova Scotia (TUNS). The consolidation appeared to be largely pushed by the Nova Scotia government. While the local provincial government certainly had a role in the OISE and FEUT integration, it appeared to have a larger one in the Dal and TUNS merger. The government essentially used the consolidation as a method for reducing costs for higher education, and TUNS agreed because it was reliant on the government's aid (Eastman & Lang, 2001).

The Dalhousie University and TUNS' merger took several years to occur despite the six-block proximity of these public institutions to each another in Nova Scotia, Canada (Eastman & Lang, 2001). The Technical University of Nova Scotia, a small technical school, officially merged into Dal, a large Canadian university, on April 1, 1997. The programs that were merged led to the reorganization of the engineering, computer science, and architecture and planning programs at Dal (Eastman & Lang, 2001).

The education minister in Nova Scotia, John MacEachern, and other key government officials in Nova Scotia were pivotal policy actors who helped ensure

the Dal and TUNS merger. The Nova Scotia government had made several budget cuts to higher education in the early 1990s which caused many institutions to suffer including TUNS and Dal. These budget cuts resulted in greater consolidation among programs at Dal (Eastman & Lang, 2001), but consolidation was less feasible at TUNS due to its smaller scope and scale (Eastman & Lang, 2001). Although TUNS was initially resistant to the merger, governmental aid was essential to its operations, and this aid would be significantly cut if the merger was not implemented (Eastman & Lang, 2001). The Technical University of Nova Scotia essentially merged with Dal in order to avoid a shutdown.

The merger from the Nova Scotia government's perspective was one that increased competition. The government was concerned that smaller institutions like TUNS would not survive in the marketplace alone, but also wanted to enhance their competition with technical education (Eastman & Lang, 2001). Similar to the Rutgers and UMDNJ merger, the merger of Dal and TUNS would yield more STEM programs, with the goals of enhancing the reputation of the institution and generating additional external revenue in the form of public or private grants (U.S. Department of Treasury and U.S. Department of Education, 2012). The Dal and TUNS merger was mainly a merger of similar fields, but at different levels (graduate vs. undergraduate), which made the merger complementary. Due to the duplication of some services, there were some modest job cuts in the process that made the program more competitive in terms of cost (Eastman & Lang, 2001). However, the competitive advantage in the

marketplace was mostly gained through the greater availability of technical education at the different levels.

Although it took several years for the two institutions to realize the merger was inevitable, the actual merger process was very quick, lasting only 8.5 months when most mergers take several years to transition (Eastman & Lang, 2001). Discussions on both sides from various stakeholders took place, but the process was also more informal, ad hoc and most agreements that were made were not legally binding (Eastman & Lang, 2001). This approach eventually became problematic when TUNS ended up receiving less representation and autonomy than it was guaranteed (Eastman & Lang, 2001).

There were several potential costs and benefits that emerged from the Dal-TUNS merger. As we have seen with this merger, as well as the OISE-FEUT merger, the goals of effectiveness and efficiency are important long-term concerns. Additionally, Nova Scotia was able to enhance the prominence of its newly merged institution that offered a larger quantity of STEM programs. On the other hand, there were some costs. The Technical University of Nova Scotia agreed to merge, mainly due to budget and policy constraints, and in the process had to make modest job cuts and lose name recognition (Eastman & Lang, 2001). Furthermore, the implementation process was not carried out well, which led to a great amount of confusion, mistrust, and disgruntled members of the university community, primarily from TUNS (Eastman & Lang, 2001). Similar to the OISE-FEUT merger, no formal evaluation of the costs and benefits was performed.

The Medical University of Ohio and the University of Toledo. The Medical University of Ohio (MUO) and the University of Toledo (UT) began official merger discussions in 2005, and finally merged on July 1, 2006 (McGinnis et al., 2007; McKether et al., 2011; Learning Alliance for Higher Education, 2007). The two universities were 3.5 miles away from one another (McGinnis et al. 2007; Learning Alliance for Higher Education, 2007). The University of Toledo is a doctoral research institution that included 20,000 students and 5,000 employees prior to the merger (McGinnis et al. 2007). The Medical University of Ohio was a free-standing health sciences institution and included “schools of medicine, nursing, allied health, and graduate students” (McGinnis et al., 2007, p.118). Prior to the merger, MUO was home to 1,600 students and 3,384 university and hospital employees (McGinnis et al., 2007).

The merger of these two public universities made the combined institution the third largest public university in the State of Ohio (McGinnis et al., 2007). There had been a long history between the universities since MUO was established. The University of Toledo, founded in 1872, was a municipal university in 1964, when MUO was first established, and therefore, MUO became a nearby standalone university (McGinnis et al., 2007; Learning Alliance for Higher Education, 2007). The University of Toledo became a state university three years later but neither party was interested in merging (McGinnis et al., 2007). The atmosphere changed for both institutions in the early 2000s, when MUO’s market share was decreasing and UT was facing major budgetary and enrollment deficits (McGinnis et al., 2007). A governor’s task force evaluated

higher education in the State of Ohio and the idea of merging was brought to the forefront of the conversation (Learning Alliance for Higher Education, 2007). Policymakers in Ohio and university leadership on both sides saw merger as an opportunity to enhance both universities. University leadership and the State were aware that almost all top-rated medical schools were a part of a nationally ranked university, and that top-rated medical schools stand to benefit from greater research revenue (McGinnis et al, 2007; Learning Alliance for Higher Education, 2007). It is noteworthy that this case bears a striking similarity to the Rutgers and UMDNJ integration on a smaller scale.

The integration was a diversification, and was not met with much resistance, as both sides saw what could be gained from combining (McGinnis et al., 2007; Learning Alliance for Higher Education, 2007). While MUO was formally acquired by UT, there certainly was a lot of collaboration that streamlined the process. There were consolidations in leadership positions, and the newly formed leadership included a mix of individuals from UT and MUO, including the former President at MUO who was named the Provost of the newly formed health sciences campus at UT (McGinnis et al., 2007). Strategic planning working groups also ensured both sides were adequately considered throughout the merger process (McGinnis et al., 2007). Furthermore, there were not many overall cuts, as the goal had been to create a more competitive and comprehensive university in the State of Ohio (McGinnis et al., 2007; Learning Alliance for Higher Education, 2007).

The aftermath of the UT and MUO merger has been evaluated in a few studies, and several mixed outcomes have been identified. McGinnis et al. (2007) found the merger resulted in a higher number of overall applications and greater collaboration among the different programs. However, McKether et al. (2011), analyzing 10 years of grant data, found that there was very little cross campus collaboration. A particular limitation in this research is that none of these studies empirically evaluates the design, implementation, or efficiency of the UT and MUO merger.

New York University Consolidations. New York University (NYU) had two recent consolidation attempts; one was successful and the other was not. New York University is a private university so less information was made public and the mergers did not require much involvement from the state. Often mergers with private institutions are viewed as simpler (Millet, 1976). However, private institutions can also have conflicts, as we will see in the two examples where stakeholder “buy in” is critical for a successful merger.

Mount Sinai Medical School, a private medical school located in New York City, and NYU’s School of Medicine proposed a merger in 1998. The consolidation of the two programs was an effort to cut rising medical costs (Kastor, 2010). The merger of the two schools would also create a prominent medical school that would dominate a very competitive location. However, because the two schools, which had similar programs, and were already prestigious on their own, the merger led to friction. The two schools had differences in their overall university mission, faculties that disagreed with one

another and pushed back against the merger, and trustees at NYU who felt that the merger would cost too much money, draining their endowment (Kastor, 2010). Eventually, these disputes led to the dissolution of the planned merger in 2008, after 10 years of discussion.

Polytechnic (Poly), located in Brooklyn, NY, was founded in 1854, and is the second oldest private school of engineering and technology in the United States (New York University, 2014). However, Poly was not as prestigious as NYU and could benefit substantially from merging with NYU's School of Engineering and Science. Polytechnic which had very little name recognition nationally was unable to secure the same resources as many of the top engineering and technology programs, and a merger with a top school in the New York City area would likely change that (Jaschik, 2008). Additionally, NYU saw the merger as an opportunity to broaden and enhance its STEM curriculum, but also absorb Poly's resources before another top school in the area did (Jaschik, 2008). Therefore, this merger can be seen largely from an RDT framework where the two parties wanted to secure more resources and protect themselves from competition.

Additionally, NYU was able to secure more resources in the form of research dollars from governmental agencies that provide lucrative grants (e, g., National Science Foundation (NSF)). The main goal of NYU can also be seen from the competition perspective, as it felt the merger would expand their reach. Polytechnic was affiliated with NYU for many years. The New York University of Engineering and Science which formerly belonged to NYU was merged into

Polytechnic University in 1974 (Rodengen, 2005). Many years later in 2008, Polytechnic University and NYU formally became affiliated, but it was not until 2014 that the institutions merged (New York University, 2008). In July 2008, Poly renamed itself the Polytechnic Institute of NYU (NYU-Poly) in recognition of the formal affiliation between the two schools. It was later announced in October 2015 that it would be renamed the NYU Tandon School of Engineering. This announcement was met with criticism from some students and alumni (Woodhouse, 2015). Although it took several years of negotiations, the Board of Trustees of NYU and the Board of Trustees of NYU-Poly both voted in October 2012 for the institutions to undertake the final steps necessary to complete the merger and to create NYU's Polytechnic School of Engineering (New York University, 2014). The relationship was established to benefit both institutions – consolidating resources on both sides and becoming a premier engineering institution. At this time, no formal evaluation of the merger has been carried out.

CHAPTER 3: CASE STUDY OF RUTGERS AND THE UNIVERSITY OF MEDICINE AND DENTISTRY OF NEW JERSEY

Rutgers and the University of Medicine and Dentistry of New Jersey

Rutgers University, The State University of New Jersey, and University of Medicine and Dentistry of New Jersey (UMDNJ) officially merged on July 1, 2013 (New Jersey Medical and Health Sciences Education Restructuring Act, 2012).

Prior to the merger, Rutgers was a large public research university with no medical school. The University of Medicine and Dentistry of New Jersey was a stand-alone health sciences university with 11 distinct units including a hospital.

Rutgers-UMDNJ was a diversification integration in which Rutgers took on UMDNJ as a means to take on different programs. The two public universities had campuses that were located across the State of New Jersey, mainly in Camden, Newark, Stratford, Piscataway, and New Brunswick. The two farthest campuses were approximately 80 miles from each other (Newark and Stratford) while the closest two campuses were adjacent to one another (Rutgers-New Brunswick and UMDNJ-New Brunswick). Eight of the 11 UMDNJ units were moved to the new Rutgers Biomedical and Health Sciences (RBHS) unit established at Rutgers University, which combined with three existing units at Rutgers, a pharmacy school, nursing school and an institute on health policy (New Jersey Medical and Health Sciences Education Restructuring Act, 2012).

Figure 3.1 illustrates the UMDNJ and Rutgers units in the newly established RBHS unit. One of the former 11 UMDNJ units, the Cancer Institute of New Jersey, separately reports to the Rutgers University President (New Jersey Medical and Health Sciences Education Restructuring Act, 2012). The UMDNJ

units that were included in the integration were the Robert Wood Johnson Medical School (RWJMS), the Cancer Institute of New Jersey (CINJ), School of Public Health (SPH), University of Behavioral Health Care (UBHC), School of Health Related Professions (SHRP), Graduate School of Biomedical Science (GSBS), School of Nursing (SON), New Jersey Medical School (NJMS), and New Jersey Dental School (NJDS). The School of Osteopathic Medicine (SOM) was integrated with Rowan University in Glassboro, New Jersey, and University Hospital (UH) was brought under the control of the State (New Jersey Medical and Health Sciences Education Restructuring Act, 2012). Finally, there were two Rutgers-UMDNJ joint units, the Center for Advanced Biotechnology and Medicine (CABM) and Environmental and Occupational Health Sciences Institute (EOHSI), which became part of RBHS (Rutgers Office of the President, 2016).

The UMDNJ merger with Rutgers was largely facilitated by the state government under Governor Chris Christie. Prior to being elected Governor of New Jersey, Chris Christie served as the U.S. Attorney who confronted UMDNJ's Board of Trustees with evidence of Medicaid overbilling in 2005 (Schwartz, 2014). U.S. Attorney Chris Christie agreed to defer prosecution for health care fraud for three years. However, this deferred prosecution was contingent on ongoing remediation, paying full restitution, and supervision by a federal monitor (Deferred Prosecution Agreement, 2005; Schwartz, 2014). The federal monitor uncovered additional issues related to billing and medical coding, and estimated that UMDNJ had received 11.7 million dollars from the State as a result of fraudulent activity from 2001 to 2005 (Schwartz, 2014).

The deferred prosecution created fundamental changes at UMDNJ, including major shifts in leadership, how billing and medical coding were conducted, and additional supervision imposed upon them by the State (Schwartz, 2014). University of Medicine and Dentistry of New Jersey's sinking rankings were also perceived as a threat to the institution's survival (Magyar, 2011). These events led the State to pursue making major changes at UMDNJ.

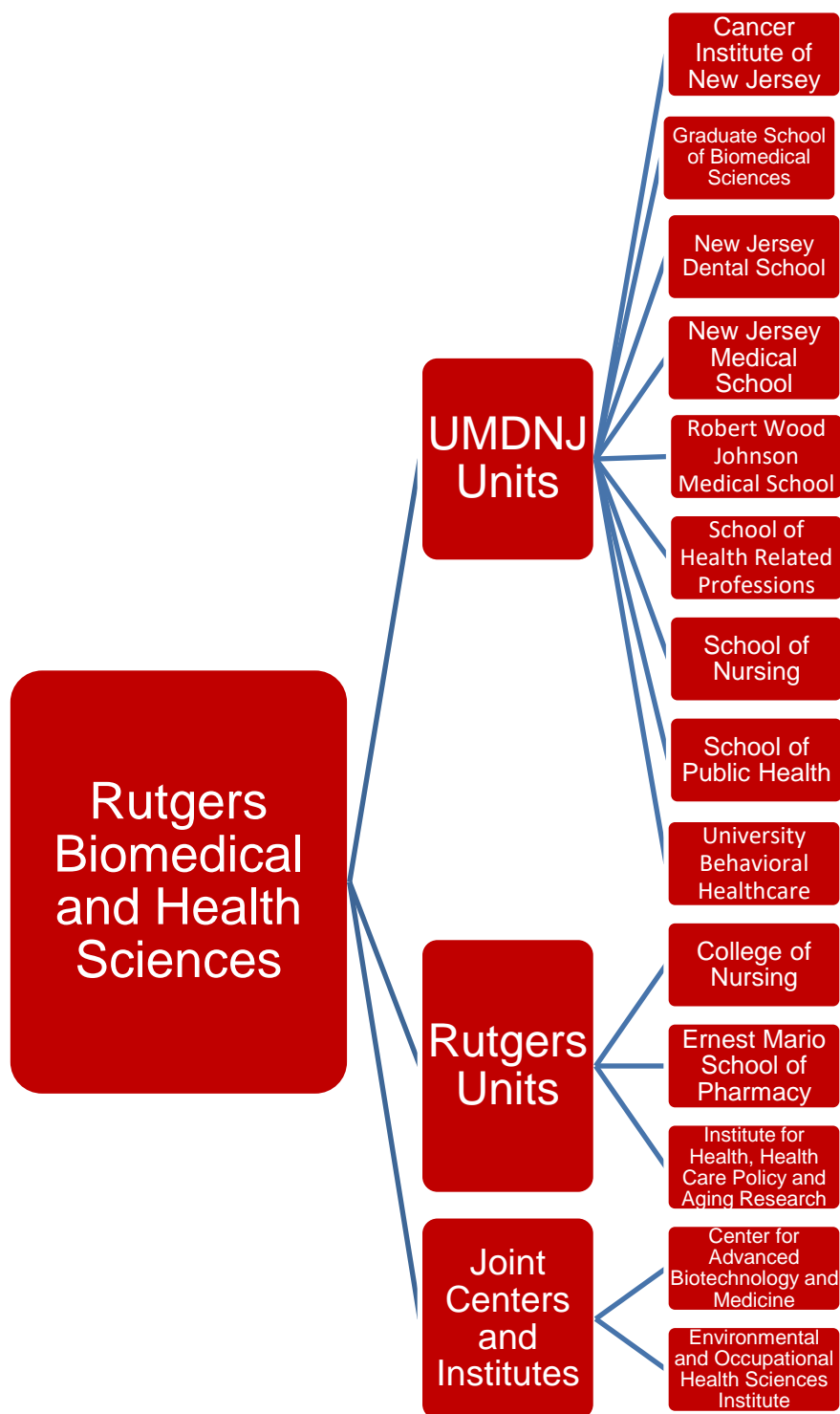


Figure 3.1 Rutgers Biomedical and Health Sciences Units²

² Cancer Institute of New Jersey was the only UMDNJ entity included in the integration that reported separately and directly to the Rutgers University President.

Rutgers stood to gain a greater competitive advantage and to secure more resources from the academic marketplace with the inclusion of UMDNJ programs. The University of Medicine and Dentistry, for the most part, had programs that Rutgers did not offer, which included those offered by two medical schools and a dental school. These complementary programs added to the value and scope of Rutgers which was one of the few public schools without a medical school among the American Association of Universities (AAU) and the Big 10 Athletic conference, both of which consist of major flagship research universities that are well-regarded academically (Rutgers Strategic Plan, 2014). The lack of a medical program at Rutgers made it difficult to compete with peer institutions in the Big 10 and AAU because of the high regard academics place on medical programs, and the extra funding that medical institutions typically receive.

From a resource dependence perspective, medical and STEM programs can also be a valuable revenue stream for a state university. Medical and STEM research brings in large grant monies from the government and private corporations, particularly if the corporations are geographically close to the institutions (U.S. Department of Treasury and U.S. Department of Education, 2012). For example, Rutgers shares a New Jersey residence with big pharmaceutical companies like Johnson & Johnson, Bristol-Myers Squibb and Merck and stands to benefit greatly from additional partnerships with these businesses.

University of Medicine and Dentistry of New Jersey also had programs that overlapped with Rutgers, most notably the two nursing programs in Newark, Rutgers' College of Nursing (which also has a presence in New Brunswick) and UMDNJ's School of Nursing. As of the summer of 2014, the two nursing schools in Newark were consolidated into one school within the division of RBHS as the School of Nursing, in an effort to enhance the competitive advantage of Rutgers' nursing programs (Rutgers Strategic Plan, 2014).

Historical Roots

History can play an important role in whether or not two institutions merge (Eastman & Lang, 2001; Harman & Harman, 2008; Millett, 1976; Pinheiro et al., 2016) as can be observed through other recent higher education M&As in the United States such as NYU-Poly and MUO-UT. History certainly played a role in the case with Rutgers and UMDNJ. Rutgers has a history that goes back centuries prior to the formation of UMDNJ with some key facts that were important for the integration. Rutgers, chartered in 1766 as Queens College, is one of the nine colonial colleges in the United States (Clemens, 2015; Dane et al., 2014; McCormick, 2014). Rutgers became the State University of New Jersey in 1945 (Clemens, 2015; Dane et al., 2014; McCormick, 2014). However, this change from a private to public university led to some complications, many of which had to do with the structure of the Board that oversaw Rutgers. The Board of Trustees oversaw Rutgers while it was a private institution and its members were primarily selected internally. However, a new board was needed to oversee the operations of a public state university in which the governor would have more

input into the membership of the Board (Rutgers, the State University Law, 1956). Therefore, the Rutgers Act of 1956 was enacted in an effort to settle governance issues (Clemens, 2015; Dane et al., 2014; McCormick, 2014).

The Rutgers Act of 1956 plays an important role in any major decisions made at Rutgers. More specifically the Rutgers Act of 1956 established a Board of Governors that included 11 members, with six of these members appointed by the Governor (Clemens, 2015; Dane et al., 2014; McCormick, 2014; Rutgers, the State University Law, 1956). The Board of Trustees which now includes 41 voting members³ and five ex-officio nonvoting members⁴, was also retained in the Rutgers Act of 1956 and had authority in some critical areas:

It advises the Board of Governors. Its consent is necessary to the appointment of the University President. It appoints, from its members, the remaining five members of the Board of Governors. It retains responsibility over the University's pre-1956 and some of its post-1956 private assets. Finally, the Trustees can pull those assets out if they conclude that the State has crossed certain red lines, including interfering with aspects of Rutgers' essential self-governance (Dane et al., 2014, p. 348)

³ The 41 voting members include 20 charter individuals (at least three shall be women and three are reserved for students), 16 alumni individuals nominated by the Nominating Committee of the Board of Trustees, and five individuals appointed by the governor of New Jersey with confirmation by the New Jersey State Senate

⁴ The five ex officio, nonvoting members include the President of the university; two faculty members and two students who are elected by the University Senate

Therefore, the Rutgers Act of 1956 establishes that any substantial legislation requires the approval of both the Board of Governors and the Board of Trustees.

Rutgers and UMDNJ have a long history that dates back to the formation of UMDNJ in the 1960s-1970s. The Seton Hall College of Medicine and Dentistry was founded in 1954, and after incurring some financial trouble was acquired by the State of New Jersey in 1965 and renamed the New Jersey College of Medicine and Dentistry (NJCMD) (Morris, 2009; Schwartz, 2014; Trelstad, 2002). The continued formation of medical education was greatly influenced by the Newark Riots of 1967 (Morris, 2009). The construction of the NJCMD campus required the removal of residential housing in the Central Ward of Newark, which angered many in the Newark community, and was a contributing factor in the Newark Riots (Morris, 2009). As a result of the Newark Riots and Martin Luther King Jr.'s assassination the following year, policymakers focused their attention on minority issues and ways to improve the economic conditions in the City of Newark (Morris, 2009). NJCMD agreed to accept primary responsibility for the City's public health care services which included medical care for the residents of Newark, recruitment of minority students, and greater employment opportunities for the City's residents (Morris, 2009). NJCMD assumed Martland Hospital located in the City of Newark in 1968, which was renamed University Hospital (UH) in 1981 (Morris, 2009). University Hospital operated and still operates as the main teaching hospital for NJMS, NJDS, and SON. University Hospital is a major healthcare provider for the City of Newark.

During this time, Rutgers Medical School (RMS) was established at Rutgers, but was not initially a school within NJCMD. RMS was first established as a two-year institution that offered the master of medical science (M.M.S.) degree with its first entering class in 1966 (Morris, 2009; Schwartz, 2014; Trelstad, 2002). There were plans to expand the program, but RMS would only be part of Rutgers University for a short period of time. The New Jersey State legislature and both Boards at Rutgers approved the State takeover of RMS in 1970 and its merger into NJCMD, which was subsequently renamed the College of Medicine and Dentistry of New Jersey (Clemens, 2015; Morris, 2009; Schwartz, 2014; Treltsad, 2002). Continued growth led to university status, and it was renamed again to the University of Medicine and Dentistry of New Jersey (UMDNJ) in 1982 (Morris, 2009; Schwartz, 2014; Trelstad, 2002). However, RMS was renamed Robert Wood Johnson Medical School (RWJMS) in 1986, and continued to share a campus in Piscataway with Rutgers (Morris, 2009). University of Medicine and Dentistry of New Jersey, with eight schools on five campuses, eventually became the largest freestanding school of health sciences in the United States (Schwartz, 2014). However, UMDNJ was a decentralized university with the schools operating independently of one another, with the exception of the joint centers and institutes in New Brunswick/Piscataway. This was most notable with the two medical schools, NJMS and RWJMS, which had different unions, billing systems, campuses, and culture (Schwartz, 2014). There was not a strong sense of community between the schools within UMDNJ, particularly among schools that were not located in the same vicinity.

Geography

Geography also plays a central role in the implementation of an M&A (Eastman & Lang, 2001; Harman & Harman, 2008; Millett, 1976; Pinheiro et al., 2016).

Geography was important in each of the cases discussed in the literature review.

The Rutgers and UMDNJ integration was no different. First, the geography of the State of New Jersey is an important factor in how higher education is structured in New Jersey, and what the job market expectations are for the residents of the State. Second, the geography of Rutgers and UMDNJ is important. The proximity of some UMDNJ units to Rutgers, many of which were initially part of Rutgers, played an essential role in the integration.

The geography and structure of New Jersey are vital to understanding the role of higher education in the state. New Jersey is a small but heavily populated state with many individuals attaining college degrees. According to the United States Census Bureau (2010), the State of New Jersey is the fourth smallest state in the United States, with a land area of 7,354.2 square miles. New Jersey is also the 11th most populous state with nearly nine million residents, and the densest state with 1,195.5 persons per square mile (U.S. Census Bureau, 2010). The residents of New Jersey are also highly educated, with 47.2% of the current state's total population ages 25-34 with a college degree, while the national average is 39.3% (U.S. Census Bureau, 2010). The State of New Jersey is also home to many residents who work in the major metropolitan cities of New York and Philadelphia, which include world-renowned hospitals and healthcare sector companies. New Jersey is also home to 14 of the world's 20 largest

pharmaceutical companies like Novartis, Johnson & Johnson, Bristol-Myers Squibb, Merck & Co., Novo Nordisk, and Bayer Healthcare (State of New Jersey, 2014). The need for a strong state university is clearly apparent in New Jersey, as is the need to produce and maintain a high-quality workforce in the healthcare industry. As noted above, Rutgers was designated the State University of New Jersey through legislation in 1945 and 1956 (Dane et al., 2014; McCormick, 2014; Rutgers, the State University Law, 1956), but has not had a medical school for education or research since 1970 (Dane et al., 2014; McCormick, 2014). This was a glaring deficiency for a major research institution and was judged by many as inadequately serving the educational needs of the citizens of New Jersey (McCormick, 2014).

The geography of Rutgers and UMDNJ was essential to the integration. First, the geography of Rutgers is complicated, and warrants a brief description. Rutgers is made up of three main campuses: New Brunswick (located in Central New Jersey), Newark (located in Northern New Jersey), and Camden (located in Southern New Jersey). Each of the campuses has a separate mission and they have different Carnegie Classifications⁵. A map of the Rutgers units in the State

⁵ Carnegie Classification-Research University I universities are designated as institutions that offer a full range of baccalaureate programs, are committed to graduate education, award 50 or more doctoral degrees a year, and receives a minimum of \$40 million in federal funding each year. Carnegie Classification-Doctoral University I are designated as institutions that grant at least 40 doctorates a year in five or more disciplines. Carnegie Classification-Research University II universities are designated as institutions that grant at least 50-doctorates and receive between \$15.5 million and \$40 million in federal funding each year. Carnegie Classification-Master's University and College I are designated as institutions that offer a full range of baccalaureate programs, are committed to graduate education through the master's degree, and award 40 or more master's degrees annually in three or more disciplines (Indiana University Center for Postsecondary Research, 2015)

of New Jersey is illustrated in Figure 3.2. New Brunswick is the flagship campus, with an enrollment of approximately 40,000 students prior to the integration (Rutgers Office of Institutional Research and Academic Planning, 2013). The New Brunswick campus is composed of five component campuses (Busch, Cook, College Avenue, Douglass, and Livingston) across six municipalities, mainly in the City of New Brunswick and Piscataway Township (Rutgers Office of Institutional Research and Academic Planning, 2013). Rutgers-New Brunswick is the only campus that is part of the AAU and holds a Carnegie Classification of Research University I with very high research activity (Indiana University Center for Postsecondary Research, 2015). The Newark campus is the closest campus to New York City and the second largest campus at Rutgers, with an enrollment of approximately 20,000 students (Rutgers Office of Institutional Research and Academic Planning, 2013). Rutgers-Newark holds a Carnegie Classification of Research University II with high research activity (Indiana University Center for Postsecondary Research, 2015). The Camden campus is the closest campus to Philadelphia and is the smallest campus at Rutgers with an enrollment of approximately 6,000 students (Rutgers Office of Institutional Research and Academic Planning, 2013). Rutgers-Camden holds a Carnegie Classification of Master's University and College I (Indiana University Center for Postsecondary Research, 2015).

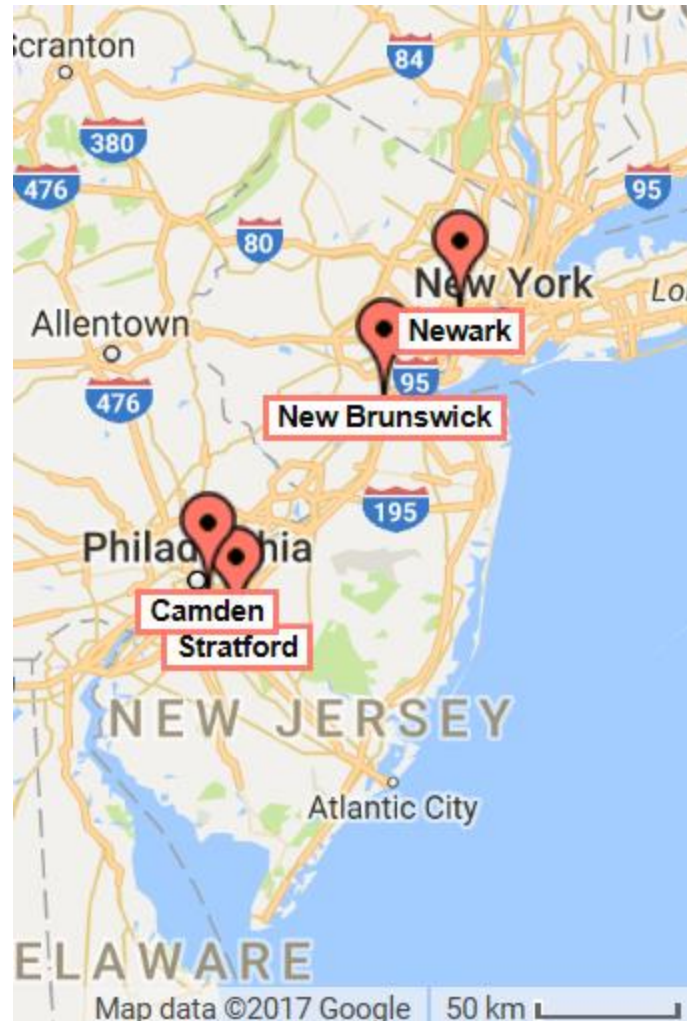


Figure 3.2 Map of the State of New Jersey with Rutgers and University of Medicine and Dentistry Locations

University of Medicine and Dentistry of New Jersey also had a presence in various parts of New Jersey including Newark, New Brunswick/Piscataway, and South Jersey. The schools that comprised UMDNJ were primarily located in Newark, Piscataway, and Stratford. It received a special Carnegie Classification for stand-alone medical schools (Indiana University Center for Postsecondary Research, 2015). University of Medicine and Dentistry of New Jersey was

primarily located in Newark, and had a presence in New Brunswick/Piscataway, and a smaller presence in Stratford. As previously discussed, RWJMS emerged from Rutgers and thus shared land on the New Brunswick/Piscataway campus. Robert Wood Johnson Medical School was originally founded as RMS within Rutgers and became a fully developed medical school at UMDNJ. The School of Public Health and CINJ were created many years after RWJMS became part of UMDNJ, but also shared land with Rutgers on the New Brunswick/Piscataway campus (Schwartz, 2014). The Center for Advanced Biotechnology and Medicine and EOHSI were also on the New Brunswick/Piscataway campus. Furthermore, the UMDNJ units in New Brunswick/Piscataway had working relationships with units at Rutgers, particularly those on the Busch campus (McCormick, 2014, Morris, 2009). New Jersey Dental School, NJMS, SHRP, SON, and UH were located in the City of Newark (Schwartz, 2014), just a few blocks away from Rutgers-Newark. The School of Osteopathic Medicine was located on the Stratford campus (Schwartz, 2014), and was located between Rowan University (approximately 12 miles southeast) and the closest Rutgers campus, Rutgers-Camden (approximately 12 miles northwest). The Graduate School of Biomedical Sciences had a presence on all three campuses at UMDNJ (Schwartz, 2014). Due to the two institutions' proximity to each other, there had been several discussions over the years regarding consolidation.

Previous Integration Recommendations and Attempts

The historical roots and geography of Rutgers and UMDNJ fostered the bonds that later contributed to the official integration in 2013. Prior to the integration,

many individuals from RWJMS felt a closer connection to Rutgers than they did to UMDNJ due to historical and geographical influences (Morris, 2009). There were a few efforts made in the years leading up to the official and final integration in which RWJMS and the other Piscataway units attempted to merge with Rutgers.

The first serious attempt at a Rutgers and UMDNJ merger was proposed under Governor James McGreevey in 2002. Governor McGreevey formed a task force, the Commission on Health Science, Education and Training, to review and make recommendations regarding higher education, with an emphasis on the health sciences, in the State of New Jersey (Clemens, 2015; McCormick, 2014). The task force was chaired by P. Roy Vagelos, a member of the Rutgers Board of Governors and Trustees, and former CEO and chairman of the board at Merck (McCormick, 2014). The final recommendations made by the task force are often referred to as the Vagelos report. The report recommended vast changes to the structure of higher education in the State of New Jersey, calling for a reorganization of many of the public institutions that would form a university system.

University systems are a set of multiple affiliated universities in a State that are usually geographically distributed (de Jager, 2011). A university system contains several universities, and a multiple-campus university is a single university that has more than one campus (de Jager, 2011). The University of California (UC) and the State University of New York (SUNY) are examples of university systems in the United States. Rutgers University was a multiple-

campus university, not a system. Rutgers had three campuses - Camden, Newark, and the flagship New Brunswick - but all fell under the umbrella of Rutgers, The State University of New Jersey.

The Vagelos report also included New Jersey Institute of Technology (NJIT), located in Newark, NJ, in the plan to restructure higher education in New Jersey. The plan called for three distinctive universities: one in North Jersey (Newark units), one in Central Jersey (New Brunswick and Piscataway units), and one in South Jersey (Camden and Stratford units) (Vagelos et al., 2002). The university in North Jersey would include UMDNJ units in Newark, Rutgers-Newark, and NJIT; the university in Central Jersey would include UMDNJ units in New Brunswick/Piscataway and Rutgers-New Brunswick; and the university in South Jersey would include the UMDNJ units in Stratford and Rutgers-Camden. The three regional universities would each be stand-alone research universities with their own University President, but would be part of a state system with a Board of Regents and a chancellor who oversaw the entire system (Vagelos et al., 2002). With the support of Governor McGreevey, the members of the committee felt this structure would produce positive changes to higher education in the State with a particular emphasis on medical/health science education (Vagelos et al., 2002). The Vagelos plan was discussed by leadership at Rutgers for over a year, but ultimately fell apart due to concerns the Board of Governors had with the proposed governance structure and finances associated with the restructuring (Clemens 2015; McCormick, 2014). Leadership at Rutgers did not feel that a complete restructuring of higher education was appropriate, but

they did see the importance of a medical school at Rutgers through the Vagelos report (Clemens 2015; McCormick, 2014). Therefore, the Vagelos report can be credited with initiating the first major discussion regarding a medical school at Rutgers.

The next formal recommendation for integration was in late 2010 with the Report of the Governor's Task Force on Higher Education, commissioned by Governor Chris Christie and chaired by former Governor Thomas Kean. Governor Christie, the former U.S. Attorney who deferred prosecution for UMDNJ, felt that major changes had to be made to UMDNJ and higher education in the State, and thus commissioned a task force to evaluate various aspects of higher education in New Jersey.

Thomas Kean was Governor of New Jersey from 1982-1990 and had made higher education a statewide priority (Clemens, 2015; McCormick, 2014). He advocated for higher education bond issues and created incentives for institutions to bring in world-class faculty to teach and conduct research (Clemens, 2015; McCormick, 2014). These efforts were key to Rutgers receiving a membership invitation to the prestigious and exclusive AAU in 1989. The AAU only consisted of 56 member schools split evenly among elite private (e.g., all but one of the Ivy League schools) and public research universities (e.g., North Carolina and Virginia) at the time of the invitation (Clemens, 2015); it currently has 62-member schools in the United States and Canada. Governor Kean was also Governor Christie's mentor (McCormick, 2014) which made the 138-page report (known as the Kean Task Force report) even more valuable.

The Kean task force was not solely focused on health sciences or medical education, Rutgers, or UMDNJ. The Kean Task Force report also assessed the financial issues that affected higher education as a whole in the State particularly after the Great Recession. The report did not make recommendations for a large restructuring like the Vagelos report, but it did incorporate key aspects of the Vagelos report. The report revisited the importance of a medical school at Rutgers, and made a formal recommendation that RWJMS and SPH be fully integrated with Rutgers-New Brunswick “to establish a first-class comprehensive university-based health science center” (Kean et al., 2010, p.18). This was met with great enthusiasm at Rutgers-New Brunswick (McCormick, 2014).

The Kean task force also addressed the lack of resources for higher education in South Jersey. It also included in an appendix, a suggestion it received to merge Rutgers-Camden with Rowan University. Rowan University had recently announced its creation of Cooper Medical School in Camden, New Jersey which would officially open in 2012 (Kean et al., 2010). Therefore, the geography of Rowan’s medical school and Rutgers-Camden set the stage for a potential merger. The appendix in the Kean task force suggested that a merger between Rowan University and Rutgers-Camden would enhance the quality of higher education in South Jersey. Furthermore, the idea in the task force’s appendix suggested that SOM in Stratford be examined to “further enhance the credibility of this new entity” (Kean et al., 2010, p.134). Finally, there were also recommendations to further evaluate the remaining UMDNJ units in Newark, but no final decision was rendered in this report.

As a result of the recommendations made by the Kean task force, Governor Christie issued Executive Order No. 51 to form the University of Medicine and Dentistry Advisory Committee to evaluate medical education in the State of New Jersey. It was specifically asked to:

Examine and provide recommendations concerning the following issues:

(a) whether Robert Wood Johnson Medical School and the School of Public Health should be merged with Rutgers University's New Brunswick-Piscataway campuses; (b) whether UMDNJ's Newark based schools should be merged with any of the senior public higher education institutions in Newark; (c) whether UMDNJ's South Jersey – based schools should be merged with any of the senior public higher education institutions in South Jersey; (d) the role and mission of University Hospital; (e) whether NJIT should start its own medical school; (f) how graduate medical education should be delivered in South Jersey; (g) whether the various public nursing schools should merge; and (h) such other matters as may be referred to the Committee by the Governor (Executive Order No. 51, 2011, p.3)

Sol Barer, a member of the Rutgers Board of Trustees and the executive chairman of the biotechnology company, Celgene, chaired the advisory committee. Two reports (often referred to as the Barer reports), an interim and final report, emerged from the advisory committee.

The interim report addressed some preliminary ideas but also requested more time for additional study. The committee recommended that RWJMS and SPH become part of Rutgers. It further suggested that CINJ, which was within RWJMS, become a distinct unit that too should fall under the Rutgers umbrella (Barer et al, 2011). The committee also recommended that NJIT not start its own medical school in Newark (Barer et al., 2011) and did not recommend that it be merged into Rutgers-Newark, as suggested in the Vagelos Report 10 years earlier. The report declared that additional study was needed to make recommendations regarding South Jersey and the Newark UMDNJ units (Barer et al., 2011).

The final Barer report was produced four months after the interim report and was far more extensive. The committee recommended that the Newark-based units of UMDNJ become a stand-alone health sciences university without UH, and that SOM become an autonomous unit within this new university. A public-private partnership with a New Jersey based non-profit health system for UH was suggested in an effort to manage the finances better than UMDNJ previously had (Barer et al., 2012). The continuation of UMDNJ's practices was not deemed sustainable and would be a financial hardship for the newly established health sciences university.

The recommendation for South Jersey would prove to be the most controversial. The committee recommended that Rutgers-Camden and Rowan University merge under the Rowan University name (Barer et al., 2012). The committee made this recommendation in an effort to improve the quality of higher

education in South Jersey, but greatly underestimated the resistance this recommendation would face.

Final Integration

A summary of the legislation provides an important outline of the integration. The reasons, implementation, and design will be discussed in a later chapter. The legislation, New Jersey Medical and Health Sciences Restructuring Act, went into effect on July 1, 2013 and officially integrated all the UMDNJ units, with the exception of UH and SOM into Rutgers (New Jersey Medical and Health Sciences Restructuring Act, 2012). SOM and GSBS programs at Stratford were integrated into Rowan (New Jersey Medical and Health Sciences Restructuring Act, 2012). The State took over UH as a separate entity, but it still would remain the main teaching hospital for NJMS, NJDS, and SON (New Jersey Medical and Health Sciences Restructuring Act, 2012). The remaining nine UMDNJ schools and institutes were moved to the new RBHS unit established at Rutgers University, which combined with three schools and institutes that originally were a part of Rutgers (New Jersey Medical and Health Sciences Education Restructuring Act, 2012). These Rutgers units were the College of Nursing, Ernest Mario School of Pharmacy, and the Institute for Health, Health Care Policy, and Aging Research (New Jersey Medical and Health Sciences Restructuring Act, 2012). Furthermore, the two joint units, CABM and EOHSI, were moved into UMDNJ (Rutgers, Office of the President, 2016). Rather than having RBHS report to one of the campus chancellors at New Brunswick, Newark, or Camden, it was determined that RBHS would be given its own

chancellor (New Jersey Medical and Health Sciences Restructuring Act, 2012). However, both the RBHS units and the New Brunswick units officially report to the Chief Executive of Rutgers-New Brunswick and the University President (Rutgers Office of the President, 2016). This means that all RBHS units are officially reported as New Brunswick, regardless of location.

The legislation also ensured that the Chancellor of RBHS would have an office in Newark with its own budget like the New Brunswick, Newark, and Camden campuses (New Jersey Medical and Health Sciences Restructuring Act, 2012). The legislation established that all campuses would have a chancellor that would report directly to the University President (New Jersey Medical and Health Sciences Restructuring Act, 2012), thus adding a chancellor for Rutgers-New Brunswick. The legislation also expanded the Rutgers Board of Governors from 11 to 15 members, with eight appointed by the New Jersey governor and seven selected by the Rutgers Board of Trustees (New Jersey Medical and Health Sciences Restructuring Act, 2012). The statute established the formation of several new governing and advisory bodies that would work with the University Chancellors. Advisory boards at Rutgers-New Brunswick and Rutgers-Newark would advise their respective Chancellor's Office; the Rutgers-Camden Board of Directors would establish and monitor Rutgers-Camden initiatives; and finally, the Rowan University/Rutgers-Camden Board of Governors was established to develop programs in the area of health sciences and establish partnerships between Rutgers-Camden and Rowan (New Jersey Medical and Health Sciences Restructuring Act, 2012).

Rutgers-Camden remained a separate campus under the purview of Rutgers University and did not merge with Rowan. The proposed Rutgers-Camden and Rowan's merger will not be the focus of this study. This study is intended to evaluate an M&A that did occur and provide recommendations on how to evaluate it. However, it is important to provide a brief summary that highlights certain aspects of the Rutgers-Camden and Rowan failed merger. Rutgers-Camden stakeholders (faculty, staff, alumni, and students) were generally not pleased with the recommendation of merging with Rowan in the second Barer report (Dane et al., 2014; McCormick, 2014). These stakeholders strongly felt that the Rutgers brand was too important to Rutgers-Camden, and that a name change would weaken the institution (Dane et al., 2014).

Furthermore, many of the Board of Trustees members did not want Rutgers to lose the Camden campus (Dane et al., 2014; McCormick, 2014). It is significant that the Camden campus contained a law school (which the New Brunswick campus did not have, although the Newark campus did). The Board of Trustees members, many of whom were lawyers, felt that it was essential to keep the law school in Camden. The Governor and several South Jersey politicians, including Senate President Stephen Sweeney and Senator Donald Norcross, on the other hand, stood by the Barer report's recommendation (Dane et al., 2014). However, the bill to establish such a merger would require the Board of Trustees' consent under the Rutgers Act of 1956 (Dane et al., 2014). Because a large majority of the Board of Trustees members refused to consent to the Rutgers-Camden and Rowan merger, the initial legislation, which included the Rutgers-

Camden and Rowan merger, and the Rutgers-UMDNJ integration was significantly revised (Dane et al., 2014). Ultimately, the final legislation, the New Jersey Medical and Health Sciences Restructuring Act, excluded the merger of Rutgers-Camden and Rowan but did establish the Rowan University/Rutgers-Camden Board of Governors, which is intended to develop future programs in the area of health sciences and establish future partnerships between Rutgers-Camden and Rowan (Dane et al., 2014).

The historical roots, geography, and previous attempts and recommendations created the path for the final integration. There were clearly underlying factors that resulted in the final integration and require further study. The reasons, design, and implementation are key to understanding how the integration plan was realized. These will be further assessed in this study through qualitative research which includes documents analyses and interviews.

Various theoretical frameworks discussed in the previous chapter will be used to frame the reasons, design, implementation, effectiveness, and efficiency of the Rutgers-UMDNJ integration. Similar to many higher education M&As, Rutgers-UMDNJ will likely fit into the RDT framework best since resource dependence, the environment, and competition appear to be important drivers of the integration. The use of the RDT framework in this case will facilitate a better understanding of how competition and resource dependence played a role in the Rutgers-UMDNJ integration.

Public policy theoretical frameworks are used to understand how legislation is formed and guided by policy actors, events, and timing. Policy

played a critical role in the reasons, design, and implementation of the Rutgers-UMDNJ integration. Therefore, the public policy theoretical frameworks, MST and ACF lend themselves to being a good fit for framing the reasons, design, and implementation assessment.

Transaction cost theory can be used to determine whether transactional costs were minimized, and Rutgers-UMDNJ became a more efficient organization as a result. Therefore, TCT is an applicable theoretical framework to the efficiency assessment which will evaluate costs associated with the integration.

Monopoly and empire-building frameworks may not be completely applicable to this case given the structure of Rutgers and UMDNJ. However, these frameworks should be evaluated to determine their applicability to other M&As in higher education, particularly with for-profit institutions who do rely on profits and shareholders.

Furthermore, the major goal for the Rutgers-UMDNJ integration is the increased effectiveness and efficiency of the overall institution. The reputation of the consolidated university can be enhanced, duplicative programs and services can be condensed, resource allocation can be more focused, with overall costs reduced. However, the Rutgers-UMDNJ merger is a large investment that carries risk. Retaining unsuccessful programs, utilizing ineffective leadership strategies, or allocating resources inadequately may weaken the overall efficiency the merger intended to create. Therefore, assessing intended outcomes and their relative efficiency is crucial to thoroughly evaluating the merger.

This study will provide a comprehensive evaluation of the Rutgers-UMDNJ integration, filling a significant gap in much of the literature regarding academic M&As. While most academic M&As studies appear to evaluate the reasons, design, and implementation process, most research in this area lacks a thorough outcomes assessment, which this study intends to produce. Furthermore, the approach used in this study is intended to be replicable in order to benefit other researchers studying M&As in higher education.

CHAPTER 4: REASONS, DESIGN, AND IMPLEMENTATION ASSESSMENT

An implementation assessment is used to measure the progress of a specific program or policy. The purpose of the implementation assessment in this study is to evaluate the progress of the Rutgers-UMDNJ integration and whether the integration was implemented with fidelity to the actual design of the integration (Fixsen, Blasé, Naoom, & Duda, 2015). The Rutgers-UMDNJ integration was largely a policy-driven initiative. It involved many stakeholders who were invested in the success of the integration but were also concerned about spillover effects. These concerns contributed to legislation that fortified the Rutgers-UMDNJ union, and was also comprehensive and extensive in order to address these concerns from various stakeholders.

The implementation assessment is useful for the current case, but it is also valuable for researchers conducting implementation assessments with other higher education M&As. The implementation assessment will evaluate several of the proposed research questions using qualitative data. Data collected includes task force reports, strategic plans, newspaper articles, legislation, and interviews. The interviews, which contained specific questions intended to address the research questions proposed in this study, will be used for the implementation assessment. Assessment that relies on qualitative data is intended to be hypotheses generating rather than hypotheses testing (Auerbach & Silverstein, 2003). Therefore, specific hypotheses will not be tested in this chapter, but research questions will be explored. Specific hypotheses testing will be

conducted in later chapters that evaluate the integration's effectiveness and efficiency.

Overview of Research Questions

The research questions regarding the reasons, design, implementation, and theoretical frameworks for the Rutgers-UMDNJ integration will be addressed in this chapter. The reasons and design research questions will provide important background information regarding the motivations for integrating the universities and how the integration was designed with respect to these reasons. There were previous attempts and recommendations for Rutgers and UMDNJ to come together but it was not until 2012 that a plan received enough support. The plan was officially implemented on July 1, 2013. The reasons and design research questions will uncover the rationale and strategic decisions that made the integration possible. Furthermore, identifying the joint and divergent goals by each of the stakeholders is fundamental to understanding how different perspectives led to the mutual decision of integration.

The reasons and design research questions will also inform the implementation assessment. The purpose of the implementation assessment is to assess how the Rutgers-UMDNJ integration was carried out, and whether the integration was implemented with fidelity to the design of the integration. The mutual decisions that were agreed upon in the legislation should require little to no changes to the actual design. Any deviation between the initial design of the integration and the final design that was implemented will need to be further explored. While some deviation may occur, a large amount of deviation from the

initial plan would suggest that the implementation was not carried out with fidelity to the design. Further insights on why implementation was or was not carried out with fidelity to the design will be discussed.

Finally, several of the theoretical frameworks examined in the second chapter will be tested. The theories that involve policy formation and implementation will be evaluated to determine which, if any, are suitable for this particular case. The theories that are applicable will provide valuable guidance to contribute to the understanding of policy formation and implementation that can be linked to future case studies with higher education M&As. These policies will include multiple streams theory, advocacy coalition theory, and resource dependence theory. Transaction cost theory will be tested in a later chapter.

Interview Methodology

Stakeholders have an essential role in policy implementation and there were various stakeholders involved in the Rutgers-UMDNJ integration. These stakeholders spanned across the entire State of New Jersey, but the vast majority of them were concentrated in three critical groups. These three groups included individuals from Rutgers, UMDNJ, and policymakers in the State of New Jersey. Individuals from each of these areas had the most input in the design of the legislation that established the integration. These stakeholders stand to gain or lose the most with a poor design and/or implementation. There were clearly different perspectives on why each of the stakeholders wanted integration, how it should be designed, and how it should be implemented.

There were different perspectives within the three critical groups of individuals. This was apparent in the documents that were outlined in previous discussions regarding combining the two institutions. Geographical location of the three groups played a significant role in the discussions leading up the integration, and played an additional role in why some of the previous recommendations failed. There were different perspectives among the Rutgers and UMDNJ individuals based on what campus they were associated with. Additionally, policymakers had different perspectives based on their constituency. Therefore, it is important to evaluate the different perspectives for the reasons, design, and implementation within each of the three main groupings of individuals.

In-depth interviews were conducted in an effort to address the different perspectives and answer the research questions regarding the reasons, design, and implementation of the Rutgers-UMDNJ integration. To protect the confidentiality of participants, only their stakeholder group and campus affiliation (for Rutgers and UMDNJ participants) will be disclosed in this study. The interviews were semi-structured which provided a framework for the interview but allowed for the interviewer to further explore particular themes or inquire about specific responses. Individuals were asked to read and agree to a consent form prior to the interview that made them aware of their rights as a research participant, and their ability to discontinue the interview at any time without penalty. The consent form and interview script used for all interviews are included in Appendix A.

An initial list of 10 individuals tied closely to the integration were identified, and asked to participate in the interview process. The remaining individuals were identified through a snowball sample where participants would identify another individual or set of individuals who may be familiar with the case. In total, 42 individuals were contacted with 17 individuals who either refused (n=4) or did not respond at all (n=13) to my interview request. All interviews lasted approximately 30-60 minutes, and no one asked to withdraw from the study. Most interviews were conducted in person (n=20), with a few conducted over the phone (n=5). In order to protect individuals from any potential breach, handwritten notes were taken and transcribed within 48 hours of the interview.

Feedback was gathered from the 25 interviews conducted with various stakeholders from Rutgers, UMDNJ, the State, and the addition of one private citizen. Each of these groupings can be further broken down by location and includes Rutgers individuals from New Brunswick/Piscataway, Newark, and Camden. University of Medicine and Dentistry individuals were from New Brunswick/Piscataway and Newark. Table 4.1 outlines the number of individuals interviewed by stakeholder group. The policymakers included individuals that served the State of New Jersey, both of whom came from districts in Northern New Jersey. The other two individuals from the State worked for politicians that represented the State of New Jersey. The one private citizen worked closely with individuals from UMDNJ's Newark campus.

Table 4.1 Number of individuals interviewed by stakeholder group	
Rutgers-New Brunswick	10
Rutgers-Newark	2
Rutgers-Camden	1
UMDNJ-New Brunswick/Piscataway	3
UMDNJ-Newark	4
The State of New Jersey	4
Private citizen	1

There were several limitations with how this sample was collected which may have impacted the results. Individuals from the State of New Jersey were the least represented, as this group was the most likely to be unresponsive to my interview request. Given the turnover of staff and faculty at UMDNJ in the wake of the institution's deferred prosecution, which will be discussed in more detail, there were fewer individuals to contact. Rutgers-New Brunswick appears to be overrepresented, as many of the individuals work for Rutgers' central administration, who have offices in New Brunswick but may oversee all Rutgers' campuses. Unfortunately, due to constraints of Rutgers' Internal Review Board (IRB), this grouping could not be further drilled down.

These interviews provided information that was essential in understanding the reasons, design, and implementation of the Rutgers-UMDNJ integration. Information from these interviews is also used later in the effectiveness assessment and efficiency assessment chapters.

Reasons for the Integration

It is important to understand why Rutgers and UMDNJ were chosen to integrate and why the State of New Jersey facilitated a large scale M&A in higher

education. The reasons for the integration appeared to have a good amount of conformity among various individuals. This was particularly apparent with respect to the reasons behind the push for integration by Rutgers and the State policymakers pushed for integration.

All 25 individuals reported that a major motivator for Rutgers-New Brunswick was to improve its reputation and enhance its status in the American Association of Universities (AAU). It is important to note that the AAU includes medical research output in their metrics to rank universities, and there has been a history of some schools (i.e. the University of Nebraska) being removed from the AAU for falling to the bottom of the rankings. This across the board agreement revealed that regardless of the individual's affiliation, a major reason that Rutgers-New Brunswick pushed for this integration to happen was to enhance its reputation among its AAU peers. Additionally, all but two individuals from UMDNJ (located in Newark) indicated that one of the main goals for the integration was to "enhance the reputation of Rutgers nationally and internationally." While the two UMDNJ individuals agreed that Rutgers-New Brunswick may have wanted to improve its reputation, they indicated that the reasons particular to state interests were the motivating factors for implementing the integration. This is a valid point, as Rutgers had been interested in the UMDNJ New Brunswick/Piscataway units for several years, but these plans never came to fruition. However, it could be argued that Rutgers' motivations all along had been to enhance its reputation and while it may not have been the

single reason for the integration itself, it was certainly the reason Rutgers wanted to acquire the UMDNJ units.

There was also quite a bit of conformity among the different groups of individuals regarding the reasons the State approved the integration. The large majority (11 out of 12) of Rutgers individuals that responded to the question (note: one individual stated they did not have adequate knowledge to answer this question), all six UMDNJ individuals (note: one individual stated they did not have adequate knowledge to answer this question), all four individuals from the State, and the one private individual reported that a major reason the State became involved was because of the leadership of Governor Chris Christie.

Many individuals from all areas and locations agreed that Governor Chris Christie's previous experience as the U.S. Attorney General during UMDNJ's deferred prosecution provided him with the knowledge and skill set to lead the integration. One individual from the New Brunswick/Piscataway UMDNJ campus stated in an interview that "Christie knew too much" regarding the issues at UMDNJ and a few individuals from Rutgers(n=6), UMDNJ (n=5), the State (n=2), and one private citizen stated that Christie wanted to dismantle the leadership at UMDNJ. The individuals from the State and the one private citizen also stated that Christie, a popular governor at the time, wanted the restructure of higher education to happen before the end of his first term. This was likely due to the Governor's wanting to demonstrate successful leadership in the higher education sector, and he used his previous experience as U.S. Attorney to accomplish the integration.

There was more variability in responses with respect to the reason UMDNJ agreed to integrate. This divergence was mostly between the units in New Brunswick/Piscataway and the units in Newark. This divergence was also pronounced among individuals at Rutgers and the State. Eleven out of 13 Rutgers individuals, all seven UMDNJ individuals, and three out of four individuals from the State reported that a major reason for the UMDNJ units on the New Brunswick/Piscataway campus to integrate was to formally be a part of Rutgers-New Brunswick, with which it shared a campus. This reason emerged early on in the previous discussions to merge Rutgers-New Brunswick with the UMDNJ units on the New Brunswick/Piscataway campus. However, there also appeared to be a lingering sense of loss among UMDNJ individuals on the New Brunswick/Piscataway campus. The UMDNJ individuals from New Brunswick/Piscataway repeatedly remarked that individuals felt more connected to Rutgers than they did to UMDNJ and there was a sense of resentment among faculty and staff about Rutgers Medical School “being pulled away from Rutgers.” One of the UMDNJ individuals, who happened to be part of Rutgers Medical School in the late 1960s, stated that the resentment and competition between the two medical schools within UMDNJ “created a sense of antipathy” in which RWJMS (formally RMS) felt very disconnected from UMDNJ. Additionally, there was very little research collaboration between the schools within UMDNJ but individuals on the New Brunswick/Piscataway campus reported to have more collaboration with units at Rutgers.

The benefits of merging for the UMDNJ units on the Newark campus were not as evident. The final suggestion prior to the integration, which was made by the second Sol Barer report was that the UMDNJ units in Newark would be their own university, so the end result was very different than previous suggestions. These individuals were asked why they thought these earlier suggestions for a more Newark-centered autonomous university of former Newark-based UMDNJ units did not come to fruition. The responses indicated that there was quite a bit of pushback from the UMDNJ units in Newark. Some individuals at Rutgers and UMDNJ referred to the integration of the Newark units as a “hostile takeover,” as the Newark units were resistant to integrating with Rutgers. However, after the deferred prosecution of UMDNJ, the institution had been significantly weakened. Previous discussions about merging had been dismissed by UMDNJ in the past. However, this time UMDNJ’s voice was much weaker and it was not able to be a significant actor/contributor to the discussion, and the reasons for why Rutgers and the State wanted to integrate prevailed.

There were major concerns regarding the center of power for Rutgers and UMDNJ. Rutgers campus in New Brunswick/Piscataway had the greatest presence and the Rutgers University President was located there as well. This was the reverse with UMDNJ and Newark. The integration proposed to have all the UMDNJ units report to a separate chancellor that would report to the Rutgers University President in New Brunswick. According to all of the UMDNJ Newark and Rutgers-Newark interviews, individuals in Newark feared that they would be ignored under this new leadership and were not happy. This feeling also

resonated among Rutgers individuals on the Newark campus and by Essex County politicians whose constituents are largely based in Newark. Therefore, the final legislation reflected the many negotiations that were aimed to give the institutions in Newark more attention.

All 25 individuals who were interviewed were also given a list of goals that the integration intended to accomplish. They were asked to validate the goals after answering questions regarding reasons, design, and implementation. These goals, outlined in the first chapter, were taken from *Rutgers, The State University of New Jersey: Complex Substantive Change Request* submitted to Middle States Commission on Higher Education on December 19, 2012 and the New Jersey Medical and Health Sciences Education Restructuring Act (2012).

The goals were not intended to correspond with the reasons for the integration. However, there was clearly some overlap. The first goal, enhance the reputation of Rutgers nationally and internationally, the fifth goal which was increasing research funds, and the sixth goal regarding research and collaboration were referred to in the interviews as major reasons for Rutgers' engagement in the integration. Most of the remaining goals had later been corroborated as being important goals, but not necessarily reasons for the integration. It is important to point out that these other goals were more generally related to improving higher education in the State of New Jersey and were not exclusively tied to the integration. Thus, while the other goals were meant to improve aspects regarding public higher education in New Jersey, these were

not the reasons for the integration of Rutgers and UMDNJ. The full validation of goals will be further assessed in the next chapter.

. The stated reasons of each stakeholder group differed, but they were quite transparent and easily identifiable. The reasons for the integration are quite evident from the perspective of Rutgers, the State, and UMDNJ units on New Brunswick/Piscataway. Rutgers wanted to enhance its status, UMDNJ on New Brunswick/Piscataway and Rutgers-New Brunswick individuals wanted to collaborate more on research projects, and the State was motivated by Governor Christie's agenda to "clean up" UMDNJ. Additionally, the timing and the players of the integration with regard to UMDNJ's deferred prosecution a few years earlier were also reasons that facilitated the integration. However, while there may have been agreement on the end result, the details of the integration were much more cumbersome, resulting in a complex design and implementation process for the Rutgers-UMNJ integration.

Design of the Integration

The design of the integration was officially described in the 2012 New Jersey Health Sciences Restructuring Act. While much of this information was summarized in a previous chapter, some of the background information regarding the legislation is not fully described in the legislation itself. This section's purpose is to answer the research question as to why the integration was designed the way it was. The information from interviews will be used to help explain the rationale behind some of the language in the legislation.

The New Jersey Health Sciences Restructuring Act (2012) established that the UMDNJ units, with the exception of SOM and a few smaller graduate programs in Stratford and Camden, would be integrated with Rutgers. The legislation specifically states that all units, with the exception of CINJ, would establish a new unit that would have its own chancellor who would report directly to the Rutgers University President. This new academic entity would also include units that were initially part of Rutgers as well. These included Rutgers College of Nursing, Ernest Mario School of Pharmacy, and the Institute for Health, Health Care Policy and Aging Research. This new unit is referred to generically as the “School of Biomedical and Health Sciences” in the legislation, as the name RBHS was not yet formally established. The new chancellor, who needed to be a physician, was to be appointed by the Rutgers University President and the Board of Governors. According to the legislation, the School of Biomedical and Health Sciences, “shall be supported through a separate line item in the annual appropriations budget” (New Jersey Health Sciences Restructuring Act, 2012, p. 86). That is, the new unit would have its own budget, similar to Rutgers-New Brunswick, Rutgers-Newark, and Rutgers-Camden. The leadership and financial language in the legislation ensured that the RBHS units would be treated distinctly.

The interviews and literature on the topic (McCormick, 2014; Schwartz, 2014) revealed that the Newark community was concerned that the RBHS unit would shift the attention away from Newark to New Brunswick. The idea was because Rutgers-New Brunswick was the AAU institution, and Rutgers-Newark

was not, new leadership may want to align more closely with the New Brunswick campus. Therefore, the location of the newly appointed chancellor became a concern. The newly appointed chancellor's office would reflect the priority location for RBHS, and individuals in Newark felt strongly that it should be based in Newark so that the Newark units would not be neglected. The legislation did something unique and specified the location of the RBHS's Chancellor's office: "The chancellor shall be based at Rutgers University-Newark" (New Jersey Health Sciences Restructuring Act, 2012, p. 86). This was added in an effort to have the support of the Newark community at large, and specifically the Essex County politicians who were needed to pass the legislation.

The legislation made additional efforts to keep the focus of RBHS in the Newark location. The legislation explicitly stated that Rutgers "shall maintain the public mission and commitment of the University of Medicine and Dentistry of New Jersey, including an affiliation with University Hospital, to provide a comprehensive healthcare program and services to the greater Newark community" (New Jersey Health Sciences Restructuring Act, 2012, p. 7). Thus, the RBHS mission would continue to support the Newark community, which would require the continued physical presence of biomedical and health sciences services in the City of Newark. Second, the legislation specifically required the UMDNJ schools based in the City of Newark to remain there. This included "the New Jersey Medical School, the New Jersey Dental School, School of Health Related Professions, the School of Nursing, and the Public Health Research Institute" (New Jersey Health Sciences Restructuring Act, 2012, p. 7).

Negotiations with politicians in the Rutgers and UMDNJ locations were essential to getting the legislation passed, but there were fewer concerns in Middlesex County relative to Newark because Rutgers-New Brunswick was the state's flagship research university. Middlesex County was perceived to have the upper hand with the integration, but it still wanted to maintain that authority. The schools that were physically based in Middlesex County had to remain in Middlesex County. This included "the Robert Wood Johnson Medical School, the Ernest Mario School of Pharmacy, the Institute of Health, Health Policy, and Aging Research, and University Behavioral Healthcare" (New Jersey Health Sciences Restructuring Act, 2012, p. 7). It is notable that Rutgers College of Nursing, which was mainly based in Newark but also had a presence on the New Brunswick/Piscataway campus, was not mentioned in the legislation. According to eight different individuals interviewed from the State, UMDNJ, and Rutgers, this was intentionally left out of the legislation in an effort to later merge UMDNJ's School of Nursing with Rutgers' College of Nursing. However, the legislation did make it difficult for other possible mergers with the biomedical and health sciences in the future, particularly between the two medical schools.

University Hospital became an independent standalone medical center owned by the State of New Jersey and governed by its own Board of Directors. The Board of Directors included 11 members, four of whom would be ex officio members from Rutgers leadership. These four members included the Dean of NJMS, the Dean of NJDS, the Chancellor of the "School of Biomedical and Health Sciences," and the University President of Rutgers. Ten individuals

interviewed stated that Rutgers did not acquire University Hospital because it would have been too financially burdensome for Rutgers to maintain. Therefore, the State assumed control over it, but a relationship would continue to exist among UH and the former UMDNJ units, especially in the areas of clinical and patient care. According to the legislation, UH had to remain the principal teaching hospital for NJMS and NJDS.

The Cancer Institute of New Jersey was the only UMDNJ entity included in the integration that reported separately and directly to the Rutgers University President. Prior to the integration, CINJ was within RWJMS, but the legislation had established that CINJ be “distinct and separate from any individual school” (New Jersey Health Sciences Restructuring Act, 2012, p. 7). Therefore, the director of CINJ reports directly to the Rutgers University President (Gower & Moler, 2014; Rutgers Office of the President, 2016) which is unlike any other unit at Rutgers. According to a few individuals (n=4) who were familiar with CINJ, individuals at CINJ had wanted autonomy from RWJMS. Individuals at CINJ felt this autonomy would allow for greater recognition which would enhance the prestige of CINJ's work. However, the rationale as to why CINJ wanted to be independent of RBHS is a bit hazier. According to one Rutgers-New Brunswick individual interviewed, “CINJ wanted to further separate themselves from the toxicity at UMDNJ and feared that this toxicity would still transpire after the integration.” Another two individuals from Rutgers-New Brunswick stated that CINJ had strong political ties that influenced the legislation. An individual from UMDNJ in New Brunswick stated that “CINJ wanted to be more competitive in

the State of Jersey and being associated with the medical school made it difficult so this extra step ensured that CINJ was completely independent from any other school at Rutgers. The politicians in the State were also on board with this plan because they saw value in New Jersey having its own renowned cancer research institute.” Thus, CINJ fought for and won independence from the new unit which would later be RBHS and report separately to the Rutgers University President.

The legislation also created a Chancellor of New Brunswick. According to interviews with Rutgers individuals from all campuses, this was done in an effort to further separate Rutgers central administration from Rutgers-New Brunswick. Traditionally, the Executive Vice President for Academic Affairs who oversees all of Rutgers was also the Chancellor of New Brunswick. This was the case prior to the integration with Richard Edwards holding both titles. Additionally, the Rutgers University President typically has far more contact with this individual when compared to administrators at Newark and Camden. This is because the individual’s job covers both central administration, and the flagship campus, New Brunswick. The argument from Newark and Camden was that the lack of separation was a conflict of interest that hurt their respective campuses, and the policymakers had agreed. Given that the centrality of Rutgers power was already within the New Brunswick campus, tensions among the campuses and the UMDNJ units were exacerbated as a result of the integration. Essentially, the thought was that even though there would be a fourth Chancellor, the medical units in New Brunswick/Piscataway would bring more partnerships and prestige to the Rutgers’ flagship campus. The creation of a separate Chancellor for New

Brunswick was intended to minimize the focus on New Brunswick, and provide the other areas within Rutgers more attention.

There were a number of changes to the governing boards in the legislation. The Board of Governors was expanded from 11 to 15 members, with the Governor directly appointing eight (formerly six) members (New Jersey Medical and Health Sciences Restructuring Act, 2012). This addition was to include members familiar with running the newly acquired biomedical and health sciences units while still giving the Governor half plus one of the Board of Governors appointments. The legislation did not make any major changes to the Board of Trustees, but according to all individuals interviewed from the State there were several political figures in the State, including Senate President Stephen Sweeney who wanted to eliminate the Board of Trustees, and to transfer all powers to the Board of Governors. Additional governing boards were established at each of the campuses in an attempt to provide support specific to the needs of each campus. The discussions prior to the integration created some divisions between the campuses, particularly with Camden, which was nearly removed from Rutgers in early efforts to merge certain New Brunswick based UMDNJ units into Rutgers-New Brunswick. Therefore, campus-specific support was important so that their priorities and needs were met. New Brunswick and Newark would both form advisory boards, which would advise their respective Chancellor's Office (New Jersey Medical and Health Sciences Restructuring Act, 2012). Rutgers-Camden would form a Board of Directors to establish and monitor its initiatives, and a Rowan University/Rutgers-Camden Board of

Governors to develop programs and establish partnerships between Rutgers-Camden and Rowan (New Jersey Medical and Health Sciences Restructuring Act, 2012).

Finally, the legislation stated specific goals that the integration by design intended to accomplish (New Jersey Medical and Health Sciences Restructuring Act, 2012). These goals included: enhancing the reputation of Rutgers nationally and internationally; enhancing educational opportunities for the residents of the State; strengthening recruitment of top faculty and students; retaining the brightest high school students (reduce “brain drain”); increasing federal (and private) research funds; creating a climate that fosters highly productive and innovative multidisciplinary projects; strengthening partnerships between higher education and healthcare industry in New Jersey; and increasing opportunities to promote and facilitate economic growth in the State of New Jersey, including attracting businesses to the state and creating jobs to keep New Jersey workers in the state. The design of the integration was intended to accomplish these goals, and measuring them as outcomes is important to determine the integration’s success. These goals will be further analyzed in the following two chapters.

Implementation Assessment

Proposed Program. The reasons and design provide a roadmap for how the integration should have been executed. The integration was envisioned as a plan to improve the quality of higher education in the State of New Jersey, particularly in the biomedical and health sciences fields. However, there were

clearly different perspectives on how that would best be accomplished.

Stakeholders from different areas within Rutgers, the State, and UMDNJ were the most influential in the design. Rutgers and policymakers in the State of New Jersey had the most influence when it came to the design, but UMDNJ had some input as well. University of Medicine and Dentistry's input was most notable with the legislation regarding CINJ, and aspects regarding the new Chancellor of the School of Biomedical and Health Sciences.

The design had several critical aspects that will be further evaluated regarding its implementation. These aspects are the implementation of the School of Biomedical and Health Sciences, the Cancer Institute of New Jersey (CINJ), subsequent school mergers made after the integration, RBHS's relationship with University Hospital, and reconfigurations of Rutgers' campus leadership. Interview transcripts with stakeholders and policy documents, which include task force reports, strategic plans, and newspaper articles, will be used to determine whether each aspect was implemented with fidelity to the design. An evaluation will also be conducted to assess the holistic nature of the implementation.

School of Biomedical and Health Sciences. The most prominent piece of the integration's design was the establishment of a new unit that would incorporate some of the Rutgers units and all of the UMDNJ units with the exception of SOM, CINJ, and UH. According to the legislation, these units would fall under the 'School of Biomedical and Health Sciences' (New Jersey Medical and Health Sciences Restructuring Act, 2012). The 'School of Biomedical and

Health Sciences' was later officially named the Rutgers (School of) Biomedical and Health Sciences, which is commonly referred to by its acronym - RBHS. Rutgers Biomedical and Health Sciences was officially established on July 1, 2013, which was Day 1 of the integration, and incorporated all of the units proposed in the legislation. Additionally, two Rutgers-UMDNJ joint units, the Center for Advanced Biotechnology and Medicine (CABM) and Environmental and Occupational Health Sciences Institute (EOHSI), which were not specifically mentioned in the legislation, were moved to RBHS.

A national search was conducted for the new chancellor to run RBHS, and someone external to Rutgers/UMDNJ was chosen. Brian Strom, an MD who served as the executive Vice Dean for Institutional Affairs at the University of Pennsylvania's Perelman School of Medicine officially became the head of RBHS on December 2, 2013 (Miranda, 2013). According to interviews with 12 individuals who worked closely with Dr. Strom (three from UMDNJ in Newark, one from UMDNJ in New Brunswick, seven from Rutgers- New Brunswick, and one from Rutgers-Newark), he splits his time between New Brunswick and Newark pretty evenly and has an office on each campus. The legislation regarding the office in Newark was intended to ensure that the Newark UMDNJ units were not forgotten. There was also tension between Rutgers-Newark and Rutgers-New Brunswick as it was believed that Rutgers central administration would not give the Rutgers Newark units adequate attention. Therefore, individuals who worked closely with Dr. Strom were asked if his spending time on both the New Brunswick and Newark campuses was perceived as problematic.

All individuals reported that they felt he spent an adequate amount of time on the Newark campus. Additionally, the individual from UMDNJ on the New Brunswick campus felt that the split time was greatly beneficial to the UMDNJ units in New Brunswick which were previously ignored by UMDNJ's central administration located in Newark.

The legislation also required that RBHS have a separate line item in Rutgers' annual appropriations budget since the integration. This is similar to how Camden, Newark, and New Brunswick are financially supported in the legislation. These units up until then were financed by decisions made by officials on the New Brunswick campus. The budget structure gave RBHS its own distinction and was immediately implemented in accordance with the language in the legislation. Rutgers Biomedical and Health Sciences' separate budget line currently still exists. According to the most recently approved budget by the Rutgers Board of Governors in the 2015-2016 fiscal year, RBHS does have its own separate budget just like the Camden, Newark, and New Brunswick campuses (Rutgers Office of Budget and Resource Studies, 2016). There doesn't appear to be any signs that this budget structure will be changed in future years.

Overall, the School of Biomedical and Health Sciences was implemented with fidelity to the design with a few minor exceptions. The joint units were not included in the legislation, but the inclusion of these centers into RBHS is appropriate given that the integration included biomedical and health science units from both Rutgers and UMDNJ. The Chancellor of RBHS spending equal

time in New Brunswick and Newark may not have been initially intended based on the language in the legislation, but the split time has reportedly enhanced the original design.

Cancer Institute of New Jersey. Another key piece of the legislation was the autonomy of the Cancer Institute of New Jersey (CINJ). The Cancer Institute of New Jersey was initially part of RWJMS and there was a sense that the center was not getting the attention it needed while embedded within the medical school. This lack of attention made it difficult for the Institute to compete with other cancer centers in the area such as Memorial Sloane Kettering in New York City, which also has some New Jersey satellite campuses, the Tisch Cancer Institute at Mount Sinai in New York City, and the Abramson Cancer Center at the University of Pennsylvania in Philadelphia. Therefore, individuals associated with CINJ, including faculty from RWJMS, pushed for CINJ's autonomy. The legislation not only called for CINJ's autonomy from RWJMS but also for it to be independent of RBHS.

The current structure of CINJ is a bit complicated. The Cancer Institute of New Jersey certainly has autonomy from RWJMS, which has allowed CINJ to get more recognition than it had in previous years, according to an individual from the New Brunswick/Piscataway campus at UMDNJ who works closely with CINJ leadership. The director of CINJ does officially report directly to the Rutgers University President, Robert Barchi (Rutgers Office of the President, 2016). However, according to four individuals interviewed (two from Rutgers-New Brunswick, one from UMDNJ-Newark, and one from UMDNJ-New

Brunswick/Piscataway) the day-to-day operations have been delegated by the Rutgers University President to Dr. Brian Strom, the Chancellor of RBHS.

There were some mixed opinions about whether this setup was implemented with fidelity to the design. The language in the legislation specifically states “Upon the transfer of the schools, institutes, and centers of the University of Medicine and Dentistry of New Jersey to Rutgers, The State University, the Cancer Institute of New Jersey shall become an independent institute at Rutgers, The State University and shall be distinct and separate from any individual school” (New Jersey Health Sciences Restructuring Act, 2012, p. 7). This language has been interpreted to mean that CINJ should be treated as an individual unit but the legislation does not state that the Rutgers University President must run CINJ nor does it explicitly state the Chancellor of RBHS cannot run the daily operations. Three of the four individuals who were associated with CINJ believed that the current setup was beneficial for the Institute. This kept the Rutgers University President involved, but the Chancellor of RBHS is much more involved with the hospitals, which are largely staffed by Rutgers faculty and staff. Robert Wood Johnson Hospital in New Brunswick, which is owned by Barnabas Health, is separate from Rutgers University. However, there are official agreements made between Rutgers and Barnabas regarding staffing, use of facilities, billing, educational opportunities, and other uses for biomedical and health science research and practice. These agreements are primarily conducted with the Chancellor of RBHS and are essential for how CINJ can conduct research. Therefore, three individuals

associated with CINJ felt that the Chancellor of RBHS overseeing the daily operations of the Institute was beneficial since he is more familiar with the arrangements necessary to make CINJ's research successful. Another individual felt that while this agreement may be beneficial, the law should be updated so that CINJ reports directly to the Chancellor of RBHS rather than the Rutgers University President as the current arrangement could be perceived as deceptive.

Internal Mergers. The language of the legislation made internal mergers difficult. The legislation required that schools on each campus remain physically on that campus which would inhibit the merger of duplicative programs within the university. For instance, RWJMS in New Brunswick/Piscataway and NJMS in Newark are both medical schools that run completely independent of each another. Very little collaboration goes on between these two schools despite being part of the same university for decades. A merger between these two schools would have the potential for more collaborative research projects, increased research grants, and an enhanced reputation of medical research and education at Rutgers. However, given the specific language within the legislation, this merger would be incredibly difficult.

There are a few schools at Rutgers that have a substantial presence at two or more campuses but have one central administration that oversees the entire school. The two notable examples are the Rutgers Law School, which is located on the Newark and Camden campuses, and the Rutgers Business School, which is on the Newark and New Brunswick campuses, with the school's

administration based mainly at Newark. Rutgers Law School was formerly Rutgers Law School-Newark and Rutgers Law School-Camden. The two schools merged on July 31, 2015 to form Rutgers Law School (Donovan & Steinbaum, 2015). These schools have greater opportunities for collaboration and also reduce redundancies of two separate schools within the same university.

The Rutgers-UMDNJ integration did allow for one internal merger. The School of Nursing (SON), which was part of UMDNJ in Newark and the College of Nursing (CON), which was part of Rutgers in Newark, but had programs in New Brunswick, was the only case in which the legislation would permit a merger. Therefore, on July 1, 2014, one year after the Rutgers-UMDNJ integration, SON and CON merged with SON retaining the new school's name. According to interviews with seven individuals familiar with SON (two were from Rutgers-New Brunswick, two were from Rutgers-Newark, and three were from UMDNJ-Newark), the merger made a lot of sense, given the programs and mission were very similar to one another. However, the merger between the nursing schools was not necessarily the smoothest. According to one individual from UMDNJ-Newark, "The merger was the right thing to do, but it was not done the right way. Because the university's databases and systems were not communicating properly, it made doing the simplest tasks very complicated." This comment was met with agreement by the others familiar with the merger. On the whole, the idea of merging two similar schools made sense in terms of enhancing the programs offered and reducing redundancies, but there were several issues. The two schools were on completely different computer systems so many tasks

had to be split between the schools despite the fact that the two schools had merged. According to the interviews that were conducted between July and October of 2016 with individuals familiar with the integration, many of these processes are still divided but there are plans to make investments in the future that will streamline the data systems.

Internal mergers after the Rutgers-UMDNJ integration may be difficult to implement due to the limitations of the legislation. However, this may not be a bad thing given the issues that the School of Nursing has faced with its own internal merger. Internal mergers in the long run may help reduce redundancies and create greater efficiencies, but it is not expected to yield immediate results. This delay may only be intensified given that it is a merger embedded within a larger merger. However, once the benefits of this internal merger begin to be realized, other internal mergers should be explored.

The School of Nursing is the sole internal merger as a result of the Rutgers-UMDNJ integration. It was implemented within the language of the legislation, which indicates fidelity to the design. However, there were a few administrative hiccups that made this internal merger a bit bumpy. Several interviewees (six individuals from Rutgers-New Brunswick, three individuals from UMDNJ-Newark, and two individuals from UMDNJ-New Brunswick/Piscataway) revealed that the integration's design lacked an outline for how to handle different data systems prior to the UMDNJ integration. Interviews with all individuals familiar with SON felt that the lack of planning negatively affected the merger between the nursing schools, and that a detailed plan would have led to a

smoother merger. Therefore, even though the merger technically was implemented with fidelity to the design, the design itself was flawed.

University Hospital. University Hospital (UH) was a key piece in the negotiations with policymakers in the State, particularly those from Essex County, New Jersey. University Hospital served the interests of Essex County politicians in a variety of ways, but most important was that the hospital provided healthcare to financially distressed individuals in the Newark community. This mission was a very expensive endeavor for UMDNJ, and the finances required for Rutgers to acquire the hospital were too burdensome for the university. However, it was still essential that the hospital be properly staffed by UMDNJ personnel. Therefore, the legislation's language was rather specific in the relationship that UH would have with the UMDNJ units after the integration had been implemented. The State would assume control over UH but UH had to remain the principal teaching hospital for NJMS and NJDS. This language was the result of negotiations made among individuals from Rutgers, UMDNJ, and policymakers in Essex County.

UH was taken over by the State on July 1, 2013 and did remain the principal teaching hospital for NJMS and NJDS after the integration. New Jersey Medical School and NJDS had fortified an agreement that was similar to what RWJMS had with RWJ Hospital in New Brunswick. Both of these agreements were overseen by Dr. Brian Strom. It is also important to note that Barnabas Health currently owns RWJ Hospital as of March 2016 and also is a management consultant for UH in Newark (University Hospital of New Jersey, 2013).

Therefore, the relationships between the university and the hospital in Newark are managed by individuals familiar with similar agreements in New Brunswick.

Currently, agreements are in place in which UH is the principal teaching hospital for NJMS and NJDS. These UMDNJ units also have relationships with other hospitals such as Hackensack University Medical Center, and the Department of Veterans Affairs NJ Health Care System, but UH is specifically referred to as the principal teaching hospital for these schools (Rutgers New Jersey Medical School, 2016). Individuals familiar with UH (all UMDNJ individuals, four individuals from Rutgers-New Brunswick, two individuals from Rutgers-Newark, two policymakers, and one private citizen) felt that the UH was certainly the principal teaching hospital for the UMDNJ units. Most individuals (all UMDNJ individuals, three individuals from Rutgers-New Brunswick, two individuals from Rutgers-Newark, one policymaker from the State, and one private citizen) felt that the partnerships with other hospitals were beneficial for the university, and did not threaten the relationship with UH. The one dissenting policymaker from North Jersey feared that top physicians may go to “more prestigious hospitals like Hackensack University Medical Center” and that UH would be losing its best physicians to competition. The same individual acknowledged that there was no evidence of this occurring yet, but feared it may happen in the future. Therefore, UH appears to have been implemented with fidelity to the design. However, agreements with other teaching hospitals should be examined further in the future.

Reconfigurations of Rutgers Campus Leadership. An interesting concept that came out of the legislation was the changes among the campuses within Rutgers. This was clearly beyond the RBHS piece, as it largely incorporated Camden, Newark, and New Brunswick. All individuals interviewed from Rutgers reported there was a tense relationship among the campuses particularly between New Brunswick and Newark for many years. However, the relationship between New Brunswick and Camden was further strained as a result of the Rowan and Rutgers-Camden merger discussions. This hostility led to more active voices in the design that pushed for campus-specific support. The legislation created advisory boards for New Brunswick and Newark that would advise their respective Chancellor's Office. The legislation also created a Board of Directors for Camden, and Rowan University/Rutgers-Camden Board of Governors to develop programs in the medical and health science fields, and establish partnerships between Rowan and Rutgers-Camden. These boards were all implemented shortly after the official integration. Currently, these boards continue to fulfill their duties, which enables the campuses to have greater autonomy.

The creation of RBHS also created some changes to the Board of Governors which oversaw all of Rutgers University. The additional board members were intended to include additional personnel to manage the increased scope and scale of the institution after the Rutgers-UMDNJ integration. The change occurred immediately after the integration.

Additionally, the Office of the Chancellor of New Brunswick was created in an effort to separate the Chancellor's roles in New Brunswick from the Executive Vice President of Academic Affairs who oversaw all academic areas within Rutgers University. Richard Edwards continued to hold the dual positions until July 1, 2015 when a replacement had been hired for the Executive Vice President of Academic Affairs position. The position was renamed to Senior Vice President of Academic Affairs and was occupied by Barbara Lee, a long-time Rutgers-New Brunswick faculty member (Rutgers Office of the Senior Vice President for Academic Affairs, 2016). The two positions are split, and the duties of the position are no longer embedded with the duties of the Chancellor of New Brunswick. Individuals at Rutgers-Newark (n=2) and Rutgers-Camden (n=1) felt that the change was beneficial for their respective campuses. A few individuals from Rutgers-New Brunswick (n=2) felt that the change was unnecessary and costly. However, the majority of individuals at Rutgers-New Brunswick (n=6) supported the change and a few were ambivalent (n=2). Those who supported the change felt it gave the Chancellor of New Brunswick the opportunity to focus on the largest campus within Rutgers, and the Senior Vice President for Academic Affairs the ability to focus on academic affairs across the university.

These aspects were met with fidelity to the design. However, there are some mixed opinions about whether the changes for the campuses were beneficial to the university. Several individuals at Rutgers-New Brunswick (n=4) reported that the campus autonomy further separated the campuses. One individual stated that the new system "makes it difficult to justify that we are one

Rutgers University.” However, all individuals at Rutgers-Newark (n=2) and Rutgers-Camden (n=1), and several at Rutgers-New Brunswick (n=5) felt that the new system benefited the Newark and Camden campuses, which had felt ignored by the central administration in the past.

Overall Implementation. Overall, the Rutgers-UMDNJ integration was implemented with fidelity to the design. Rutgers Biomedical and Health Sciences was formed with the units specified in the legislation, and was treated as a distinct academic operation with its own separate chancellor and budget. Joint units were not included in the legislation’s language but given that two units were an institute and a center with the majority of faculty belonging to RBHS, it is not a significant deviation from the design. The Chancellor of RBHS spending equal time in New Brunswick may be interpreted as a deviation, but most individuals felt this was beneficial to all of the RBHS units. The Cancer Institute of New Jersey became its own independent unit and officially reported directly to the Rutgers University President. Daily operations are managed by the Chancellor of RBHS whose duties include negotiating agreements with the RWJ Hospital, and the RBHS, schools which contain the majority of the faculty that work in CINJ. The legislation has put parameters in place that allowed for internal mergers, but made it difficult to merge schools on different campuses. The nursing schools in Newark merged with respect to these parameters. The legislation also required that University Hospital be the principal teaching hospital for NJMS and NJDS, which did come to fruition. Finally, the reconfigurations of the leadership, which included the addition of campus boards, creating a separate Chancellor of New

Brunswick, and adding members to the Rutgers Board of Governors, were executed as specified in the legislation.

The original design of the Rutgers-UMDNJ integration closely fit the final design that was implemented. There were a few minor exceptions. The most notable of these was the location of the Chancellor of RBHS and who manages CINJ's daily operations. These deviations are relatively minor and were reported to be beneficial to the integration for the most part. Therefore, this demonstrates that keeping true to a program's design is important, but there is a level of elasticity needed to enhance the quality of a program. These two aspects of the Rutgers-UMDNJ integration exemplify that while the design was an effective guide that should be strictly adhered to, a few aspects required some flexibility to enhance the quality of the outcomes.

There were some other important aspects that came to light as a result of the implementation assessment. The design itself had some flaws. This was particularly seen with the merger of the nursing schools. Many individuals reported that the plan for the nursing school merger was ambiguous and should have been more detailed prior to the merger. One individual remarked "Looking back, we should have done more planning prior to the merger. We didn't at the time because we thought it made a lot of sense to merge the schools but overlooked a lot of the small details. Those small details didn't end up being so small." This reflects a greater issue with the design rather than the implementation. But, it sheds light on the importance of planning and is an example where proper planning may have improved the outcome.

The Rutgers-UMDNJ case is a good example of a well-implemented design. The design which mostly came from the 2012 New Jersey Health Sciences Restructuring Act was adhered to very closely. However, it wasn't that difficult to stay true to this design because it was legislatively mandated. A design that is a law can be beneficial because it needs to be strictly followed, and deviations between the initial design and final design are small. Breaching the law would have led to serious consequences for the university so the Rutgers and UMDNJ integration had to be implemented with fidelity to the design. The language in the legislation did allow for some areas to be flexible, but were inflexible in others. The future of additional internal mergers within RBHS has been criticized because of the strict language in the legislation regarding the locations of the schools. A design that needs to be too strictly adhered to may create burdens that can harm outcomes, such as merging other programs within RBHS to make it more efficient. Furthermore, unidentified plans for enhancing the quality of Rutgers may be halted due to the strict language in the legislation. Therefore, a balanced design that is implemented properly has the strongest likelihood to produce the best outcomes for a program. The Rutgers-UMDNJ case was balanced but it could have allowed for a little more flexibility, particularly for creating more efficient programs within RBHS in the future.

Theoretical Frameworks

Overview. All theoretical frameworks have the shared goal to be generalizable and replicable, but there are clear distinctions among the various frameworks. Theoretical frameworks are used to organize theories in a

prescriptive manner so they can be better understood and applied (Jenkins-Smith, Nohrstedt, Weible, & Sabatier, 2014; McLendon, 2003). Theoretical frameworks do not establish testable hypotheses but provide a structure for organizing policy formation (Jenkins-Smith et al., 2014). Therefore, it is important that frameworks be tested to determine whether a case can be described in such a manner. Rutgers-UMDNJ's integration requires one or more theoretical frameworks to better synthesize how the case was designed and implemented.

The previous chapter laid out each of the theoretical frameworks for policy formation. Each of these will be reviewed in this chapter to determine which, if any, of the frameworks are most appropriate. Frameworks themselves are meant to provide guidance and are not meant to be directly testable (Jenkins-Smith et al., 2014). The frameworks discussed in the previous chapter include multiple streams theory (MST), advocacy coalition framework theory (ACF), monopoly and empire-building theories, and resource dependence theory (RDT). It is important to note that none of these frameworks are mutually exclusive of one another. Therefore, it is very likely that more than one framework will be needed to meaningfully contextualize the Rutgers-UMDNJ integration.

Multiple Streams Theory. It has been argued that the policy processes of formation and implementation of higher education have been largely ignored by researchers (McClendon, 2003). However, given the generalizable nature of the agenda setting frameworks, researchers do not need to reinvent the wheel. Much of higher education policy can and does fall into many of agenda setting frameworks that have been applied to other areas of policy research. McLendon

(2003) specifically mentioned that multiple streams theory and advocacy coalition framework theory were both applicable to higher education policy research.

Kingdon's multiple streams theory (MST) is frequently applied to policy agenda setting and formation in public policy research. Multiple streams theory is used to explain how certain agendas get pushed and become policy while others may fail. The Rutgers-UMDNJ integration is an example where the agenda was successfully pushed and followed Kingdon's framework. The three streams in MST are problems, policies, and politics and can be used to explain how the Rutgers-UMDNJ integration was implemented.

The problem stream of MST identifies problems or issues that the government is qualified and able to influence. Problems in MST are issues that individuals, inside or outside the government, would like to remedy (Anderson, 2010; Kingdon, 1995). There were problems with health and biomedical higher education in the State, which players inside and outside of the government recognized and wanted to act. The silos between the State's major research university and the standalone health and biomedical sciences university were large and problematic. There was a perception that these deep silos negatively impacted higher education, and hindered economic growth in the State of New Jersey. This perception was what contributed to the problem stream of MST in this case.

The policy stream of MST consists of policies that are also known as solutions for problems. Policymakers, bureaucrats, representatives, lobbyists,

academics, and others develop proposals for policies which can contribute to solutions for problems (Anderson, 2010). Policies are often formed separately from the problem itself and typically wait for a problem with which the policy can be paired. The idea of merging Rutgers and UMDNJ was a policy formally discussed many years prior to the actual integration. However, the policy required the problem stream and politics stream to be coupled, as well as a policy window and a policy entrepreneur to push the agenda.

The politics stream of MST has to do with composition of the major policymakers in the government. Changes in the government, including election results, swings in the mood of the public, and changes in the head of the State and/or federal government contribute to the politics stream (Anderson, 2010). These governance changes provide opportunities for policymakers to get their politics (solutions) pushed. The politics stream in the Rutgers-UMDNJ integration had a lot to do with the election of Governor Chris Christie in 2009. The Governor had prosecuted UMDNJ as the U.S. Attorney, and wanted to leverage that experience to push the proposal of merging UMDNJ with Rutgers. Governor Christie wanted to advance this agenda to demonstrate his leadership during his first term, and to overhaul UMDNJ's administration which had been the center of controversy and corruption for nearly a decade. The major policy entrepreneur in this case was Governor Chris Christie who wanted to fundamentally change UMDNJ's structure. However, the leadership at Rutgers which included the Rutgers University President and the Board members also wanted to enhance their profile by absorbing a medical institution. Therefore, administrative leaders

at Rutgers were also policy entrepreneurs who wanted to see UMDNJ become part of Rutgers.

The three streams are largely independent of one another. An agenda becomes a policy when the three streams come together, and a policy window is opened. A policy window opens when an opportunity arises which allows policy entrepreneurs to push their agenda. University of Medicine and Dentistry was extremely weakened both in terms of reputation and finance after the deferred prosecution. The Great Recession of 2009 lowered allocations to universities and colleges in the State of New Jersey including UMDNJ, which was already suffering financially. Those events that hurt UMDNJ's ability to operate as a standalone medical university created a policy window for the policy entrepreneurs to push their agenda for integration.

Multiple streams theory is a solid framework that explains the agenda setting process and policy formation of the Rutgers-UMDNJ integration. The three streams, the policy window, and policy entrepreneurs in MST are clearly identifiable and applicable for this case. This type of framework also clearly describes how the integration came into existence, which is important for individuals less familiar with the case itself and enables researchers to draw from it for future work.

Advocacy Coalition Framework. Advocacy coalition framework theory (ACF) is also notable in the public policy research regarding agenda setting and formation. An advocacy coalition, as previously discussed, is a process where

policy change occurs over an extended period of time using many small changes, as opposed to a series of large jumps (Jenkins-Smith et al., 2014; John, 2003; McClendon, 2003; Olivas, 1984). Advocacy coalitions are composed of people from various public (e.g., government) and private organizations that share a set of common beliefs and engage in a significant amount of coordinated activity over time (Jenkins-Smith et al., 2014; McClendon, 2003). The link between the beliefs and their interactions allows them to create networks that push policy problems onto the agenda in the hopes of making policy changes.

According to ACF, policies form within a policy subsystem, which is a physical boundary where a political issue is discussed, and the players are contained (Jenkins-Smith et al., 2014). The boundary for Rutgers and UMDNJ falls within the State of New Jersey. The State involves many policymakers at all levels of governments, and stakeholders at Rutgers and UMDNJ, including academics, administrators, students, parents, board members, and other policy participants. The success of policy participants relies upon their ability to translate their policy beliefs into actual policy (Jenkins-Smith et al., 2014). Chances for success increase when policy participants are able to identify allies and form coalitions that share similar policy core beliefs (Jenkins-Smith et al., 2014). One major coalition was evident throughout the history that led to the Rutgers and UMDNJ integration. The coalition that wanted some type of M&A consisted of individuals from Rutgers, UMDNJ units in New Brunswick/Piscataway, and policymakers at the State level (e.g. Governors McGreevey and Christie). The effort started with the Vagelos Report which was

commissioned by Governor McGreevey in 2002 and completed 10 years later under Governor Chris Christie. Conflicts existed primarily with UMDNJ units in Newark as well as politicians in the City of Newark.

Advocacy coalition framework theory also offers different pathways to policy change. The pathway that is applicable for this case is through a major policy change that is attributable to an external event (Jenkins-Smith et al., 2014). Furthermore, ACF requires that coalitions mobilize to exploit the event (Jenkins-Smith et al., 2014). The external event in this case is UMDNJ's deferred prosecution, which severely weakened the university and was followed by the election of Governor Chris Christie, who knew intimate details about UMDNJ as the U.S. Attorney overseeing that case. The event provided an opportunity for the coalition made up of members from Rutgers and the State government to put forth a foreseeable plan that would give Rutgers the UMDNJ medical units. Negotiations had to be made but the idea of UMDNJ remaining independent was no longer viable in the environment of Christie's administration.

Advocacy coalition framework theory can also be used to demonstrate how agendas can become policy. It also enables accounting for the amount of time it takes to push a policy proposal and is best used to explain policies that are formed incrementally. The steps leading up to the Rutgers and UMDNJ's integration were incremental and began with the Vagelos report. The Rutgers-UMDNJ integration was also influenced by a weakened UMDNJ and the election of Governor Chris Christie, who had an agenda to fundamentally change UMDNJ. These two concepts, when put together, can be framed through ACF,

which can also be referenced in other research regarding M&As in higher education.

Monopoly and Empire-Building Theories. Monopoly theory and empire-building theory have both been used to understand M&As in the private sector. The frameworks provide guidance on why organizations are prone to merge. However, given that these frameworks have been applicable in other areas of industry, they should be examined to determine if they are applicable to M&As in higher education.

Monopoly theory views M&As as occurring to gain market power through wealth (Harman & Harman, 2008; Trautwein, 1990). However, given that Rutgers/UMDNJ is a nonprofit, it is difficult to argue that market power in terms of wealth could be gained from an M&A in higher education. Resources, on the other hand, are another argument and will be discussed more with resource dependence theory.

Empire-building theory claims that M&As are planned by managers who want to enhance their own personal utility and profits rather than the values of their stockholders (Trautwein, 1990). This framework is similar to monopoly theory regarding market power. The concept of personal profits in empire-building theory is much more difficult to identify in a nonprofit university. While the concept of enhancing personal utility may be applicable to nonprofits, personal profits do not. Since personal profits are key to empire-building theory, it is largely not applicable to nonprofits which include many private and public

universities like Rutgers and UMDNJ. However, only evaluating the motivation of personal utility is certainly relevant to higher education leaders and bureaucrats who seek to expand their university.

Monopoly and empire-building theories may not necessarily be applicable to M&As involving nonprofit universities like Rutgers and UMDNJ, but these theories can certainly be used to frame M&As with for-profit universities. These institutions operate very differently than nonprofits, and do have focus on gaining market power through earning larger profits. For-profit universities are still the minority in the higher education space, but have experienced rapid growth since the 1990s (Zumeta et al., 2012). While M&As in higher education do not appear to be trending among for-profit universities, we may see for-profit higher education M&As in the near future. At that time, monopoly and empire-building theories may be used to evaluate an M&A in higher education.

Resource Dependence Theory. Resource dependence theory (RDT) has been used to explain why institutions from both the private and public sector merge. Resource dependence theory is the study of how external resources affect the behavior of an organization, and suggests that organizations must secure resources from the marketplace that are critical for growth and survival (Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Pinherio et al., 2016).

Organizations form inter-organizational arrangements such as M&As to gain scarce and necessary resources (Boyd, 1990; Hillman et al., 2009; Pfeffer & Salancik, 1978). Competition among higher education institutions has grown globally, and more institutions worldwide are looking to M&As as a method to

enhance their profile without the time and money it would take to start new programs.

Rutgers stood to gain a greater competitive advantage and secure more resources from the marketplace with the inclusion of UMDNJ programs.

University of Medicine and Dentistry, for the most part, had programs that Rutgers did not offer including those offered by two medical schools and a dental school. These complementary programs added to the value and scope of Rutgers, which was one of the few public schools in the AAU and the Big 10 Academic Alliance, both of which consist of major flagship research universities that are well-regarded academically, without a medical school (Rutgers Strategic Plan, 2014). The lack of a medical program at Rutgers made it difficult to compete with peer institutions in the Big 10 and AAU because of the overall high value that medical programs have in the marketplace, and the extra funding that medical institutions receive. Furthermore, UMDNJ needed to improve its organization and revive its academic reputation after the deferred prosecution and a merger with Rutgers preserved most of their programs. Therefore, both institutions would potentially benefit from putting together their resources to become a more competitive institution after consolidation.

Organizations are also driven to merger as a result of cuts in funding such as decreased allocations from the State, upon which all public institutions are reliant on (Skodvin, 1999). Therefore, institutions need to insulate resources from the marketplace to protect their assets (Birnbaum, 1991). Medical and STEM programs can be a valuable revenue stream for a state university. Medical and

STEM research bring in large grant money from the government and private corporations, particularly if the corporation is physically close to the institution(s) (Department of Treasury & Department of Education, 2012). For example, Rutgers shares a New Jersey residence with big pharmaceutical companies like Johnson & Johnson, Bristol-Myers Squib, and Merck, and stands to benefit greatly from additional partnerships with these businesses. These partnerships were specifically referred to in the 2012 New Jersey Health Sciences Restructuring Act as being an important piece of the integration.

Resource dependence theory is certainly applicable to the Rutgers-UMDNJ integration, but it does not cover all aspects related to the merger. Resource dependence theory explains the external motivations for why Rutgers and UMDNJ were driven to merge. These reasons can also largely be applied to other M&A cases in higher education. However, this framework does appear to miss the political reasons which were critical to why Rutgers and UMDNJ integrated. Therefore, RDT is an appropriate but not comprehensive framework that can explain the Rutgers-UMDNJ integration.

Discussion. All theoretical frameworks have the shared goal to be generalizable and replicable, but there are clear distinctions among the various frameworks. Typically, what differentiates one framework from another is the importance of certain central social processes and how these processes link to social, political, and economic outcomes (John, 2003). Some frameworks may be more applicable than others for a particular case.

Advocacy coalition framework theory and MST are both agenda setting frameworks that have a long history of research. Both ACF and MST were found to be applicable in this study. The key difference between ACF and MST in this case is that ACF accounts more for time which is an important part of the story. There were previous efforts and discussions for a decade prior to the actual implementation. These efforts led to the creation of coalitions that had a common belief in mind, and they capitalized when the opportunity arose for merging the two universities. However, the opportunity itself is highlighted in MST as essential where it is just one of several methods for pushing an agenda in ACF. Neither MST nor ACF is perfect at detailing the integration but both provide a good summary of what happened.

Monopoly theory and empire-building theory were not the best frameworks to use in this case. Both frameworks focus on profits and financial wealth, which make them difficult to apply to nonprofit M&As. However, these theories could be applied to another study that assesses M&As with for-profit universities.

Finally, RDT is another suitable framework that can help explain and describe M&As in higher education and is applicable for this case. It does not sufficiently detail the whole story, particularly the political aspects of the integration. However, RDT is more accurate than the agenda setting frameworks in explaining the reasons that Rutgers and UMDNJ wanted to merge. The agenda setting frameworks evaluate actors' motivations more than the institution's motivations. Resource dependence theory has the ability to capture

an institution's motivations which is a vital aspect to a framework that can be applied to M&As in higher education.

The three frameworks - MST, ACF, and RDT - all appear to be useful frameworks that can be applied to the Rutgers-UMDNJ case. Each has its strengths and limitations, and none alone can detail the entire case. They are each individually sufficient in identifying key aspects to make these findings more generalizable in other related research studies. Multiple streams theory and ACF are powerful frameworks for explaining the political influences, timing, and opportunities for a case, which can be tied to other related work. Resource dependence theory can explain why institutions, both public and private, consider organizational changes like M&As. However, the frameworks tell an incomplete story of the case. Frameworks are intentionally broad, so they can be tied to other cases. Identifying the appropriate frameworks and how the case fits into the framework are important for the generalizability of the results which can be included in future research studies.

CHAPTER 5: EFFECTIVENESS ASSESSMENT

The ideal goal for an M&A in higher education is to increase both institutional effectiveness and efficiency simultaneously. Enhanced effectiveness can result in more robust and competitive programs and increased efficiency can condense duplicative programs and services, refine resource allocation, and reduce overall costs (Arrow et al., 1961; Eastman & Lang, 2001; Kenny, 2008; Skodvin, 1999). This chapter will focus solely on examining the effectiveness of an M&A in higher education. Very little research has systematically evaluated the effectiveness of an M&A in the university setting, but private corporations have used M&As for this purpose and have seen noticeable changes. Skodvin (1999) suggests that M&As can be evaluated for their effects on governance and/or management (administration) processes, economic impacts, and academic outcomes. According to Skodvin (1999), the direct impacts of M&As in higher education are typically more gradual when compared to M&As in the private sector.

Institutions of higher education in the United States and around the world have recently engaged in a serious dialogue regarding M&As as a means to enhance the institution's profile (Eastman & Lang, 2001; Goedegebuure & Meek, 1991; Harman & Harman, 2008; Pinheiro et al., 2016; Skodvin, 2014). However, the timing for achieving the presumed benefits of an M&A has not been well studied. The absence of such analysis demonstrates the need for conducting effectiveness assessments of M&As in higher education since more universities are considering this strategy to increase an institution's prominence. The implementation of this evaluative assessment will shed light on the effectiveness

of M&As as a strategy in raising institutional prominence. The majority of the existing literature on M&As is concentrated on private corporations, but since universities are quite different from private corporations, M&As in higher education require their own focus. It is important that universities set manageable goals and expectations prior to engaging in an M&A, especially with respect to the timing of effects. This research will provide both a framework for how to assess outcomes in a higher education M&A, and whether these outcomes can be seen at a specific time point. This study will assess the outcomes for selected metrics at three years post-integration depending on the availability of data. Often a three-year time period is long enough to observe outcomes of private M&As (Brueller et al., 2014), but may not be enough time to assess the outcomes in the sphere of higher education where outcomes are typically more gradual (Pinheiro et al., 2016; Skodvin, 1999). This is an important point to test as is documenting outcomes that may be felt immediately or at different time intervals.

Establishing a list of research questions to be assessed is an important first step in evaluating the outcomes of an M&A. The legislation of the Rutgers-UMDNJ integration outlined specific outcomes the M&A was intended to achieve. While it is known that the university has monitored these outcomes, a full empirical examination of the Rutgers-UMDNJ integration's results has not been conducted. Specific hypotheses will be formulated and tested in this chapter to determine whether the Rutgers-UMDNJ integration has achieved its intended outcomes.

Research Questions

This chapter will address the research question related to effectiveness.

Effectiveness can be measured by the observed outcomes and whether their “desired effects or consequences are being achieved” (Lee, Johnson, & Joyce, 2008, p. 141). Outcomes will be based on the specific goal outlined in the legislation, and this research makes an attempt to measure these outcomes empirically to determine whether the Rutgers-UMDNJ integration was effective.

First, the goals that were identified in the legislation need to be verified with individuals who were involved in the integration planning. This will confirm whether the correct set of goals are being evaluated. Second, the measurable outcomes for each goal will be identified. While there are several different ways the outcomes can be defined and measured, the outcome measures will be based on the data available. Then, outcomes will be measured to determine whether any were met. This would reveal which goals, if any, have been fully, partially, or not reached. Finally, why certain outcomes have been realized or not realized will be discussed.

Findings from Stakeholder Interviews

As mentioned in the previous chapter, 25 interviews were conducted with various stakeholders from Rutgers, UMDNJ, policymakers from the State, and one private citizen. Individuals were asked about each of the goals in the legislation and whether they were indeed the goals of the Rutgers-UMDNJ

integration. Goals outlined in the legislation that were met with agreement from at least half of the stakeholders were further assessed.

The goals were all deemed appropriate by most individuals interviewed, but some goals were met with stronger agreement than others. Table 5.1 outlines the goals outlined in the legislation, the number of individuals who agreed with the appropriateness of each goal along with their affiliation.

Table 5.1 Stakeholder Agreement to Goals								
Goal	Stakeholder Affiliation							Total Agreement
	Rutgers-New Brunswick	Rutgers-Newark	Rutgers-Camden	UMDNJ-New Brunswick	UMDNJ-Newark	State of New Jersey	Private Citizen	
Enhance the reputation of Rutgers nationally and internationally	10	0	1	3	4	4	1	23
Enhance educational opportunities for the residents of the State	8	0	0	0	0	3	1	12
Strengthen recruitment of top faculty and students	9	0	0	0	0	3	1	13
Retain the brightest high school students (reduce "brain drain")	8	0	0	0	0	3	1	12
Increase federal research funds	10	0	0	1	1	4	1	17
Create a climate that fosters highly productive and innovative multidisciplinary projects	9	0	0	1	4	3	1	18
Strengthen partnerships between higher education and healthcare industry in New Jersey	8	0	0	1	2	3	1	15
Increase opportunities to promote and facilitate economic growth in the State of New Jersey, including attracting businesses to the state and creating jobs to keep New Jersey workers in the state	8	0	0	1	3	3	1	16
Total Possible	10	2	1	3	4	4	1	25

The overwhelming majority of individuals (23 out of 25) agreed with the goal of 'enhancing the reputation of Rutgers nationally and internationally' as a primary driver for the Rutgers-UMDNJ integration from the perspective of Rutgers. However, a number of individuals indicated that while this provided a very broad framework for the integration, there were a number of other specific

reasons that contributed to the integration. The UMDNJ-Newark individuals agreed that Rutgers wanted to improve its reputation but felt that the primary driver of the integration was the state's interest in breaking down UMDNJ.

The goal regarding increased multidisciplinary research occurring between Rutgers and UMDNJ was met with the second highest agreement among the respondents (18 out of 25). Most individuals felt that the formal relationship between the universities would encourage greater collaboration among faculty and students. This goal is an efficiency measure of synergies that formed as a result of the integration, and will be evaluated in the next chapter.

The goal of increasing federal research funds was a close third (17 out of 25). This goal is closely aligned with why other M&As involving medical universities have occurred, which is because medical research brings in more federal research dollars. These federal research dollars increase revenue for the institution and enhance an institution's reputation among scholars (Ali et al., 2010; Liebert, 1977).

The two related goals involving the economy and workforce were both largely agreed to by stakeholders (16 and 15, respectively, out of 25), but because these goals require much more time to be realized, they will not be evaluated at this time. However, it is important for them to be assessed in the future since these goals are closely tied to the State's interest while the other six goals are more related to the university's interest.

Approximately half of the stakeholders interviewed agreed with the goals of enhancing educational opportunities for the residents of the State (12 out of 25), strengthening recruitment of top faculty and students (13 out of 25), and retaining the brightest high school students (12 out of 25). It is notable that none of the UMDNJ stakeholders identified these three goals as motivators for the integration. A few individuals from UMDNJ stated that these goals were too broadly defined. Additionally, many stakeholders who agreed with these goals felt that the initiation into the Big 10 Academic Alliance in 2014 and the establishment of the Rutgers-New Brunswick Honors College in 2015 were primarily motivated by these goals as well. The integration that occurred at the same time may have supplemented these other academic initiatives. Therefore, they felt that achievement of these goals may potentially be due to factors unrelated to the integration and that it would be difficult to separate from these other academic initiatives.

The interviews also revealed a handful of other potential goals. These included the motivation from Rutgers-New Brunswick to “take the medical school back” after it was taken from them many years ago (n=5)⁶. Another motivation that was identified was the personal desire of Governor Chris Christie to have a major successful accomplishment during his first term (n=10)⁷. Since Chris Christie had considerable familiarity with UMDNJ during his time as the U.S. Attorney for New Jersey, it put him in a unique position to finally ensure that

⁶ All from Rutgers-New Brunswick

⁷ Four from Rutgers-New Brunswick, two from UMDNJ-Newark, one from UMDNJ-New Brunswick, and three individuals from the State).

Rutgers and UMDNJ integrated after several other failed attempts. A few individuals (n=4)⁸ mentioned that economies of scale was a primary motivation to integrate, a goal which is consistent with most M&As (Brueller et al., 2014; Pinheiro et al., 2016). The first two of these three additional goals were discussed briefly in the previous chapter since they are difficult to measure quantitatively, and they will not be explored further in this chapter. The third additional goal will be addressed in the following chapter. The goals initially identified in the official documentation, including the legislation that finalized the integration will be evaluated in this chapter.

Assessment of the Goals

The goals of enhancing the reputation of Rutgers nationally and internationally, enhancing educational opportunities for the residents of the State, strengthening recruitment of top faculty and students, retaining the brightest high school students, increasing federal research funds, and creating a climate that fosters highly productive and innovative multidisciplinary projects were all confirmed to be appropriate by the stakeholders who were involved in the design and implementation of the Rutgers-UMDNJ integration. It has been estimated that it may take several years to fully realize the benefits of an M&A in higher education (Pinheiro et al., 2016; Skodvin, 1999). These goals will be assessed in the interim, three years after the integration has been implemented, but it is

⁸ Two from Rutgers-New Brunswick and two from UMDNJ-Newark

important to recognize that many of these goals may still require additional time to be reached.

The goal of strengthening top faculty may have quantifiable outcomes, but the data was limited at the time of this research. Therefore, follow-up analysis with quantitative data that may become available in the future is recommended. The goals of enhancing educational opportunities for the residents of the State, strengthening recruitment of top students, and retaining the brightest high school students overlapped quite a bit and therefore will be evaluated together.

Data for each goal was first examined descriptively with the intention of pursuing follow-up analysis if there was a shift after the integration. Based on results from the descriptive analyses, it was determined that “enhancing the reputation of Rutgers nationally and internationally”, and “increasing federal research funds” would be analyzed purely at a descriptive level. The collective analysis of “enhancing educational opportunities for the residents of the State”, “strengthening recruitment of top students”, and “retaining the brightest high school students” will be quantitatively analyzed with an interrupted time series (ITS) research design.

Research Question 1: Enhance the reputation of Rutgers nationally and internationally

The incorporation of the medical units of UMDNJ was intended to improve the reputation of Rutgers on a broad level. Enhancing the reputation of Rutgers was a clear goal of the Rutgers-UMDNJ integration, one that was met with

overwhelming agreement among the stakeholders involved in the integration. Therefore, data on the reputation of Rutgers and comparable universities internationally and nationally was used to answer this research question.

Hypotheses

The addition of UMDNJ's medical units to Rutgers was expected to enhance Rutgers' reputation nationally and internationally. In order to control for secular effects, trends will be evaluated three years prior to the integration and three years after the integration. Therefore, the following hypotheses will be tested:

H_{A1} : Rutgers' national reputation will increase over time following the Rutgers-UMDNJ Integration

H_{A2} : Rutgers' international reputation will increase over time following the Rutgers-UMDNJ Integration

While it is expected that Rutgers' reputation will trend upward after Rutgers and UMDNJ became a single entity, it is certainly possible that it may be too early to see these effects within the evaluative time period.

Data

A popular way to measure the reputation of a university and how it compares to other peer institutions is to evaluate tier rankings. Tier rankings such as U.S. News and World Report's (USNWR) are important indicators of reputation. However, these tier rankings are not without limitations. They have been considered controversial, and many researchers and academic administrators

have identified specific flaws with many of the tier rankings used with colleges and universities. Tier rankings have been criticized for (a) their ability to provide an incentive for universities to report inaccurate data (Carmody, 1987; Hunter, 1995; Meredith, 2004), (b) not fully distinguishing between different fields of study or research offered at the same university (Olcay & Bulu, 2016), and (c) metrics for ranking being arbitrary, since metrics on academic quality are difficult to quantify (McGuire, 1995; Meredith, 2004; Schmitz, 1993; Webster, 2001).

Despite the potential problems with tier ranking systems, several studies have indicated that they occupy a significant component of students' decision calculus when choosing a university (Monks & Ehrenberg, 1999; Webster, 2001; Luca & Smith, 2013). Recently, Luca & Smith (2013) found that a one rank improvement in USNWR led to a 1%-2% increase in applications for a university. Thus, colleges and universities strive to improve both their reputation and academic quality through these tier rankings to attract more students.

The most prominent tier ranking used by prospective students comes from U.S. News and World Report (USNWR) (Monks & Ehrenberg, 1999; Webster, 2001; Meredith, 2004; Luca & Smith, 2013). The "Best Colleges" issue outsells the other issues offered by U.S. News and has inspired other U.S. based and globally based magazines to create their own college ranking issues (Meredith, 2004; Luca & Smith, 2013). Rutgers-New Brunswick has consistently been ranked in the top 100 universities, and is usually somewhere toward the lower middle grouping of public AAU institutions.

The other prominent tier rankings include the United Kingdom's Times Higher Education World University Rankings (THE), the United Kingdom's Quacquarelli Symonds' World University Rankings (QS), and Shanghai Ranking Consultancy and Center for World-Class Universities of Shanghai Jiao Tong University's Academic Ranking of World Universities Shanghai Rankings (ARWU). These three ranking agencies evaluate universities on a global level where USNWR is focused on colleges and universities in the United States. It is notable that U.S. institutions make up the large majority of top ranked universities internationally, and Rutgers-New Brunswick appears to be ranked by each of these ranking agencies every year. Typically, Rutgers-New Brunswick is in the top 100 of universities according to ARWU and USNWR, the top 125 of universities according to THE, and the top 300 of universities according to QS. U.S. News and World Report did start a global tier ranking system in 2014, but it will not be evaluated in this study since they began after Rutgers and UMDNJ integrated.

Some of the rankings also include a reputation score in their model used for the entire tier ranking. Quacquarelli Symonds' World University Rankings, THE, and USNWR all include a reputation metric that is calculated in the overall tier ranking. The reputation metric for QS is worth 40% of the total QS score used to calculate the tier ranking and is the highest weighted metric of the overall score (QS World University Rankings, 2017). This is calculated using data from a survey collected from over 70,000 individuals in the higher education space, but no other details are provided regarding who these individuals are. Times

Higher Education uses two reputation metrics where one is based on teaching (15% of total THE score) and one is based on research (18% of the total THE score) (Times Higher Education, 2017). Both of the reputation metrics use survey data. The reputation survey receives approximately 10,000 responses, and examines the perceived prestige of teaching and research excellence at a university (Times Higher Education, 2017). No additional details are provided. Data for these metrics in QS and THE are also not widely available, and the details for the methodology are vague. Therefore, it is challenging to directly assess how an institution's reputation is affected within these two-tier rankings. USNWR, on the other hand, has fewer limitations on the availability and transparency of data.

Sample

Quacquarelli Symonds' World University Rankings and THE were used to test whether Rutgers' international reputation improved and USNWR was used to test whether Rutgers' national trend improved. Academic Ranking of World Universities Shanghai Rankings was excluded since there was no reputation component in the overall score.

Measures

The measures used here are the overall rankings for QS, THE, and USNWR, and the reputation metric for USNWR for three years pre-integration and three years post-integration. It is important to note that scores for each ranking are

released in the preceding year (e.g., USNWR 2017 rankings are released in 2016).

The reputation metric for USNWR after 2014 can be broken into two parts. Academic reputation currently comprises 22.5% of the total USNWR score used to calculate the tier ranking. The 22.5% of the academic reputation metric is further divided into two parts. The first component is an assessment by peers that has an overall weight of 15% (US News and World Report, 2017a). This is calculated using data from a survey administered to university presidents, provosts, and chief academic officers to rank other institutions on a scale of 0 to 5 where 0 is the lowest and 5 is the highest, and the average score for each institution is used in the final calculation (US News and World Report, 2017a). This survey has a low response rate, 40% overall (US News and World Report, 2017a), but no information is provided about who completes the survey, either overall or how many respondents rated an individual institution.

The second component is an assessment completed by High School counselors which has an overall weight of 7.5% (US News and World Report, 2017a). This is calculated using data from a survey administered to high school counselors across the United States. The survey has a 7% overall response rate (US News and World Report, 2017a) and, just like the survey administered to peers, no information is provided about who completes the survey, either overall or as to how many respondents rate an individual institution. The survey administered to high school counselors began in 2011 but the data was not publicly available until 2014, and will therefore be excluded from this analysis.

Only the assessment by peers will be included for purposes of evaluating changes over time in academic reputation.

While the other ranking agencies include metrics that are related to reputation, this level of data is not publically available from those other prominent ranking agencies. The data from USNWR is available at a much more granular level where this metric can be isolated from the full ranking score. This information was not available from QS or THE. Therefore, USNWR, both overall and with the isolated reputation metric, will be examined more closely than the other tier rankings.

The average peer assessment score for all public AAU institutions was also evaluated for three years prior to and three years after the integration. However, this score was not publicly available in the 2013, 2012, or 2011 publication years so 2010 and 2009 were used as substitutes for 2013 and 2012.

Analysis and Results

The overall rankings for QS, THE, and USNWR are included in Figures 5.1-5.3. The published year to which the ranking pertains to is included on the horizontal axis. The trends for Rutgers-New Brunswick appear to be stable or decline between the pre- and post-integration years which indicates that the inclusion of UMDNJ units had no effect on the global or national rankings. For both QS (Figure 5.1) and THE (Figure 5.2) rankings, there was a subtle increase followed by a precipitous decline. The decline in the global rankings is likely due to the

growing competition of non-U.S. universities, but the information here is very limited.

The information on reputation for each ranking agency is vague and thus difficult to replicate. It is also difficult to determine whether the shifts in the global rankings are related to reputation or another metric since much of the metric data is either unavailable or the details regarding data collection are unclear.

Therefore, the global rankings should be interpreted with extreme caution.

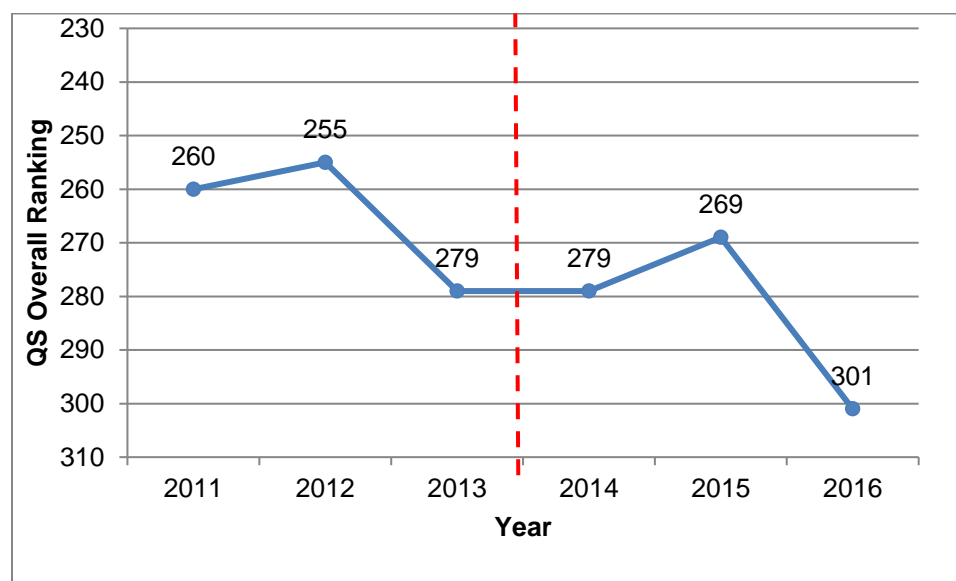


Figure 5.1 Rutgers- New Brunswick QS World University Ranking⁹

⁹ Years on horizontal axis are based on the year QS Rankings were released

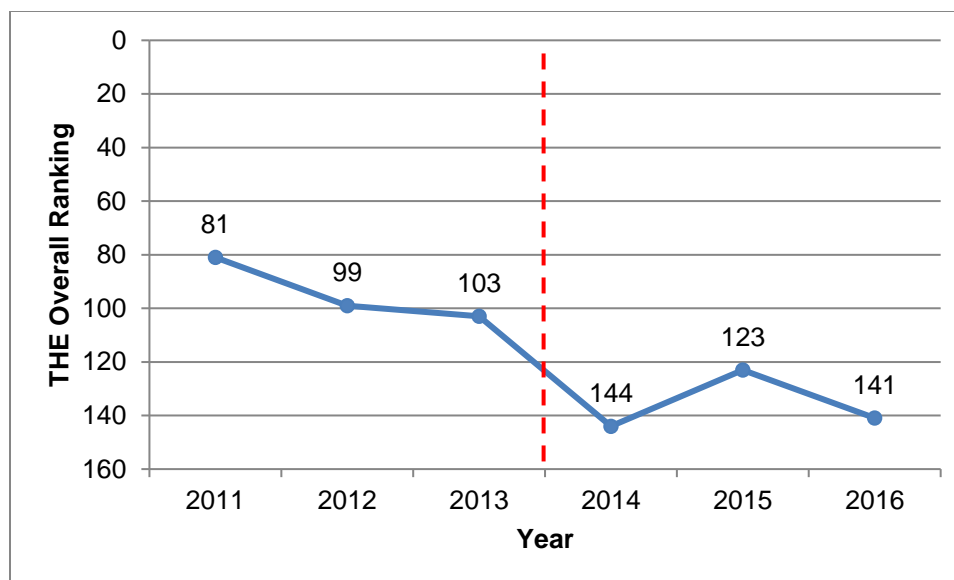


Figure 5.2 Rutgers- New Brunswick THE World University Ranking¹⁰

U.S. News and World Report has similar limitations but provides a slightly more transparent and comprehensive methodology compared to the global rankings. The overall ranking had a consistent downward trend for two years post-integration (Figure 5.3) and increased in the third-year post-integration. However, this pattern may be related to one or more of the other components of the USNWR overall ranking so the average peer assessment score was separately evaluated.

¹⁰ Years on horizontal axis are based on the year THE Rankings were released

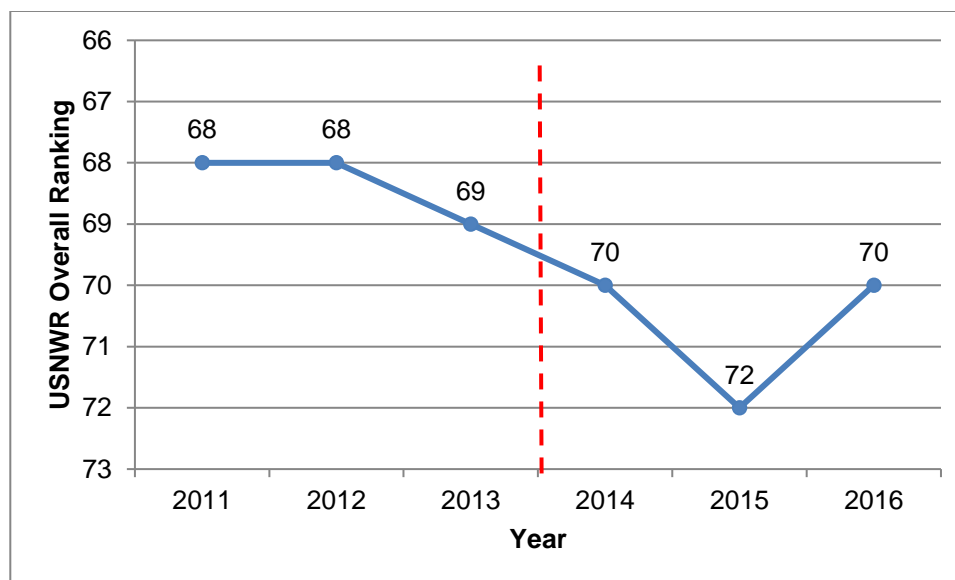


Figure 5.3 Rutgers- New Brunswick USNWR Ranking¹¹

The trends over time for the average peer assessments scores for all public AAU institutions shown in Table 5.2 demonstrate that this metric does not change much from year to year across the institutions. Rutgers-New Brunswick did have a modest 0.1 increase between 2013 and 2014 which held constant for three years. This modest bump in the reputation score could be attributed to the integration but given how small it is, it is equally likely to have been produced by random noise.

¹¹ Years on horizontal axis are based on the year USNWR Rankings were released

Table 5.2 US News Peer Assessment Scores						
AAU Public Universities	2009	2010	2014	2015	2016	2017
Rutgers, The State University of New Jersey	3.3	3.3	3.3	3.4	3.4	3.4
Michigan State University	3.4	3.5	3.5	3.5	3.5	3.5
Ohio State University-Main Campus	3.6	3.6	3.8	3.7	3.7	3.8
University of Iowa	3.5	3.5	3.5	3.5	3.5	3.5
University of Michigan-Ann Arbor	4.4	4.4	4.5	4.4	4.4	4.4
University of Minnesota-Twin Cities	3.6	3.6	3.7	3.6	3.7	3.7
University of Wisconsin-Madison	4.1	4.1	4.1	4.1	4.1	4.0
Indiana University-Bloomington	3.7	3.6	3.6	3.6	3.6	3.6
Pennsylvania State University - University Park	3.7	3.8	3.6	3.6	3.6	3.7
Purdue University-Main Campus	3.7	3.7	3.6	3.6	3.6	3.7
University of Illinois at Urbana-Champaign	4.0	4.0	3.9	3.9	3.9	3.9
University of Maryland-College Park	3.6	3.6	3.6	3.6	3.6	3.6
University of Nebraska-Lincoln ¹² <i>Public, not AAU</i>	3.1	3.1	3.1	3.1	3.2	3.2
Georgia Institute of Technology	4.0	4.0	4.1	4.2	4.1	4.1
Stony Brook University	3.2	3.2	3.2	3.2	3.2	3.2
University at Buffalo	2.9	2.9	3.0	3.0	3.0	3.0
University of Arizona	3.5	3.5	3.5	3.5	3.5	3.5
University of California-Davis	3.8	3.8	3.8	3.8	3.8	3.8
University of California-Irvine	3.5	3.6	3.6	3.6	3.6	3.6
University of California-Los Angeles	4.2	4.2	4.2	4.2	4.2	4.2
University of California-San Diego	3.8	3.8	3.8	3.8	3.8	3.8
University of Missouri-Columbia	3.2	3.2	3.3	3.3	3.2	3.2
University of North Carolina at Chapel Hill	4.1	4.1	4.1	4.1	4.0	4.0
University of Pittsburgh-Pittsburgh Campus	3.4	3.4	3.4	3.4	3.4	3.5
University of Virginia-Main Campus	4.3	4.3	4.3	4.3	4.2	4.2
Iowa State University	3.1	3.2	3.2	3.2	3.2	3.3
Texas A & M University-College Station	3.5	3.5	3.6	3.6	3.6	3.6
The University of Texas at Austin	4.0	3.9	4.0	4.0	4.0	4.0
University of California-Berkeley	4.7	4.7	4.7	4.7	4.7	4.7
University of California-Santa Barbara	3.5	3.5	3.5	3.5	3.5	3.5
University of Colorado Boulder	3.4	3.5	3.6	3.5	3.5	3.5
University of Kansas	3.3	3.3	3.3	3.3	3.3	3.3
University of Oregon	3.3	3.2	3.3	3.3	3.3	3.3
University of Washington	3.9	3.8	3.8	3.8	3.8	3.9

Source: US News and World Report

The results from QS and THE demonstrate that the reputation of Rutgers did not improve on an international level after the integration was implemented. The results from USNWR's reputation metric showed that national reputation neither improved nor declined. However, the data is extremely limited. For all of these rankings, very little information is available on who completes the surveys, and why individuals give the scores they do.

¹² University of Nebraska-Lincoln was included as a peer as it belongs to the Big 10 Academic Alliance and was formally part of the AAU until 2011

The use of tier ranking systems is an imperfect method used to analyze reputation nationally and internationally. Despite their limitations, they are still extremely popular and are currently the best way to assess a university's reputation, both nationally and internationally. The surveys sent to leaders need better response rates to ensure reliability in the scores from year to year. Further, more detailed information would be needed to determine whether specific changes to an institution, like an M&A, have influenced a survey respondent's opinion of a university. Alternatively, a separate national or international study that specifically asks university stakeholders including administrators, faculty, staff, and/or students specific questions related to reputation would better capture this specific goal.

Research Question 2: Increase federal research funds

Federal research funds are used to help fund research conducted at the university, both in terms of direct and indirect costs. It is important that universities have federal research funds to help develop and disseminate new knowledge. These funds are highly competitive to obtain (Ali et al., 2010), and therefore have a certain amount of prestige associated with them. Medical research, in particular, is highly respected and typically receives a substantial amount of federal research dollars.

Hypothesis

The addition of UMDNJ to Rutgers as well as the expected collaboration of Rutgers and UMDNJ faculty was expected to increase Rutgers' federal research funds. Therefore, the following hypothesis was tested:

H_{A1} : R&D expenditures will increase for Rutgers relative to comparable universities after the Rutgers-UMDNJ Integration

It is certain that R&D expenditures would increase as a matter of addition when UMDNJ integrated with Rutgers. However, it is unlikely that an increase in new resources will be seen so shortly after the integration was implemented. This type of growth typically requires more time (Pinheiro et al., 2016; Skodvin, 1999).

Data

Universities typically report federal research and development (R&D) expenditures to represent the federal funding that institutions use towards research (Britt, 2016). This data is available through the Higher Education Research and Development (HERD) survey conducted by the National Center for Science and Engineering Statistics (NCSES) under the auspices of the National Science Foundation (NSF). The HERD survey collects R&D expenditures from all institutions that receive federal research dollars, and enables comparative analysis.

The overall amount of R&D expenditures in higher education has declined in both current and constant dollars for several years (Britt, 2016). Much of this is

related to declines in federal funding. Only three major agencies, the Department of Defense, the National Aeronautics and Space Administration, and the Department of Agriculture appear to either have increased their federal R&D expenditures or kept steady in recent years when virtually all other agencies have experienced declines (Britt, 2016). Medical sciences comprised about a third of all higher education R&D expenditures in fiscal years 2015 and 2014 (Britt, 2016). These trends demonstrate that the goal of increasing federal research funds as a result of the integration had merit. The inclusion of medical research, alone, would enhance Rutgers' profile as a more competitive research university. Multidisciplinary research in the STEM fields between Rutgers and UMDNJ may develop over time, which could result in garnering more federal research dollars.

Sample

Data from the HERD survey was used to assess the hypothesis with R&D expenditures. HERD collects data from universities approximately one year after the fiscal year, therefore data was only available through 2015 at the time of analysis. Thus, the information presented only includes years 2011-2015, which is three years of data pre-integration and two years of data post-integration.

Public AAUs, including those with and without medical schools, were included to assess how Rutgers compares with its peers pre- and post-integration. Table 5.3 includes a list of the public AAU and Big 10 Academic Alliance universities, and indicates which of these have a medical school.

Table 5.3 Public AAU and Big 10 Academic Alliance Universities		
Rutgers, The State University of New Jersey Michigan State University Ohio State University-Main Campus University of Iowa University of Michigan-Ann Arbor University of Minnesota-Twin Cities University of Wisconsin-Madison	Big 10 Academic Alliance	Medical School
Indiana University-Bloomington* Pennsylvania State University** Purdue University-Main Campus University of Illinois at Urbana-Champaign*** University of Maryland-College Park University of Nebraska-Lincoln <i>Public, not AAU</i> ¹³		
Georgia Institute of Technology Stony Brook University University at Buffalo University of Arizona University of California-Davis University of California-Irvine University of California-Los Angeles University of California-San Diego University of Missouri-Columbia University of North Carolina at Chapel Hill University of Pittsburgh-Pittsburgh Campus University of Virginia-Main Campus	Medical School	
Iowa State University Texas A & M University-College Station The University of Texas at Austin University of California-Berkeley University of California-Santa Barbara University of Colorado Boulder University of Kansas University of Oregon University of Washington		

*The reporting line for the Indiana University School of Medicine changed, and beginning in FY 2015, it is counted in Bloomington's R&D expenditures

**University Park does not have a medical school but at times University Park and Hershey are reported together (i.e. R&D expenditures)

*** On March 12, 2015, the Board of Trustees approved the creation of a medical school at the University of Illinois Urbana-Champaign. The school did not begin accepting medical students at the time of study.

Measures

An important limitation with federal R&D expenditures is that the pool of resources available varies from year to year. Therefore, an institution's share (or

¹³ University of Nebraska-Lincoln was included as a peer as it belongs to the Big 10 Academic Alliance and was formally part of the AAU until 2011

percent) of the total amount of available federal R&D expenditures was used to determine whether or not Rutgers experienced an increase in the percentage of available federal research funds over time.

Analysis and Results

The shares of R&D expenditures for Rutgers and its public AAU and Big 10 Academic Alliance peers are included in Table 5.4. The Big 10 Academic Alliance peers are also depicted visually in Figure 5.4. Rutgers, UMDNJ, and Rutgers combined with UMDNJ are included in both the accompanying table and figure. The shares of R&D expenditures increase for Rutgers as a result of the integration, but this is expected due to the addition of UMDNJ's resources. There is a small decline for Rutgers combined with UMDNJ between 2013 and 2014, and is mostly due to the exclusion of UMDNJ's School of Osteopathic Medicine which was not integrated with Rutgers. Rutgers' modest decline between 2014 and 2015 appears to follow the same pattern as many of Rutgers' peers. Indiana-Bloomington is the notable outlier¹⁴. These data indicate that the inclusion of UMDNJ did enhance Rutgers' profile among its peers in terms of federal R&D expenditures, but this increase does not appear to be due to newly acquired resources by Rutgers as a result of the integration.

¹⁴ This was because the reporting line for the Indiana University School of Medicine changed from the Chancellor of Indiana University-Purdue University to the President of Indiana University. As a result, Indiana-Bloomington started including Indiana University School of Medicine in their R&D expenditures in 2015.

Table 5.4 R&D Expenditures Shares (Dollars in Thousands)					
AAU Public Universities	2011	2012	2013	2014	2015
Total	\$65,274,305	\$65,872,295	\$67,144,309	\$67,351,035	\$68,807,857
<i>Rutgers, The State University of New Jersey</i>	0.662%	0.660%	0.735%	0.956%	0.914%
<i>University of Medicine and Dentistry of New Jersey</i>	0.359%	0.313%	0.319%	0.000%	0.000%
<i>Rutgers, The State University of New Jersey AND University of Medicine and Dentistry of New Jersey</i>	1.021%	0.974%	1.054%	0.956%	0.914%
Michigan State University	0.696%	0.770%	0.768%	0.782%	0.811%
Ohio State University-Main Campus	1.275%	1.164%	1.182%	1.210%	1.189%
University of Iowa	0.680%	0.678%	0.648%	0.667%	0.644%
University of Michigan-Ann Arbor	1.960%	2.008%	2.048%	2.003%	1.990%
University of Minnesota-Twin Cities	1.298%	1.254%	1.278%	1.302%	1.280%
University of Wisconsin-Madison	1.703%	1.776%	1.673%	1.646%	1.554%
Indiana University-Bloomington	0.282%	0.280%	0.295%	0.306%	0.705%
Pennsylvania State University (includes Hershey)	1.218%	1.211%	1.248%	1.189%	1.150%
Purdue University-Main Campus	0.886%	0.915%	0.887%	0.839%	0.812%
University of Illinois at Urbana-Champaign	0.836%	0.886%	1.107%	0.923%	0.930%
University of Maryland-College Park	0.759%	0.763%	0.733%	0.720%	0.735%
University of Nebraska-Lincoln <i>Public, not AAU</i> ¹⁵	0.360%	0.385%	0.397%	0.413%	0.413%
Georgia Institute of Technology	1.004%	1.046%	1.088%	1.077%	1.112%
Stony Brook University	0.324%	0.334%	0.336%	0.314%	0.321%
University at Buffalo	0.541%	0.547%	0.578%	0.574%	0.557%
University of Arizona	0.935%	0.949%	0.937%	0.873%	0.881%
University of California-Davis	1.084%	1.083%	1.081%	1.057%	1.048%
University of California-Irvine	0.528%	0.531%	0.518%	0.505%	0.479%
University of California-Los Angeles	1.505%	1.523%	1.440%	1.408%	1.484%
University of California-San Diego	1.546%	1.630%	1.602%	1.585%	1.601%
University of Missouri-Columbia	0.354%	0.364%	0.352%	0.352%	0.359%
University of North Carolina at Chapel Hill	1.332%	1.343%	1.449%	1.470%	1.405%
University of Pittsburgh-Pittsburgh Campus	1.378%	1.316%	1.300%	1.272%	1.252%
University of Virginia-Main Campus	0.610%	0.582%	0.575%	0.532%	0.542%
Iowa State University	0.410%	0.396%	0.397%	0.465%	0.445%
Texas A & M University-College Station	1.081%	1.053%	1.221%	1.268%	1.260%
The University of Texas at Austin	0.968%	0.944%	0.944%	0.869%	0.946%
University of California-Berkeley	1.085%	1.109%	1.083%	1.105%	1.146%
University of California-Santa Barbara	0.353%	0.355%	0.352%	0.343%	0.324%
University of Colorado Boulder	0.599%	0.595%	0.575%	0.563%	0.612%
University of Kansas	0.421%	0.435%	0.445%	0.448%	0.453%
University of Oregon	0.158%	0.159%	0.141%	0.135%	0.116%
University of Washington	1.760%	1.684%	1.776%	1.747%	1.716%

Source: Higher Education Research Survey (HERD)

¹⁵ University of Nebraska-Lincoln was included as a peer as it belongs to the Big 10 Academic Alliance and was formally part of the AAU until 2011

These findings are expected, given the short passage of time since Rutgers and UMDNJ integrated. Future assessment will be needed to track whether the integration allowed Rutgers to capture new resources. Securing a greater amount of new federal dollars as a result of the integration would require a growth in synergies between the two institutions. Research on M&As, including studies in higher education, has demonstrated that forming synergies can take several years to fully realize (Pinheiro et al., 2016; Skodvin, 1999). This goal and the goal of enhancing multidisciplinary research, which will be examined in the following chapter, will likely take several years to realize fully.

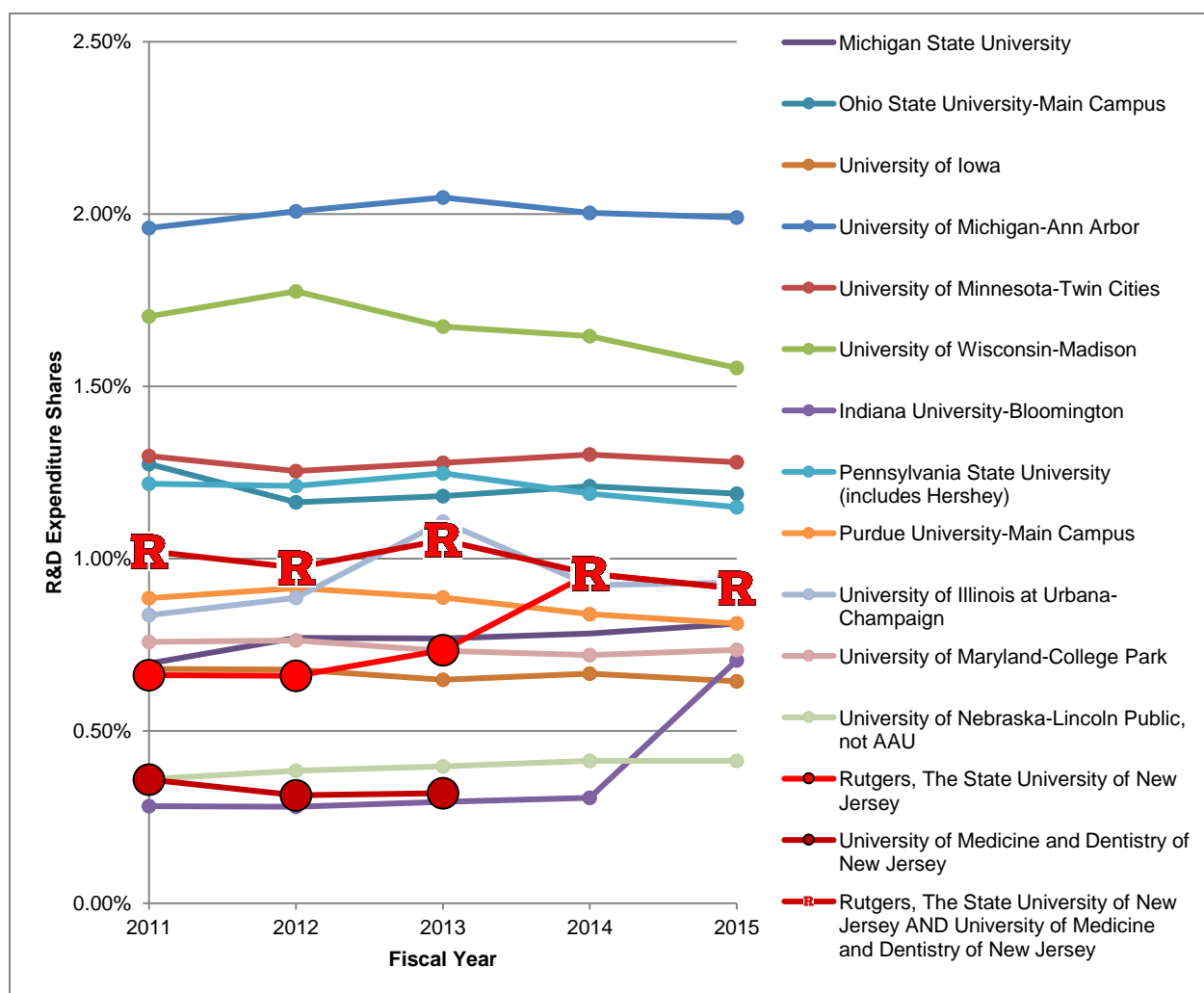


Figure 5.4 - R&D Expenditure Shares for Big 10 Academic Alliance Institutions

Research Question 3: Enhance educational opportunities for the residents of the State, strengthen recruitment of top students, and retain the brightest high school students (reduce “brain drain”)

The three goals of enhancing educational opportunities for the residents of the State, strengthening recruitment of top faculty and students, and retaining the brightest high school students (reduce “brain drain”) each received agreement from about half of the stakeholders interviewed. These three goals are related to one another and can be evaluated using student data, with the exception of an analysis of faculty recruitment, data for which was not available at the time of the study.

Enhancing health science education opportunities at Rutgers would enhance educational opportunities for residents in the State of New Jersey. This is because Rutgers is a state school with a mission to primarily serve New Jersey residents, and enrolls more residents from New Jersey than any other college or university in the State. However, **it has been estimated that more than 40% of New Jersey high school seniors leave to pursue their baccalaureate degrees outside the State** (McCormick, 2005). According to analysis from U.S. News and World Report (2017b), New Jersey ranks second in the nation for Pre K-12 education, but loses a larger percentage of its high school students to out of state universities than any other state in the United States. Typically, these are

high achieving students leaving the State for other elite institutions (McCormick, 2014; McCormick, 2005; Kean et al., 2010). This net out-migration is often referred to as “brain drain,” and is a concern to legislators who fear that these high achieving students will not return to the state upon graduation to contribute to the economy (McCormick, 2014; McCormick, 2005). Therefore, advocates for higher education in New Jersey are eager to make enhancements that would attract more in-state students to remain in New Jersey.

Health science education is also an attractive major for incoming undergraduate students across the United States. According to a 2015 report from the Higher Education Research Institute’s (HERI) Cooperative Institutional Research Program (CIRP) survey, 20.8% of incoming first year students enrolled in a four-year undergraduate program reported they are pre-med students with another 11.3% reporting an intention to major in another health profession major such as kinesiology, nursing, or pharmacy (Eagan et al., 2015). Prior to the Rutgers-UMDNJ integration, undergraduate students at Rutgers had the opportunity to major in these fields but since there was no direct connection to a medical institution these programs were less attractive to potential students. Without a medical or dental school, Rutgers was also unable to attract any graduate students interested in medical or dental education. Many of Rutgers’ AAU peers had a medical school, and Rutgers lagged amongst its peers in providing medical education.

While additional opportunities in health science education existed through UMDNJ, the opportunities were mostly available to graduate students with very

limited opportunities for undergraduate students. There were clearly silos between the two universities and the pairing of them was beneficial to both undergraduate and graduate students, particularly those who were interested in health science education and who may be more likely to study and work in the State of New Jersey. According to the New Jersey Department of Labor and Workforce Development (2017), the health science industry employed over 116,000 individuals in 2015, many of whom live in the State of New Jersey. New Jersey is also home to 14 of the world's 20 largest pharmaceutical companies like Novartis, Johnson & Johnson, Bristol-Myers Squibb, Merck & Co, Novo Nordisk, and Bayer Healthcare (New Jersey Department of Labor and Workforce Development, 2017; State of New Jersey, 2014), which largely employ New Jersey residents. Further, the pharmaceutical industry contributes approximately \$34 billion toward the state's gross domestic product (New Jersey Department of Labor and Workforce Development; 2017). New Jersey also has many residents who work in the major metropolitan cities of New York and Philadelphia which include world-renowned hospitals and healthcare sector companies.

Hypotheses

The three goals in this section primarily emphasize enhancing undergraduate education opportunities and recruitment at Rutgers. Graduate education advancement was certainly a factor in the integration, but the focus on retaining New Jersey high school students demonstrates that undergraduate education was the main focus. Therefore, an evaluation of whether undergraduate admissions changed after the integration will be conducted. As mentioned

previously, Rutgers joining the Big 10 Academic Alliance and the development of the Honors College on the New Brunswick campus could have also contributed to the fulfillment of these goals. Therefore, analysis will also include an examination of whether students indicated they had an interest in studying a health science major. A list of health science majors available at Rutgers-New Brunswick is provided in Table 5.5.

Table 5.5 Rutgers Health Science Majors
Biochemistry Biological Life Sciences Biological Sciences Biomathematics Biomedical Engineering Biotechnology Cell Biology/Neuroscience Evolutionary Anthropology Exercise Physiology Exercise Science Genetics Health Science Kinesiology Medical Technology Microbiology Molecular Biology Molecular Biochemistry Nursing Pre-Dentistry Pre-Health Pre-Medicine Psychology Public Health Pharmacy

The following hypotheses will be tested to determine whether the integration had enhanced recruitment of top students, and reduced New Jersey's "brain drain" problem:

H_{A1} : Students who accept their admission to an undergraduate program will increase over time following the Rutgers-UMDNJ Integration

H_{A2} : Students from New Jersey who accept their admission to an undergraduate program will increase over time following the Rutgers-UMDNJ Integration

H_{A3} : High academic achieving students who accept their admission to an undergraduate program will increase over time following the Rutgers-UMDNJ Integration

H_{A4} : High academic achieving students from New Jersey who accept their admission to an undergraduate program will increase over time following the Rutgers-UMDNJ Integration

H_{A5} : Students interested in the health sciences who accept their admission to an undergraduate program will increase over time following the Rutgers-UMDNJ Integration

H_{A6} : Students interested in the health sciences from New Jersey who accept their admission to an undergraduate program will increase over time following the Rutgers-UMDNJ Integration

Data

Similar to the analysis conducted for reputation, six years of admissions data from admitted and incoming first-year undergraduate students were used to evaluate trends. Transfer students were removed from the analysis because the application process is less homogeneous than the process for first-year applicants. Analysis included data from three years prior to the integration

(academic years 2010-11, 2011-12, and 2012-13), and three years post-integration (academic years 2013-14, 2014-15, and 2015-16).

Sample

Analysis needed to be stratified by the undergraduate school within Rutgers-New Brunswick because each school has its own application process. Therefore, it is possible that a student may apply to more than one school and have different acceptance outcomes. The schools within Rutgers-New Brunswick which accept first-year students are the School of Arts and Sciences (SAS), the School of Environmental and Biological Sciences (SEBS), Ernest Mario School of Pharmacy (Pharm), the School of Engineering (SOE), Rutgers School of Business-New Brunswick (RBS-NB), and Mason Gross School of the Arts (MGSA).

Schools that did not have health science majors were evaluated in an effort to disentangle the effect of Rutgers' initiation into the Big 10 Academic Alliance which was announced the same year as the integration. These schools were selected as possible comparison groups whose admission outcomes would not potentially be affected by the integration of health sciences, but may be influenced by Rutgers' initiation to the Big 10 Academic Alliance. Two schools, RBS-NB and MGSA qualified for this role; however, a school of fine arts' admission process varies quite a bit from the other schools. Schools of fine arts like MGSA rely largely on art portfolios rather than SAT scores and grades received in high school. Thus, only RBS-NB was included as a comparison

school in order to potentially eliminate the confounding presented by the almost concurrent affiliation with the Big 10 Academic Alliance.

The sample included all first-year students who were admitted to an undergraduate school at Rutgers-New Brunswick between 2010-11 and 2015-16 except for MGSA. The School of Arts of Sciences, SEBS, Pharm, and SOE were the primary schools of interest with RBS-NB serving as a control.

Profiles of students who accepted their admission (Tables 5.6-5.10) demonstrate trends in the student body over the six-year period. The rate of acceptance, overall and among New Jersey residents, appeared to subtly decrease over time at all five schools. However, SAT scores appeared to increase over time, particularly after the integration, at the four schools of interest but decreased for two years post-integration at RBS-NB. The number of students who reported an interest in health sciences appears to grow rapidly at SEBS after the integration.

There are also noteworthy demographic trends over time. The international student population appears to be growing at all five schools over time, with a strong uptick in the years post-integration. Student acceptance appears to be on the decline at all schools with the exception of Pharmacy. The growth of females accepting their admission into SEBS, SOE, and RBS-NB is also evident.

Table 5.6
Profile of Students Who Accepted Admission - School of Arts and Sciences

Category	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16	
	N	%	N	%	N	%	N	%	N	%	N	%
% Accepted Admission	3,253	26.11%	3,228	26.05%	3,220	26.05%	3,466	25.84%	3,369	24.36%	3,310	23.36%
%NJ Accepted Admission	3,020	28.46%	3,005	28.66%	2,925	28.49%	3,112	28.41%	2,972	26.94%	2,817	26.43%
Gender												
Male	1,438	44.21%	1,477	45.76%	1,448	44.97%	1,677	48.38%	1,546	45.89%	1,560	47.13%
Female	1,815	55.79%	1,751	54.24%	1,772	55.03%	1,789	51.62%	1,823	54.11%	1,750	52.87%
Race/Ethnicity												
Black	345	10.61%	341	10.56%	342	10.62%	378	10.91%	376	11.16%	381	11.51%
Hispanic	364	11.19%	426	13.20%	400	12.42%	462	13.33%	456	13.54%	439	13.26%
Asian	987	30.34%	990	30.67%	1,110	34.47%	1,246	35.95%	1,285	38.14%	1,265	38.22%
White	1,557	47.86%	1,471	45.57%	1,368	42.48%	1,380	39.82%	1,252	37.16%	1,225	37.01%
Parent Education												
No parent went to college	1,054	32.40%	1,076	33.33%	1,078	33.48%	1,117	32.23%	1,121	33.26%	1,099	33.20%
At least one parent went to college	2,199	67.60%	2,152	66.67%	2,142	66.52%	2,349	67.77%	2,249	66.74%	2,211	66.80%
Interest in Health Sciences												
No	2,095	64.40%	2,064	63.94%	2,002	62.17%	2,085	60.16%	2,031	60.28%	2,111	63.78%
Yes	1,158	35.60%	1,164	36.06%	1,218	37.83%	1,381	39.84%	1,338	39.72%	1,199	36.22%
Residency												
NJ	3,020	92.84%	3,005	93.09%	2,925	90.67%	3,112	89.79%	2,972	88.22%	2,817	85.11%
International	20	0.61%	21	0.65%	58	1.80%	118	3.40%	205	6.08%	280	8.46%
Out of State	213	6.55%	202	6.26%	243	7.53%	236	6.81%	192	5.70%	213	6.44%
SAT Score	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	1172.95	138.13	1175.42	142.49	1174.07	138.42	1188.60	140.75	1191.44	142.44	1204.36	143.26

Table 5.7
Profile of Students Who Accepted Admission - School of Environmental and Biological Sciences

Category	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16	
	N	%	N	%	N	%	N	%	N	%	N	%
% Accepted Admission	650	15.37%	654	15.61%	640	15.40%	655	12.57%	614	11.21%	726	14.24%
%NJ Accepted Admission	591	16.81%	588	16.61%	568	16.80%	599	13.80%	564	12.57%	656	15.93%
Gender												
Male	287	44.15%	275	42.05%	264	41.25%	266	40.61%	220	35.83%	269	37.05%
Female	363	55.85%	379	57.95%	376	58.75%	389	59.39%	394	64.17%	457	62.95%
Race/Ethnicity												
Black	65	10.00%	68	10.40%	88	13.75%	64	9.77%	44	7.17%	89	12.26%
Hispanic	85	13.08%	88	13.46%	79	12.34%	82	12.52%	81	13.19%	115	15.84%
Asian	150	23.08%	137	20.95%	148	23.13%	166	25.34%	161	26.22%	194	26.72%
White	350	53.85%	361	55.20%	325	50.78%	343	52.37%	328	53.42%	328	45.18%
Parent Education												
No parent went to college	240	36.92%	233	35.63%	206	32.19%	208	31.76%	216	35.18%	239	32.92%
At least one parent went to college	410	63.08%	421	64.37%	434	67.81%	447	68.24%	398	64.82%	487	67.08%
Interest in Health Sciences												
No	476	73.23%	471	72.02%	463	72.34%	471	71.91%	403	65.64%	384	52.89%
Yes	174	26.77%	183	27.98%	177	27.66%	184	28.09%	211	34.36%	342	47.11%
Residency												
NJ	591	90.92%	588	89.91%	568	88.75%	599	91.45%	564	91.86%	656	90.36%
International	0	0.00%	2	0.31%	7	1.09%	9	1.37%	19	3.09%	20	2.75%
Out of State	59	9.08%	64	9.79%	65	10.16%	47	7.18%	31	5.05%	50	6.89%
SAT Score	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	1150.94	130.76	1158.29	118.20	1152.72	125.63	1176.82	129.59	1165.02	127.18	1172.02	136.29

Table 5.8
Profile of Students Who Accepted Admission - School of Pharmacy

Category	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16	
	N	%	N	%	N	%	N	%	N	%	N	%
% Accepted Admission	218	30.15%	213	28.25%	236	27.10%	188	22.38%	204	21.18%	189	17.70%
%NJ Accepted Admission	169	33.73%	150	28.52%	186	28.48%	151	23.30%	171	22.29%	171	19.54%
Gender												
Male	85	38.99%	69	32.39%	81	34.32%	73	38.83%	77	37.75%	73	38.62%
Female	133	61.01%	144	67.61%	155	65.68%	115	61.17%	127	62.25%	116	61.38%
Race/Ethnicity												
Black	9	4.13%	3	1.41%	2	0.85%	3	1.60%	7	3.43%	4	2.12%
Hispanic	9	4.13%	8	3.76%	6	2.54%	5	2.66%	8	3.92%	10	5.29%
Asian	155	71.10%	165	77.46%	191	80.93%	150	79.79%	147	72.06%	139	73.54%
White	45	20.64%	37	17.37%	37	15.68%	30	15.96%	42	20.59%	36	19.05%
Parent Education												
No parent went to college	54	24.77%	50	23.47%	48	20.34%	46	24.47%	42	20.59%	51	26.98%
At least one parent went to college	164	75.23%	163	76.53%	188	79.66%	142	75.53%	162	79.41%	138	73.02%
Residency												
NJ	169	77.52%	150	70.42%	186	78.81%	151	80.32%	171	83.82%	171	90.48%
International	8	3.67%	19	8.92%	22	9.32%	8	4.26%	8	3.92%	3	1.59%
Out of State	41	18.81%	44	20.66%	28	11.86%	29	15.43%	25	12.25%	15	7.94%
SAT Score	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	1374.45	115.94	1378.92	107.48	1377.12	97.53	1403.94	107.71	1398.14	106.13	1380.63	111.55

Table 5.9
Profile of Students Who Accepted Admission - School of Engineering

Category	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16	
	N	%	N	%	N	%	N	%	N	%	N	%
% Accepted Admission	701	21.54%	670	20.74%	704	21.92%	672	19.24%	727	19.16%	669	16.21%
%NJ Accepted Admission	667	23.61%	636	23.13%	672	24.31%	615	20.78%	644	20.56%	606	18.33%
Gender												
Male	589	84.02%	545	81.34%	558	79.26%	535	79.61%	553	76.07%	494	73.84%
Female	112	15.98%	125	18.66%	146	20.74%	137	20.39%	174	23.93%	175	26.16%
Race/Ethnicity												
Black	40	5.71%	41	5.14%	40	5.68%	29	4.32%	37	5.09%	36	5.38%
Hispanic	69	9.84%	175	21.96%	65	9.23%	58	8.63%	63	8.67%	64	9.57%
Asian	261	37.23%	295	37.01%	316	44.89%	311	46.28%	371	51.03%	326	48.73%
White	331	47.22%	286	35.88%	283	40.20%	274	40.77%	256	35.21%	243	36.32%
Parent Education												
No parent went to college	204	29.10%	175	26.12%	183	25.99%	169	25.15%	176	24.21%	168	25.11%
At least one parent went to college	497	70.90%	495	73.88%	521	74.01%	503	74.85%	551	75.79%	501	74.89%
Interest in Health Sciences												
No	541	80.75%	546	85.85%	558	82.42%	476	77.15%	496	77.86%	480	79.82%
Yes	129	19.25%	90	14.15%	119	17.58%	141	22.85%	141	22.14%	126	20.18%
Residency												
NJ	667	95.15%	636	94.93%	672	95.45%	615	91.52%	644	88.58%	606	90.58%
International	0	0.00%	4	0.60%	11	1.56%	19	2.83%	57	7.84%	40	5.98%
Out of State	34	4.85%	30	4.48%	21	2.98%	38	5.65%	26	3.58%	23	3.44%
SAT Score	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	1250.68	130.67	1265.82	131.32	1288.24	122.56	1298.23	120.30	1310.00	121.31	1317.80	125.99

Table 5.10
Profile of Students Who Accepted Admission - School of Business

Category	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16	
	N	%	N	%	N	%	N	%	N	%	N	%
% Accepted Admission	432	15.89%	437	17.09%	479	17.62%	556	16.55%	637	17.37%	638	16.75%
%NJ Accepted Admission	407	17.56%	399	18.24%	448	19.24%	469	17.09%	526	17.52%	526	18.27%
Gender												
Male	270	62.50%	276	63.16%	282	58.87%	290	52.16%	350	54.95%	374	58.62%
Female	162	37.50%	161	36.84%	197	41.13%	266	47.84%	287	45.05%	264	41.38%
Race/Ethnicity												
Black	14	3.32%	13	2.97%	21	4.38%	16	2.88%	23	3.61%	18	2.82%
Hispanic	30	7.11%	32	7.32%	27	5.64%	32	5.76%	44	6.91%	40	6.27%
Asian	193	45.73%	208	47.60%	244	50.94%	306	55.04%	374	58.71%	366	57.37%
White	185	43.84%	184	42.11%	187	39.04%	202	36.33%	196	30.77%	214	33.54%
Parent Education												
No parent went to college	127	29.40%	107	24.49%	112	23.38%	143	25.72%	179	28.10%	135	21.16%
At least one parent went to college	305	70.60%	330	75.51%	367	76.62%	413	74.28%	458	71.90%	503	78.84%
Residency												
NJ	407	94.21%	399	91.30%	448	93.53%	469	84.35%	526	82.57%	526	82.45%
International	4	0.93%	6	1.37%	14	2.92%	62	11.15%	98	15.38%	92	14.42%
Out of State	21	4.86%	32	7.32%	17	3.55%	25	4.50%	13	2.04%	20	3.13%
SAT Score	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	1257.52	100.80	1276.93	105.48	1284.53	98.67	1269.39	103.78	1273.11	118.46	1302.40	104.60

Measures

Three dependent variables were used to address the hypotheses in this section.

Two dependent variables were binary, and one was continuous. The first binary variable used was whether a student accepted their admission¹⁶. The second binary variable was coded for whether a student expressed an interest in a health

¹⁶ 0 for when a student did not accept their admission; 1 for when a student did accept their admission

science major in their application¹⁷. Finally, the third dependent variable analyzed was SAT scores which is a continuous variable. Analyses of health science interest and SAT scores were only conducted for students who accepted their admission to one of the five Rutgers-New Brunswick schools.

The covariates included in this study included residency (New Jersey, out of state, or international), and student demographic information (gender, race/ethnicity, and parent education level). For the purposes of regression analyses, these values were dummy coded. Table 5.11 identifies these covariates variables and their respective reference groups.

Table 5.11: Dummy-Coded Variables Used in Regression Models			
Category	Dummy variable	Reference variable	Coding
Gender	Female	Male	1 = Female 0 = Male
Race/Ethnicity	Black (Non-Hispanic)	White	1 = Black (Non-Hispanic) 0 = All other races/ethnicities
	Hispanic		1 = Hispanic 0 = All other races/ethnicities
	Asian		1 = Asian 0 = All other races/ethnicities
Parent Education	First Generation College	At least one parent went to college	1 = No parent went to college 0 = At least one parent went to college
Permanent Residence	International	New Jersey	1 = Permanent residence is outside the United States 0 = United States residence
	Out of State		1 = United States residence excluding New Jersey 0 = International residence and New Jersey residence

Analysis

Interrupted time series analysis (ITS) was used to detect whether or not the Rutgers-UMDNJ integration had a significant effect on underlying admission trends. Interrupted time series studies use data collected at multiple time points

¹⁷ 0 for when a student did not express an interest in a health science major in their application; 1 for when a student did express an interest in a health science major in their application

before and after an intervention to establish any underlying trends that are interrupted at a known point in time (Cochrane Effective Practice and Organisation of Care, 2017).

Analysis to evaluate the pre (three years before the implementation of the integration) and post (three years after the implementation of the integration) effects of the integration was conducted using a logistic in the case of binary dependent variables or OLS regression in the case of SATs for each school. Each model used the same predictors, and is defined as follows:

$$G(I_{it}) = \beta_0 + \beta_1 \text{Integration}_t + \beta_2 \text{Year}_t + \beta_3 (\text{Integration}_t \times \text{Year}_t) + \beta_4 X_{it} + E_{it}$$

Where G is the identity function in the case of OLS and the logit function in the case of logistic regression, I_{it} is a specific dependent variable [acceptance of admission, interest in health sciences, or SATs] for student i at time t ; Integration is an indicator variable equal to '1' for years after the integration (all academic years on or after 2013-14), and '0' otherwise (Years 2010-11, 2011-12, 2012-13); Year is a linear time trend; Integration x Year is an interaction variable that measures the deviation in the trend from the pre-integration period, and is the coefficient of interest that provides the treatment effect in all of the analysis; X represents a vector of variables pertaining to the individual at each time period; and E is an identically and independently normally distributed error term for OLS, but has a logistic distribution in the case of the binary dependent variables. All reported standard errors in this study are robust standard errors.

A series of regression models were estimated to predict the probability (or average prediction) of the three dependent variables. Models were estimated to examine if the trend in the dependent variables significantly deviated after the integration while controlling for relevant (and available) covariates with respect to the probability students accepting the admission offered, the probability of an incoming student's indication of interest in majoring in a health science, and SAT scores of incoming students. For each dependent variable and school, three models were estimated with each model incrementally including more variables in an effort to determine how the effect of the focal variables change across models and to assess improvements in model fit. The first model only included the integration variable, the second model added all time variables, and the final model included all time variables as well as all demographic covariates.

The main dependent variable was acceptance, with both SAT and student interest in a health science major serving as supplemental measures. The analysis that predicts acceptance does evaluate high achieving students, and it is limited to students who scored in the top 75th percentile. A supplemental analysis was run to assess whether SAT scores increased over time as a result of the integration. Further, due to the possibility that the trends of acceptance and SAT scores may be impacted by Rutgers' initiation into the Big 10 Academic Alliance or the Honors College, another supplemental model was run to evaluate whether a growing number of undergraduates would express an interest in a health science major. Since there was no variability in health science major interest in

Pharm and RBS-NB, this analysis was only conducted for SAS, SEBS, and RBS-NB.

Table 5.12 outlines the characteristics for each model including the dependent variables, samples used, schools included, type of model used, and results reported. Models were estimated for each school as each school has a separate admission process. The models used to estimate acceptance and SAT were further stratified. The model used to estimate acceptance was stratified to run separate models of high academically achieving students¹⁸, students interested in majoring in a health science major, and students who are New Jersey residents. The model used to estimate SAT was also run on the stratified populations of students interested in majoring in a health science, and students who are New Jersey residents. The Schools of Pharmacy and Business were excluded from any analyses that measured interest in a health science major as there was no variability on this measure across these schools. All students in the School of Pharmacy had an intention to major in Pharmacy, a health science major, and no students in the School of Business intended on majoring in a health science.

¹⁸ Defined as students with a SAT Composite Score at or above the 75th percentile

Table 5.12 Characteristics for Each Model

Dependent Variable	Sample	Separate models for	Type of model	Results reported
Acceptance of Admission	Admitted Students – All, High Achieving, Interest in Health Science, NJ Residents	SAS, SEBS, SOE, Pharm, and RBS-NB	Logit	<ul style="list-style-type: none"> • Raw coefficients • Y-standardized coefficients • Marginal effects on the probability of acceptance
SAT Scores	Accepting Students – All, Interest in Health Science, NJ Residents	SAS, SEBS, SOE, Pharm, and RBS-NB	OLS	Coefficients
Interest in Health Science	Accepting Students – All	SAS, SEBS, and SOE	Logit	<ul style="list-style-type: none"> • Raw coefficients • Y-standardized coefficients • Marginal effects on the probability of interest

Results are reported in the form of raw coefficients for all models. Y-standardized coefficients, marginal effects on the probability, and predicted probabilities are also reported for the logistic regression models. Raw coefficients were transformed to Y-standardized coefficients in the case of logistic regression because the variance in the dependent variable is not constant across different models, and the coefficients can change even if the variables added in subsequent models make no contribution to explaining the dependent variables as it does in linear regression (OLS). This transformation allows for a simpler interpretation of a given independent variable (X) upon a latent dependent variable (Y*) (e.g., a one-unit increase in a significant interaction variable in the overall SAS model 3 produces a -0.025 standard deviation decrease in student acceptance holding all other variables constant). Only the models that had a significant interaction variable were standardized. Since the third model for each set of analyses included all the relevant time variables as well as demographic and regional covariates, and produced the highest pseudo R^2 for the logistic

regression models and adjusted R^2 for the OLS models, it was retained for interpretation.

Predicted probabilities and marginal effects on the probability were also calculated for the logistic regression models. Predicted probabilities were calculated for each discrete variable holding all other variables at their means (e.g. the probability of a student accepting their admission to the School of Arts and Sciences for the typical female when all other independent variables are held at their means is 23.67%). Predicted probabilities for the time variables, show the probability of an outcome occurring (acceptance to a Rutgers school or expressing interest in a health science major) holding all other variables at their means. Marginal effects on the probability were also computed for each independent variable, and are interpreted as the change in the probability of an outcome occurring (acceptance to a Rutgers school or expressing interest in a health science major) for a small change (in non-binary variables) or a discrete change (in binary variables) in the variable.

Results

The goal of the integration was to attract more high-quality students, and thus it was anticipated that the students who accepted their admission to Rutgers would increase over time following the Rutgers-UMDNJ integration. In what follows, ITS results which adjust for available covariates are reported separately for each dependent variable.

Dependent Variable 1: Student Acceptance of Admission

Table 5.13 shows that overall acceptance declined significantly post-integration at SAS and SOE as evidenced by Model 3 which exhibits a significant interaction term, whereas at SEBS, acceptance declined immediately after integration, without a change in the underlying trend. The table further shows that admission acceptance of students interested in health sciences also experienced a significant and immediate decline in the level after integration at SEBS, and in the slope at SAS.

With respect to high achieving students, the news is not any better. Their acceptance level at SEBS declined immediately after integration, while at SOE the decline in the trend (slope) post-integration was significant. SEBS and SOE acceptance in the case of NJ residents were no different from that of high achievers, showing an immediate decline in the level at SEBS and a decline in the level and trend at SOE.

Table 5.13 Logistic Regressions of Student Accepting Their Admission to Rutgers-New Brunswick by School

Overall															
School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business			
Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	
Constant	-1.07 (.01)**	-1.06 (.03)**	-1.21 (.03)**	-1.71 (.03)**	-1.72 (.07)**	-1.315 (.03)**	-1.34 (.07)**	-1.39 (.07)**	-0.92 (.05)**	-0.77 (.12)**	-1.01 (.15)**	-1.61 (.03)**	-1.74 (.08)**	-1.88 (.08)**	
Integration	-0.08 (.02)**	-0.01 (.04)	0.00 (.02)	-0.23 (.03)**	-0.31 (.08)**	-0.32 (.08)**	-0.20 (.04)**	-0.12 (.08)	-0.01 (.08)	-0.45 (.07)**	-0.14 (.14)	-0.12 (.14)	0.01 (.04)	-0.12 (.09)	
Year		-0.00 (.01)	-0.01 (.02)		0.04 (.03)	0.01 (.03)		0.01 (.03)	0.013 (.03)		-0.08 (.06)	-0.10 (.06)		0.06 (.04)	
Integration *Year		-0.06 (.02)**	-0.05 (.02)**		0.07 (.04)	0.07 (.04)		-0.12 (.04)**	-0.11 (.04)*		-0.07 (.08)	-0.06 (.08)		-0.06 (.05)	
Female			-0.02 (.02)		0.07 (.04)*			-0.41 (.04)**			0.41 (.07)**			0.01 (.04)	
Black			0.53 (.03)**		0.26 (.06)**			0.45 (.08)**			-0.12 (.23)			0.02 (.11)	
Hispanic			0.30 (.03)**		0.12 (.06)*			0.29 (.07)**			0.15 (.19)			0.15 (.09)	
Asian			0.23 (.02)**		-0.39 (.04)**			0.23 (.04)**			0.06 (.09)			0.32 (.04)**	
First Generation			0.50 (.02)**		0.38 (.04)**			0.53 (.04)**			0.75 (.09)**			0.51 (.05)**	
International			-0.63 (.04)**		-0.57 (.14)**			-0.72 (.10)**			0.41 (.16)*			-0.21 (.07)**	
Out of State			-1.03 (.03)**		-0.82 (.06)**			-1.21 (.08)**			-0.72 (.10)**			-1.06 (.10)**	
Pseudo R ²	.00	.00	.03	.00	.00	.02	.00	.00	.03	.00	.01	.04	.00	.02	
Students Interested in Health Sciences															
School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business			
Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	
Constant	-0.99 (.02)**	-1.01 (.05)**	-1.20 (.06)**	-1.78 (.05)**	-1.88 (.12)**	-1.80 (.13)**	-1.52 (.06)**	-1.36 (.15)	-1.22 (.17)**						
Integration	-0.06 (.03)*	0.02 (.06)	-0.01 (.06)	-0.30 (.06)**	-0.48 (.14)**	-0.52 (.14)**	-0.07 (.08)	0.22 (.18)	0.23 (.18)						
Year		0.01 (.024)	0.02 (.03)		0.05 (.06)	0.07 (.06)		-0.08 (.07)	-0.08 (.07)						
Integration *Year		-0.10 (.03)**	-0.11 (.03)**		0.02 (.08)	-0.00 (.08)		-0.04 (.10)	-0.06 (.09)						
Female			-0.04 (.03)		-0.09 (.06)			-0.18 (.08)*							
Black			0.60 (.05)**		0.34 (.10)**			0.30 (.19)							
Hispanic			0.35 (.05)**		0.19 (.10)*			0.20 (.16)							
Asian			0.32 (.03)**		-0.33 (.07)**			-0.04 (.09)							
First Generation			0.43 (.03)**		0.33 (.07)**			0.21 (.11)*							
International			-0.81 (.11)**		-0.75 (.31)*			-1.21 (.40)**							
Out of State			-1.34 (.05)**		-0.92 (.11)**			-1.29 (.18)**							
Pseudo R ²	.00	.00	.04	.00	.00	.03	.00	.00	.02						
SAT Scores at or above 75th percentile															
School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business			
Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	
Constant	-1.43 (.02)**	-1.45 (.04)**	-1.50 (.05)**	-2.11 (.04)**	-2.11 (.10)**	-2.01 (.10)**	-1.46 (.03)**	-1.58 (.08)**	-1.56 (.08)**	-0.96 (.05)**	-0.82 (.12)**	-1.05 (.15)	-1.67 (.03)**	-1.84 (.09)**	
Integration	-0.03 (.02)	0.01 (.05)	0.01 (.05)	-0.23 (.05)**	-0.27 (.11)*	-0.29 (.11)*	-0.15 (.04)**	-0.17 (.08)*	-0.15 (.08)	-.44 (.07)**	-0.16 (.14)	-0.13 (.14)	-0.01 (.04)	-0.20 (.09)*	
Year		0.01 (.02)	0.01 (.02)		-0.00 (.04)	0.01 (.05)		0.06 (.03)	0.06 (.03)		-0.07 (.06)	-0.09 (.06)		0.08 (.04)*	
Integration *Year		-0.07 (.03)*	-0.04 (.03)		0.04 (.06)	0.04 (.06)		-0.16 (.05)**	-0.14 (.05)**		-0.08 (.08)	-0.06 (.08)		-0.05 (.05)	
Female			-0.11 (.02)**		0.05 (.05)			-0.46 (.05)**			0.40 (.07)			-0.03 (.04)	
Black			0.31 (.05)**		0.17 (.11)			0.24 (.10)*			-0.12 (.25)			-0.10 (.13)	
Hispanic			0.10 (.05)*		0.06 (.09)			0.09 (.20)			0.17 (.07)			0.09 (.10)	
Asian			0.30 (.02)**		-0.42 (.06)**			0.23 (.04)**			0.08 (.09)			0.34 (.05)**	
First Generation			0.43 (.03)**		0.34 (.06)**			0.42 (.05)**			0.64 (.09)**			0.44 (.05)**	
International			-0.79 (.06)**		-0.54 (.19)**			-0.99 (.12)**			0.42 (.16)**			-0.48 (.09)**	
Out of State			-1.04 (.05)**		-0.62 (.09)**			-1.19 (.09)**			-0.68 (.10)**			-1.01 (.10)**	
Pseudo R ²	.00	.00	.02	.00	.00	.02	.00	.00	.03	.01	.01	.03	.00	.02	
NJ Residents Only															
School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business			
Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	
Constant	-0.95 (.01)**	-0.95 (.03)**	-1.25 (.04)**	-1.62 (.03)**	-1.63 (.07)**	-1.73 (.075)*	-1.19 (.03)**	-1.23 (.07)**	-1.41 (.07)**	-0.84 (.05)**	-0.58 (.14)**	-0.99 (.18)**	-1.51 (.03)**	-1.63 (.08)**	
Integration	-0.05 (.02)**	-0.01 (.04)	0.00 (.04)	-0.20 (.04)**	-0.29 (.08)**	-0.29 (.08)**	-0.22 (.04)**	-0.18 (.08)*	-0.16 (.08)*	-0.45 (.07)**	-0.08 (.16)	-0.10 (.16)	-0.04 (.04)	-0.20 (.09)*	
Year		0.00 (.02)	-0.01 (.02)		0.00 (.03)	0.01 (.032)		0.02 (.03)	0.02 (.03)		-0.13 (.07)	-0.12 (.07)		0.06 (.04)	
Integration *Year		-0.05 (.02)*	-0.04 (.02)		0.09 (.05)	0.07 (.05)		-0.10 (.04)*	-0.09 (.05)*		0.01 (.09)	-0.00 (.09)		-0.02 (.05)	
Female			0.00 (.02)		0.07 (.04)			-0.42 (.04)**			0.49 (.08)**			0.03 (.04)	
Black			0.55 (.03)**		0.27 (.07)**			0.48 (.09)**			-0.20 (.27)			-0.01 (.12)	
Hispanic			0.32 (.03)**		0.14 (.06)*			0.28 (.07)**			0.12 (.22)			0.14 (.09)	
Asian			0.28 (.02)**		-0.37 (.04)**			0.26 (.04)**			-0.03 (.10)			0.35 (.05)**	
First Generation			0.57 (.02)**		0.41 (.04)**			0.58 (.05)**			0.98 (.10)**			0.58 (.05)**	
Pseudo R ²	.00	.00	.02	.00	.00	.02	.00	.00	.02	.01	.01	.04	.00	.01	

**p<.01; *.01<p<.05

Many of the covariates were significant for all the overall models at each of the three schools and while variation in statistical significance occurred among the stratified models, the direction appeared to be consistent. Students outside of New Jersey (international and out of state) were less likely to accept their admission across all three schools. Black, Hispanic, and first-generation students, on the other hand, were more likely to accept their admission across all three schools relative to their NJ peers. Females and Asian students varied across the three schools with Asians being more likely to accept their admission into SAS and SOE, but less likely to accept their admission into SEBS. Females were more likely to accept their admission into SEBS, but less likely to accept their admission into SAS or SOE.

The Y-standardized coefficients (Table 5.14) are reported for the models in which the interaction variable was significant. This included the overall model for SAS and SOE, students who expressed an interest in a health science major at SAS, students who had a SAT score at or above the 75th percentile at SOE, and SOE students from NJ. The Y-standardized coefficients demonstrate how the time coefficients change as the model incrementally incorporates more independent variables. The values change slightly across models for SOE but larger differences are evident in the models for SAS, demonstrating the importance of incorporating relevant covariates across the models.

Table 5.14						
Y-Standardized Coefficients of Students Who Accept Their Admission to Rutgers-New Brunswick by School						
	Overall					
	School of Arts and Sciences			School of Engineering		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Integration	-0.041	-0.003	0.002	-0.055	-0.065	-0.052
Year		-0.001	-0.003		0.007	0.007
Integration *Year		-0.035	-0.025		-0.063	-0.055
Female			-0.013			-0.220
Black			0.285			0.241
Hispanic			0.159			0.154
Asian			0.122			0.122
First Generation			0.217			0.282
International			-0.075			-0.381
Out of State			-0.186			-0.640
	Students Interested in Health Sciences					
	School of Arts and Sciences			School of Engineering		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Integration	-0.035	0.010	-0.004			
Year		0.003	0.028			
Integration *Year		-0.055	-0.083			
Female			-0.018			
Black			0.184			
Hispanic			0.106			
Asian			0.159			
First Generation			0.189			
International			-0.125			
Out of State			-0.482			
	SAT Scores at or above 75th Percentile					
	School of Arts and Sciences			School of Engineering		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Integration				-0.080	-0.091	-0.082
Year					0.033	0.034
Integration *Year					-0.086	-0.075
Female						-0.246
Black						0.126
Hispanic						0.049
Asian						0.120
First Generation						0.223
International						-0.526
Out of State						-0.631
	NJ Only					
	School of Arts and Sciences			School of Engineering		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Integration				-0.120	-0.098	-0.086
Year					0.011	0.010
Integration *Year					-0.054	-0.051
Female						-0.225
Black						0.258
Hispanic						0.152
Asian						0.138
First Generation						0.314

Only the predicted probabilities and marginal effects for the models with significant time variables will be discussed (Table 5.15) which included SAS and

SOE. The predicted probability of acceptance based on the significant interaction variable for the overall SAS model was .2483 when all other variables were held at their means, and among students who expressed an interest in a health science major the predicted probability was .2570. The marginal effects showed that a one-unit increase in the interaction time variable (or the average annual change in the post-integration period) decreases the probability of acceptance by 0.83% and 2.00% respectively. This means that acceptance among admitted SAS students in the post-integration period was slightly declining over time.

Table 5.15 Predicted Probabilities and Marginal Effects of Student Accepting Their Admission to Rutgers-New Brunswick by School
Overall

	School of Arts and Sciences		School of Engineering	
	Predicted Probability (Y=1)	Marginal Effect	Predicted Probability (Y=1)	Marginal Effect
Integration	0.2384	0.0005(.007)	0.1764	-0.0146(.012)
Year	0.2483	-0.0009(.003)	0.1947	0.0019(.005)
Integration *Year	0.2483	-0.0086(.003)*	0.1947	-0.0156(.006)*
Female	0.2367	-0.0043 (.003)	0.1423	-0.0584(.006)**
Black	0.3381	0.1074(.007)**	0.2571	0.0769(.016)**
Hispanic	0.2906	0.0575(.006)**	0.2269	0.0469(.012)**
Asian	0.2670	0.0423(.004)**	0.2029	0.0347(.006)**
First Generation	0.3137	0.0970(.004)**	0.2570	0.0882(.008)**
International	0.1468	-0.0978(.006)**	0.1019	-0.0869(.009)**
Out of State	0.1139	-0.1504(.003)**	0.0707	-0.1323(.006)**

Students Interested in Health Sciences

	School of Arts and Sciences		School of Engineering	
	Predicted Probability (Y=1)	Marginal Effect	Predicted Probability (Y=1)	Marginal Effect
Integration	0.2487	-0.0015(.011)		
Year	0.2570	0.0031(.005)		
Integration *Year	0.2570	-0.0200(.006)**		
Female	0.2469	-0.0068(.005)		
Black	0.3620	0.1242(.011)**		
Hispanic	0.3119	0.0693(.010)**		
Asian	0.2879	0.0617(.006)**		
First Generation	0.3123	0.0836(.006)**		
International	0.1314	-0.1218(.012)**		
Out of State	0.0960	-0.1935(.005)**		

SAT Scores at or above 75th Percentile

	School of Arts and Sciences		School of Engineering	
	Predicted Probability (Y=1)	Marginal Effect	Predicted Probability (Y=1)	Marginal Effect
Integration			0.1791	-0.0215(.012)
Year			0.1786	0.0089(.005)
Integration *Year			0.1786	-0.0195(.006)**
Female			0.1250	-0.0601(.006)**
Black			0.2010	0.0353(.016)*
Hispanic			0.1793	0.0132(.012)
Asian			0.1846	0.0316(.006)**
First Generation			0.2218	0.0640(.008)**
International			0.0725	-0.1013(.008)**
Out of State			0.0646	-0.120(.006)**

NJ Only

	School of Arts and Sciences		School of Engineering	
	Predicted Probability (Y=1)	Marginal Effect	Predicted Probability (Y=1)	Marginal Effect
Integration			0.1968	-0.0263(.013)*
Year			0.2144	0.0031(.005)
Integration *Year			0.2144	-0.0155(.007)*
Female			0.1630	-0.0649(.007)**
Black			0.2944	0.0887(.018)**
Hispanic			0.2552	0.0497(.013)**
Asian			0.2341	0.0427(.007)**
First Generation			0.2977	0.1059(.009)**

**p<.01

*.01<p<.05

The predicted probabilities and marginal effects for SOE suggests that acceptance in the post-integration period was declining over time as well. The predicted probability of acceptance based on the significant integration variable for SOE was .1968, and the predicted probabilities based on the significant interaction variable for SOE was .1947 overall, .1786 for high achieving students, and .2144 among New Jersey residents. The marginal effect of a discrete change in the integration variable (or an immediate effect at the point of integration) decreases the probability of acceptance by 2.63%, and a one-unit increase in the interaction variable (or the average annual change in the post-integration period) decreases the probability of acceptance by 0.19% overall, 1.95% among high achieving students, and 1.55% among New Jersey residents.

Dependent Variable 2: SAT Scores.

Ordinary least squares (OLS) regression models were estimated to predict incoming students' SAT scores over time at each of the schools. Table 5.16 presents the OLS models for each school. The School of Arts and Sciences and Pharm experienced significant SAT score increases post-integration in both the overall and NJ resident only models with the integration variable being significant. The interaction variable was also significant for both SAS models, demonstrating that SAT scores trended upward in the years post-integration, indicating that SAT scores were on average about 10 points higher after the integration. The year variable was significant for SOE in both the overall and NJ resident only models which demonstrates that SAT scores have trended upward over the entire six-year period and are likely unrelated to the integration. On the

other hand, RBS-NB, had a significant negative integration effect. But the year variable was significantly positive, demonstrating that SAT scores did not appear to improve at RBS-NB after the integration. SAT scores did not appear to significantly increase for SEBS and among any of the models stratified for students interested in the health sciences for the other four schools.

Table 5.16 Ordinary Least Squares Regression of SATs for Incoming Students by Rutgers-New Brunswick School															
	Overall														
	School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	1174.15 (1.41)**	1173.30 (2.69)**	1219.49 (3.60)**	1153.80 (2.83)**	1152.55 (7.74)**	1193.39 (7.73)**	1268.13 (2.83)**	1229.95 (7.44)**	1259.87 (7.39)**	1376.44 (4.13)**	1372.68 (11.52)**	1400.67 (11.97)**	1273.43 (2.78)**	1246.16 (7.32)**	1261.67 (7.23)**
Integration	20.27 (2.00)**	11.78 (4.31)**	10.46 (3.87)**	17.50 (4.08)**	18.76 (8.90)*	14.85 (8.35)	40.61 (3.91)**	-7.16 (8.32)	-4.12 (7.59)	17.88 (6.11)**	25.88 (12.38)**	32.61 (10.77)**	8.77 (3.79)*	-35.09 (8.10)**	-20.13 (7.38)**
Year		0.43 (1.55)	0.54 (1.71)		0.62 (1.55)	1.23 (3.57)		19.08 (3.37)**	18.12 (3.14)**		1.86 (5.01)	-3.83 (4.37)		13.40 (3.31)**	12.44 (3.08)**
Integration * Year		7.31 (2.42)**	9.57 (2.17)**		-3.04 (5.05)	-0.95 (4.70)		-9.43 (4.76)*	-5.47 (4.33)		-13.51 (7.55)	-6.20 (6.52)		3.37 (4.48)	3.34 (4.08)
Female			-39.56 (1.80)**			-29.13 (3.89)**			-19.58 (4.43)**			-33.54 (5.24)**		-37.72 (3.40)**	
Black			-87.90 (2.95)**			-69.92 (5.93)**			-82.90 (7.87)**			-75.86 (15.54)**		-41.66 (10.13)**	
Hispanic			-58.98 (2.70)**			-53.56 (5.38)**			-67.63 (6.38)**			-62.55 (15.62)**		-40.92 (7.84)**	
Asian			49.25 (2.19)**			29.17 (5.20)**			20.14 (3.94)**			52.36 (7.23)**		42.36 (3.62)**	
First Generation			-63.64 (1.88)**			-51.92 (3.92)**			-73.70 (4.14)**			-89.64 (7.22)**		-50.33 (3.90)**	
International			-79.77 (4.23)**			-39.08 (14.79)**			-138.82 (8.90)**			-50.51 (9.55)**		-119.54 (6.45)**	
Out of State			-28.43 (3.91)**			14.78 (7.19)*			-26.39 (7.42)**			-40.54 (7.08)**		-1.01 (7.52)	
Adjusted R ²	.01	.01	.21	.00	.00	.14	.03	.03	.21	.01	.01	.31	.00	.02	.23
	Students Interested in Health Sciences														
	School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	1188.81 (2.48)**	1181.82 (6.52)**	1228.83 (6.37)**	1157.56 (5.56)**	1146.55 (15.42)**	1209.18 (14.97)**	1297.71 (6.96)**	1279.07 (17.15)**	1310.71 (17.81)**						
Integration	13.53 (3.42)**	0.54 (7.40)	-1.19 (6.50)	23.16 (7.54)**	13.45 (17.20)	9.83 (15.75)	29.64 (9.08)**	2.81 (19.84)	2.80 (18.61)						
Year		3.47 (3.00)	4.32 (2.65)		5.48 (7.07)	3.05 (6.40)		9.51 (8.00)	6.29 (7.66)						
Integration * Year		2.94 (4.18)	5.54 (3.64)		-6.49 (9.32)	0.90 (8.50)		3.97 (10.92)	10.74 (10.07)						
Female			-45.42 (3.09)**			-35.46 (7.04)**			-33.23 (8.62)**						
Black			-84.30 (4.59)**			-95.11 (9.79)**			-55.39 (16.97)**						
Hispanic			-60.15 (4.61)**			-58.93 (10.04)**			-50.13 (16.61)**						
Asian			54.91 (3.59)**			14.65 (8.78)			23.91 (9.07)**						
First Generation			-71.28 (3.18)**			-58.51 (6.88)**			-93.04 (11.36)**						
International			-70.64 (10.27)**			-44.36 (31.04)			-45.14 (44.50)						
Out of State			-22.40 (6.40)**			9.77 (13.86)			-19.36 (17.00)						
Adjusted R ²	.00	.00	.25	.01	.01	.17	.01	.02	.18						
	NJ Residents Only														
	School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering			School of Pharmacy			School of Business		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	1176.81 (1.47)**	1173.38 (3.83)**	1218.87 (3.74)**	1151.88 (2.98)**	1149.09 (8.09)**	1192.01 (8.08)**	1270.34 (45.80)**	1231.78 (7.70)**	1261.04 (7.59)**	1386.69 (4.93)**	1385.38 (13.74)**	1398.58 (13.69)**	1275.79 (2.91)**	1245.51 (7.66)**	1262.91 (7.53)**
Integration	21.31 (2.12)**	11.31 (4.54)*	10.34 (4.06)*	19.15 (4.29)**	21.04 (9.44)*	16.05 (8.83)	45.80 (4.07)**	-2.22 (8.63)	-2.40 (7.86)	12.60 (7.03)	28.26 (14.25)*	33.20 (12.34)**	20.29 (3.99)**	-24.86 (8.35)**	-17.85 (7.71)**
Year		1.72 (1.78)	1.40 (1.61)		1.40 (3.75)	2.18 (3.49)		19.26 (3.49)**	18.05 (3.23)**		0.64 (5.87)	-2.57 (5.03)		14.89 (3.43)**	13.20 (3.20)**
Integration * Year		5.03 (2.59)	7.29 (2.29)**		-5.97 (5.32)	-3.45 (4.93)		-9.68 (4.96)	-6.84 (4.52)		-16.91 (8.62)	-10.00 (7.35)		0.39 (4.68)	-1.05 (4.33)
Female			-41.07 (1.90)**			-30.31 (4.08)**			-21.41 (4.68)**			-33.03 (5.96)**		-39.64 (3.66)**	
Black			-86.84 (3.06)**			-70.19 (6.28)**			-85.03 (8.23)**			-79.85 (18.45)**		-46.75 (10.60)**	
Hispanic			-60.09 (2.77)**			-52.27 (5.57)**			-69.12 (6.59)**			-64.13 (15.97)**		-42.33 (7.99)**	
Asian			49.85 (2.26)**			29.60 (5.36)**			20.51 (4.05)**			54.91 (7.92)**		40.81 (3.72)**	
First Generation			-65.17 (1.97)**			-54.37 (4.09)**			-76.19 (4.33)**			-101.01 (8.33)**		-55.69 (4.19)**	
Adjusted R ²	.01	.01	.22	.00	.01	.14	.03	.04	.21	.00	.01	.32	.01	.02	.20

**p<.01

*0.1<p<.05

Dependent Variable 3: Interest in a Health Science Major

Table 5.17 presents the raw coefficients for each of the three schools analyzed. Interestingly, each school only had one significant time variable. The interaction variable was significant for SAS and SEBS, while the integration variable was significant for SOE. This meant that student interest in a health science major increased immediately after the integration at SOE, but did not significantly trend upward in the years post-integration. Student interest in a health science major appeared to significantly decrease over time after the integration at SAS, but significantly increased over time after the integration at SEBS.

Table 5.17 Logistic Regression of Interest in a Health Science Major for Incoming Students by Rutgers-New Brunswick School									
	School of Arts and Sciences			School of Environmental and Bio. Sciences			School of Engineering		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	-0.557 (.021)**	-0.660 (.056)**	-1.254 (.062)**	-0.970 (.051)**	-1.020 (.134)**	-1.183 (.147)**	-1.588 (.058)**	-1.444 (.058)**	-1.648 (.169)**
Integration	0.091 (.029)**	0.059 (.064)	0.090 (.065)	0.440 (.069)**	-0.063 (.156)	-0.039 (.159)	0.278 (.079)**	0.481 (.181)**	0.587 (.187)**
Year		0.052 (.026)*	0.045 (.026)		0.025 (.062)	0.025 (.063)		-0.072 (.03)	-0.121 (.076)
Integration *Year		-0.126 (.036)**	-0.102 (.037)**		0.396 (.085)**	0.402 (.086)**		0.014 (.099)	0.030 (.103)
Female			0.490 (.030)**			-0.323 (.071)**			1.165 (.088)**
Black			0.632 (.050)**			0.750 (.116)**			0.198 (.187)
Hispanic			0.290 (.049)**			0.360 (.110)**			0.145 (.163)
Asian			0.746 (.035)**			0.822 (.085)**			0.283 (.090)**
First Generation			-0.003 (.033)			0.029 (.076)			-0.511 (.105)**
International			-1.557 (.108)**			-1.384 (.359)**			-1.765 (.395)**
Out of State			-0.175 (.062)**			-0.065 (.134)			-0.055 (.194)
Pseudo R^2	.00	.00	.04	.01	.02	.05	.00	.00	.06

**p<.01

*.01<p<.05

The Y-standardized coefficients for the models with a significant interaction variable are displayed in Table 5.18. This only included SAS and SEBS. The Y-standardized coefficients demonstrate how the time coefficients change as the model incrementally incorporates more independent variables. The values change slightly across models for SAS but larger differences are evident in the models for SEBS, demonstrating the importance of incorporating relevant covariates into the model.

Table 5.18 Y-Standardized Coefficients of Interest in a Health Science Major for Incoming Students by Rutgers-New Brunswick School						
	School of Arts and Sciences			School of Environmental and Bio. Sciences		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Integration	0.040	0.016	0.048	0.308	0.064	-0.021
Year		0.023	0.024		-0.015	0.013
Integration *Year		-0.045	-0.054		0.281	0.213
Female			0.261			-0.171
Black			0.337			0.397
Hispanic			0.154			0.190
Asian			0.397			0.435
First Generation			-0.001			0.016
International			-0.829			-0.733
Out of State			-0.093			-0.034

The predicted probabilities and marginal effects for SAS and SEBS are displayed in Table 5.18. The predicted probabilities based on the significant interaction variable for SAS was .3621 and .3297 for SEBS. A one-unit increase in the interaction variable (or the average annual change in the post-integration period) decreases the probability of health science interest by 2.4% for SAS, but increases the probability of a student being interested in a health science major by 8.7% at SEBS.

Table 5.19 Predicted Probabilities and Marginal Effects of Incoming Student Interest in Health Science Major by Rutgers-New Brunswick School				
	School of Arts and Sciences		School of Environmental and Bio Sciences	
	Predicted Probability (Y=1)	Marginal Effect	Predicted Probability (Y=1)	Marginal Effect
Integration	0.3783	0.021(0.015)	0.3095	-0.008(.034)
Year	0.3621	0.010(0.006)	0.3297	0.005(.014)
Integration *Year	0.3621	-0.024(.009)**	0.3297	0.087(.018)**
Female	0.4219	0.113(.007)**	0.2864	-0.070(.016)**
Black	0.5057	0.154(.012)**	0.4719	0.175(.028)**
Hispanic	0.4285	0.069(.012)**	0.3842	0.081(.026)**
Asian	0.4867	0.177(.008)**	0.4600	0.188(.020)**
First Generation	0.3676	-0.001(.008)	0.3178	0.006(.016)
International	0.1148	-0.266(.011)**	0.1046	-0.213(.034)**
Out of State	0.3309	-0.040(.014)**	0.3010	-0.014(.028)

**p<.01

*.01<p<.05

Discussion.

The results from these analyses indicate that recruitment of quality undergraduate students has not significantly or uniformly increased as a result of the integration. Results from the models showed that acceptance decreased after the integration for all schools, but was only significant for SAS, SEBS, and SOE. However, SAT scores appeared to increase after the integration at SAS and Pharmacy. The subsequent 8-point decline of SAT scores on average at RBS-NB post-integration provides some evidence that the SAT score increases at Pharmacy (about 25 points) and SAS (about 20 points) occurred as a result of the integration. Further, increased interest in a health science major at SEBS and SOE demonstrates that these fields are appealing to incoming students at these schools.

While these results are largely disappointing to the university, they are not completely unexpected. As mentioned previously, much of the literature has indicated it will take several years to see the effects of an M&A in higher education (Pinheiro et al., 2016; Skodvin, 1999). It may take more time for Rutgers to leverage UMDNJ's programs. The University of Medicine and Dentistry of New Jersey did not have a great reputation prior to the integration, so Rutgers may need to improve the image of these programs before more positive results emerge. Recruitment goals may begin to be realized as Rutgers builds on and promotes health science education.

Summary of Results for all Goals Measured

- The descriptive results from QS and THE demonstrate that the reputation of Rutgers did not improve on an international level after the integration was implemented
- The descriptive results from USNWR showed a minor increase in reputation, but this increase is so small that is not likely to be related to any significant change after the integration was implemented
- Federal R&D expenditures (descriptively) increased for Rutgers post-integration, but this increase does not appear to be due to newly acquired resources
- Undergraduate acceptance did not increase in any of the Rutgers-New Brunswick schools, and actually significantly decreased over time for SAS and SOE

- SAT scores significantly improved for incoming students at SAS and Pharm post-integration over time, while they significantly decreased for incoming students at RBS-NB, the school that was used as a comparison school
- Interest in a health science major increased post-integration over time for incoming students at SEBS, but decreased for SAS post-integration over time

Discussion

The primary purpose of the study is to propose a framework for how to assess an M&A in higher education. Given the time, money, and energy involved in an M&A in higher education, it is important that they be properly measured. The information in this chapter delineates a plan for how to conduct an effectiveness assessment by measuring the intended outcomes of an M&A. The processes involved in an effectiveness assessment are meant to be broad so that steps are easily replicated across various cases of higher education M&As. These steps include identifying specific goals, determining how to measure goals given the availability of data, and finally measuring whether goals have been met. The data, analysis, and outcomes of these steps will vary from case to case, but provide guidance on how to evaluate an M&A which can be generally applied and later triangulated to similar cases.

Theoretical frameworks provide a similar level of guidance to research of this nature. Resource dependence theory (RDT) and transactional cost theory

(TCT) are both frameworks that can help explain an M&A's outcomes and can provide a framework that allows for linking, supporting, and organizing other research studies. Resource dependence theory and TCT are similar in nature that they both provide guidance on how decisions are made in an M&A, but RDT appears to be the most relevant to an effectiveness assessment. Resource dependence theory focuses on external competition as a driving factor where TCT, on the other hand, is primarily interested in preserving internal relationships among involved parties to become a stronger entity while minimizing transaction costs.

Resource dependence theory also appears to be the most widely applied in M&A research, both in higher education and in the private sector. This theory is frequently applied to research to explain the motivations and the goals for an M&A which is largely due to competition, and securing resources in the marketplace. This was seen in virtually all the higher education cases discussed earlier, and appears to be applicable in the Rutgers-UMDNJ case as well.

Resource dependence was clearly a motivation behind the goals measured in this chapter. The goals of the Rutgers-UMDNJ integration were all established for both the State of New Jersey and Rutgers University to capture more resources from the marketplace. The first goal of enhancing the reputation of Rutgers allows the university to be more competitive which enables it to capture more available resources from the marketplace. The second goal measured, increasing federal research funds, would make Rutgers more competitive among its AAU peers, many of which have medical schools. Finally,

RDT explains the motive for enhancing medical education opportunities in the State is to retain educated residents who can later contribute to New Jersey's large health science industry. This would keep New Jersey's economy competitive in the health science industry.

Competition to secure economic resources within the State of the New Jersey was the primary purpose of the Rutgers-UMDNJ integration from a policy perspective. Therefore, RDT appears to be more applicable to the effectiveness assessment. Transaction cost theory (TCT) which examines how transaction costs can be reduced should be revisited when analyzing cost effectiveness and/or efficiency which will be covered in the following chapter.

Many of the goals have yet to be fully realized at this point, or have shown minimal progress. This includes increasing the share of federal research funds, enhancing the international reputation of Rutgers, and strengthening undergraduate recruitment. However, some signs of progress have been made. The increased SAT scores for SAS and Pharm post-integration accompanied with a decrease in SAT scores for RBS-NB post-integration suggests that SAT score improvement may have been related to the integration. This may be preliminary evidence that Rutgers is attracting higher achieving students as a result of the integration.

The Rutgers admissions data also showed reported interest in health sciences majors among incoming undergraduate students at SEBS increased in the post-integration period. Overall, it appears the results are promising even if

the analysis shows that some of these goals have not yet been realized. It's likely that three years may be too early to fully see growth for all of these areas given that research has suggested that M&As in higher education tend to see results several years later (Pinherio et al., 2016; Skodvin, 1999). Therefore, the same analyses should be conducted again in a few years to see whether there has been any significant movement with all of the goals evaluated in this chapter.

This research has many limitations. The timing of the initiation of Rutgers into the Big 10 Academic Alliance and the creation of the undergraduate Honors College may have also contributed to many of the positive outcomes this research has found. While there were efforts made to separate these initiatives from the Rutgers-UMDNJ integration where possible, it is difficult to determine whether the integration was solely responsible for these outcomes. It is highly likely that these initiatives had collectively impacted these goals, and isolating the effect of one of these will be difficult to do at any point in time.

Another notable limitation is related to the data used in this chapter. Not all goals could be evaluated quantitatively at this time. For instance, recruitment of top faculty was a goal in which quantitative data was not available. Data on graduate students was also not available. Further, the data used for many of the goals had limitations. The tier rankings to evaluate reputation provided peer data, but how the data was collected and utilized by each one of the agencies was vague and difficult to ascertain. The R&D expenditure data only had two years of data available post-integration where all the other measures were available three years post-integration.

Perhaps, the most important limitation was the inability to conduct these analyses on graduate student data. The admissions data included only undergraduate students, and only had a select number of variables available for all students and all years. The majority of programs from UMDNJ serve graduate students. The image of UMDNJ was undeniably hurt after the deferred prosecution in 2005, which would have had an impact on admissions for the university. The integration with Rutgers would have had a greater effect on the graduate school admissions for the UMDNJ programs. However, since this data was not available, I was unable to evaluate and assert whether the integration had an effect on these programs. Future research with graduate student admissions data is strongly suggested.

Finally, time was a major limitation in this research. The evaluation of this case occurred only a few years after the official Rutgers-UMDNJ integration. This was beneficial for analyzing the design and implementation chapter since that chapter relied on the recall and availability of individuals at Rutgers and UMDNJ before and after the M&A. However, it is less beneficial for an effectiveness assessment. Many of these goals take time to be realized and not enough time has passed to fully see the effects of the Rutgers-UMDNJ integration, particularly with the goals not covered in this chapter which were related to the New Jersey economy. Future research is needed to evaluate the trends of the goals over time covered in this chapter as well as the two goals related to the New Jersey economy not evaluated in this chapter.

CHAPTER 6: EFFICIENCY ASSESSMENT

As stated previously, a primary goal for an M&A in higher education is to enhance both effectiveness and efficiency. Effectiveness (i.e., the relationship between input and outcomes) is related to outcomes that can create more robust and competitive programs that will improve educational outcomes and was examined in the previous chapter. Analysis revealed that the integration shows some promise in meeting some of the goals related to effectiveness three years post-integration, while not showing much positive evidence for other goals. This chapter will focus on evaluating efficiency in a higher education M&A. Increased efficiency (i.e., the relationship between inputs and outputs) within an organization can condense duplicative programs and services, refine resource allocation, and reduce overall costs (Arrow et al., 1961; Eastman & Lang, 2001; Kenny, 2008; Skodvin, 1999).

The two dominant ways in which organizational efficiency in a traditional M&A is evaluated are through the formation of synergies, (i.e., the value of the combined institution is greater than the sum of individual parts) (Skodvin, 2014); and economies of scale, (i.e., the reduction in the per unit cost of production when the volume of output is stable or enhanced) (Bess & Dee, 2008; Eastman & Lang, 2001; Patterson, 2000). A newly created merged institution would have improved value by enhancing its overall academic position in the marketplace. In higher education mergers, resulting synergies are often measured by diversification strategies, which enhance market power in the higher education space. This increased market power can be realized through stronger

recruitment of faculty and students, stronger relationships among faculty and students, and the ability to capture a larger portion of available research dollars (Skodvin, 2014).

Analyses of economies of scale in higher education “relate the size (usually measured by the number of students) to the cost per unit of size” (Patterson, 2000, p. 259). Furthermore, economies of scale in higher education can help “gain administrative benefits (e.g., economies of scale with regard to number of administrators, a more professional and efficient administration, and to improve the use of infrastructure and the use of physical facilities)” (Skodvin, 2014, p.5-6).

Frequently, the outcomes of both methods are among the major goals of a higher education M&A. However, the formation of synergies appears to be seen more immediately than economies of scale. This is because it takes more time for a university to identify and actively take steps to eliminate redundancies than it does to create an environment that increases competition and/or collaboration. However, this timeliness on merging synergies is dependent on the environment and whether it fosters collaboration either naturally or through leadership intervention. Mergers also “require a lot of resources for planning, coordination and physical infrastructure, especially in the implementation phase” (Skodvin, 2014, p.6), which may require more administrative resources in the early stages of a merger (Mintzberg, 1983). Therefore, these resources may not be reduced or eliminated until sometime after the merger is initiated. Further, it is more difficult for a university to generate new revenue than a company in the private

sector, as universities mainly rely on state allocations and tuition for a fixed number of students for income (Eastman & Lang, 2001). The research that currently exists suggests that efficiencies do not occur immediately with higher education M&As. Examples include the Georgia State higher education system mergers (Gardner, 2017), the merger of Finnmark University and the University of Tromso in Norway (Arbo & Bull, 2016), and the Ontario Institute for Studies in Education (OISE) and the merger of University of Toronto (UT) in Canada (Eastman & Lang, 2001).

The Georgia State higher education system merged 14 of its colleges and universities into seven between 2011 and 2017 with the goal of enhancing higher education in the State at reduced cost (Gardner, 2017). However, the administration for the Georgia State higher education system has acknowledged that while some costs have been reduced (e.g., redundancies in administrative positions), new costs have been incurred. Only 28 administrative positions were eliminated since 2017, while approximately 80 new student support positions were added after the mergers. Transitional costs required to consolidate systems, such as information technology and human resources, were also incurred. Therefore, the Georgia mergers have not begun to realize financial efficiencies six years post-merger.

Finnmark University and the University of Tromso, both in Norway, officially merged in August 2013 (Arbo & Bull, 2016). Research conducted by Arbo and Bull (2016) suggested that while many of the goals related to the merger were ultimately successful, many financial benefits related to the merger

have not yet been realized. This was particularly apparent when it came to merging the support functions and administrative services of the newly merged university.

While many higher education M&As achieve intended results, the overarching goal of efficiency takes some time to be fully realized. OISE and UT, for instance, cost about \$10 million to merge, but the bulk of these costs were recovered approximately three years after the \$10 million had been spent (Eastman & Lang, 2001). However, OISE and UT had considerable government oversight, which is uncommon in universities in the United States, but contributed to this timeliness.

It is important to note the differences between economic efficiency and organizational efficiency. Economic efficiency is generally thought to be achieved when all resources are receiving optimal returns from the point of view of society at large (Arrow et al., 1961; Kenny, 2008). It is not expected that a merger would result in complete economic efficiency for an institution as universities have considerable inefficiencies built in that can't be avoided (Bess & Dee, 2008; Kenny, 2008) and can be unrelated to a merger such as the cost of uneaten or spoiled food incurred by dining services. Organizational efficiency, on the other hand, is an organization's ability to become efficient using specific plans for that organization (Bess & Dee, 2008). For this case, that would entail measuring the goals outlined in the legislation that established the Rutgers-UMDNJ integration. Therefore, what is truly being assessed in this chapter is efficiency from the

organization's standpoint. The goal of the merger in this case is to move closer to organizational efficiency when two institutions combine.

Like the previous chapter, establishing a list of goals to be assessed is important to evaluate organizational efficiency. Impact measurement was applicable for all the goals in the legislation, while only a subset of the goals can be assessed for efficiency. Because there are several ways to measure the efficiency of a particular university, it is important to use the appropriate efficiency measure for each goal. While the university and credit agencies (such as Moody's Investors Service) have been monitoring some of the financial outcomes, a full empirical examination of efficiency within the merged university covering both finances and academics has not yet been conducted.

Overview of Research Questions

This chapter will follow up on the preceding chapter by addressing the research question related to efficiency of the integration. Efficiency can condense duplicative programs and services, refine resource allocation, and reduce overall costs (Arrow et al., 1961; Eastman & Lang, 2001; Kenny, 2008; Skodvin, 1999). The efficiency of an organization can be measured in two ways, through synergies and economies of scale.

First, the goals that were identified in the legislation need to be verified with individuals who were involved in the integration planning. Second, the goals that can yield efficient outcomes will need to be identified. This will confirm whether the correct set of goals is being evaluated, and whether they can

produce efficient outcomes. Finally, the measurable outcomes for each appropriate goal will be identified. While there are several different ways the outcomes can be defined and measured, the outcomes will be based on the data available which are largely qualitative. This analysis would indicate which goals, if any, may have been reached. Finally, why certain outcomes have been realized or not will be discussed.

Appropriateness of Goals

This chapter will continue to use data collected through 25 personal interviews with various stakeholder groups described in the previous two chapters. While it can be argued that all the goals may indirectly be tied to efficiency, the only goal applicable for analysis at this time (three years post-integration) was “create a climate that fosters highly productive and innovative multidisciplinary projects.” This goal was directly tied to facilitating synergies between the two institutions resulting from the integration. The other goals are intended to improve educational outcomes, and thus were evaluated in the previous chapter.

The interviews revealed that all stated goals were applicable to the integration, including increased multidisciplinary work between the two institutions. As mentioned previously, the last two goals, “strengthen partnerships between higher education and the healthcare industry in New Jersey” and “increase opportunities to promote and facilitate economic growth in the State of New Jersey, including attracting businesses to the state and creating jobs to

keep New Jersey workers in the state” would require more time to be realized. Therefore, these goals will not be addressed now, but should be in the future. Details on the other goals are available in the previous chapter.

Increased multidisciplinary projects occurring between Rutgers and UMDNJ garnered a good deal of consensus among stakeholders interviewed. Eighteen individuals¹⁹ agreed that “Create a climate that fosters highly productive and innovation multidisciplinary projects” was an important goal of the integration. Most individuals felt that the formal relationship between the universities would encourage greater collaboration among faculty from the two institutions as well as between faculty and students, and thus facilitating synergies between both institutions.

The interviews also revealed a handful of other potential goals including the motivation from Rutgers-New Brunswick to “take the medical school back,” the personal desire of Governor Chris Christie to have a major successful accomplishment during his first term along with this knowledge of UMDNJ’s weakened infrastructure, and creating economies of scale between the two institutions. A few individuals²⁰ mentioned that economies of scale (e.g. reducing redundancies) were a primary motivation to integrate, which makes sense since this is typically the goal of an M&A. The first two of these three additional goals were discussed in the implementation chapter and not deemed to have resulted in any organizational efficiencies by stakeholders who were interviewed. As such,

¹⁹ Nine from Rutgers-New Brunswick, four from UMDNJ-Newark, one individual from UMDNJ-New Brunswick, three officials from the State of New Jersey, and one private citizen

²⁰ n=4; two from Rutgers-New Brunswick and two from UMDNJ-Newark

they will not be explored further in this chapter. The third additional goal is related to efficiency in terms of measuring economies of scale and will be addressed in this chapter.

Efficiency Assessment of Goals

Synergies

The first way institutional efficiency of a traditional M&A can be evaluated is through synergies, i.e., the value of the combined institution is greater than the sum of its two parts (Skodvin, 2014). In other words, is an institution post-merger more valuable, in terms of both pecuniary and non-pecuniary (reputation, goodwill, etc.) wealth, together than the individual institutions were pre-merger? Synergies often involve the integration of unique assets that are hard to trade (Farrell & Shapiro, 2001), which means the value of an organization is somewhat abstract and may vary by industry. Regardless of the industry, the intended outcome of an M&A is innovation (Prabhu et al. 2005; Rao et al., 2016) where organizations form synergies with one another to form a superior organization with increased market power. These synergies are most beneficial when the two merging organizations share comparable characteristics, which can include cultural and financial similarities (Farrell & Shapiro, 2001; Rao et al., 2016).

Financial resources for universities, especially public institutions, are becoming increasingly scarce (State Higher Education Executive Officers, 2017; Zumeta et al., 2012). Therefore, from the perspective of the merging universities, it is important for them to strengthen their market power. Increased market power

in academic settings can be observed through stronger relationships among faculty and students, enhanced recruitment of faculty and students, and the ability to capture a larger portion of available research dollars (Skodvin, 2014). “By definition, a synergy will not be achieved by one firm unilaterally without the merger” (Farrell & Shapiro, 2001, p. 693). Recruitment of faculty and students, and acquiring more research dollars are both initiatives that institutions often undertake independently, where greater collaboration between two universities requires an intervention to occur, such as a merger.

Forming synergies requires cooperation and coordination of the merging organizations (Farrell & Shapiro, 2001). This can occur naturally or may require intervention by those leading the merger. It can be expected that two similar universities would merge to create a stronger university with an environment that fosters greater collaboration. It can also be anticipated that two organizations that merge under duress may be resistant to forming synergies. The current case of Rutgers and UMDNJ is a unique case in which both concepts may hold true, since the universities had a longstanding history, were located closely to one another, and shared similar cultural values as doctoral degree granting research universities. However, many stakeholders from UMDNJ (according to data collected from interviews), were initially opposed to integration with Rutgers, which would make collaboration difficult and lead to little or no multidisciplinary work between the two universities.

Data to assess increased multidisciplinary research projects was limited at the time of study. No quantitative data were available to directly measure pre-

integration and post-integration multidisciplinary research. Therefore, interview data with key stakeholders were collected to assess whether multidisciplinary research increased between the two universities as a result of the integration.

Information on multidisciplinary research projects was collected in the same interview as the ones discussed earlier in this chapter regarding the appropriateness of the goals. Individuals had indicated that the integration had created synergies, and while growth was occurring, they all agreed that it is difficult to quantitatively measure.

Virtually all individuals who were identified as being familiar with faculty productivity²¹ agreed that collaboration is growing because of the integration in the science, technology, engineering, and mathematics (STEM) fields. Increased collaboration appeared to be immediately evident on the New Brunswick campus. Individuals indicated that this was because of the history between UMDNJ-New Brunswick and Rutgers that was discussed in earlier chapters of this study. So, to some degree there was already collaboration occurring between the two institutions prior to the merger. Additionally, initial conversations that discussed the merging of UMDNJ-New Brunswick with Rutgers-New Brunswick, such as the recommendation from the New Jersey Higher Education Task Force (2010, p.62), allowed for relationships to be fostered earlier than with the schools on the Newark campus.

Several individuals²² mentioned that collaborative work was most pronounced in the centers and institutes as a result of the integration. Centers

²¹ n=9

²² n=7

and institutes are often established with the intention of fostering multidisciplinary projects. It is difficult to track specifically who is working together, but most of the preexisting centers and institutes are on the New Brunswick campus. This includes the Cancer Institute of New Jersey (CINJ), the Institute for Health, Health Care Policy and Aging Research, Center for Advanced Biotechnology and Medicine (CABM), and Environmental and Occupational Health Sciences Institute (EOHSI). This further contributed to an environment that promoted multidisciplinary research on the New Brunswick campus, especially in CABM and EOHSI, which were joint units between Rutgers and UMDNJ prior to the integration.

While multidisciplinary research clearly occurred between the two institutions in New Brunswick prior to the integration, greater collaboration occurred after the integration because it made fostering relationships easier, according to those interviewed. Post-integration relationships between UMDNJ and Rutgers on the New Brunswick campus appeared to occur organically, particularly due to the relationships that existed prior to the integration. The Newark campus appears to have had a more difficult time engaging in multidisciplinary work immediately after the integration. This is expected given the history and physical structure of the New Brunswick campus as described in Chapter 5. According to one individual from Rutgers-New Brunswick, “UMDNJ faculty in New Brunswick wanted to associate with Rutgers-New Brunswick for years. Newark was a completely different story.” Collaboration appears to be

growing on the Newark campus, but is more sluggish than on the New Brunswick campus.

A few factors emerged out of the interviews that further explain the difficulty with collaboration on the Newark campus. Seven individuals indicated that the resistance to merge the UMDNJ units on the Newark campus was fueled by perceived disparities in resources. This led individuals to be less receptive about working together on multidisciplinary projects initially. According to an individual from Rutgers-New Brunswick, “Many folks in Newark were mad and taken by surprise that they were being taken over by Rutgers. It was that they were taken over by New Brunswick and they resented that.” An individual from UMDNJ-New Brunswick explained, “People in Newark were used to focusing on issues in Newark, not New Brunswick. That’s the way things were prior to the integration and they (UMDNJ-Newark) were set in their ways.” Additionally, Rutgers-Newark did not have the large presence in health and biomedical science that Rutgers-New Brunswick did, and thus relationships between Rutgers-Newark and UMDNJ-Newark were weak pre-integration. Individuals from the UMDNJ units in Newark would need to work with individuals on another campus. According to one individual from UMDNJ-New Brunswick, “It is a lot easier to work with someone that you can walk across campus to meet with for lunch than it is to work with someone that is a 30-minute drive away.” Therefore, location was another barrier that inhibited multidisciplinary work.

The difficulty of multidisciplinary work being fostered between the UMDNJ units at Newark and the New Brunswick units was foreseen, which is why RBHS

was established as a separate entity at Rutgers when the legislation was being designed. “People in Newark were worried that the shift of focus would move toward New Brunswick, so there was no way this (the integration) was going to fly without certain assurances that Newark wasn’t going to be ignored,” an official from the State of New Jersey stated. Another individual from UMDNJ-New Brunswick explained, “There was a sense of competition between the two campuses, and under previous leadership competition was encouraged where collaboration was not. There were barely any relationships between New Brunswick and Newark (UMDNJ entities) prior to the integration.” The creation of a new Chancellor who oversaw the health and biomedical sciences units on the Newark and New Brunswick campuses was intended to break the silos that previously existed between the campuses, and foster an environment where multidisciplinary projects could transpire. Three years after the integration and two years after the new Chancellor, Brian Strom, was hired, multidisciplinary work at UMDNJ appears to be growing in all locations.

According to five of the individuals interviewed, the Chancellor has demonstrated leadership that has created an environment conducive to collaborative research. Three of these individuals further mentioned that multidisciplinary research between the UMDNJ units on the separate campuses had never been particularly robust prior to the integration. An individual from UMDNJ-New Brunswick stated, “The new chancellor really sees value in the two campuses (UMDNJ-New Brunswick and UMDNJ-Newark) working together, rather than competing against one another.” Another individual from UMDNJ-

Newark further explained that new leadership specifically impacted the two medical schools located on separate campuses, “New leadership – particularly Brian Strom and Robert Barchi, has really transformed the relationship between the medical schools on the two campuses.” This suggests that while the formation of synergies within the New Brunswick campus may have been natural, synergies involving collaboration between the UMDNJ units on New Brunswick and Newark required intervention.

According to the interviews conducted, the Rutgers and UMDNJ integration appears to have successfully formed synergies through enhanced multidisciplinary research. An individual from Rutgers-New Brunswick explained, “Even though I don’t have specific numbers to reference, the number of grant applications between researchers from Rutgers and former UMDNJ schools has grown.” Another individual from Rutgers-New Brunswick mentioned that “some of the newly established institutes like the Global Health Institute have reached out to faculty on both campuses and encouraged collaborative work.” The information is encouraging, but there are also some limitations. Most notably, it is difficult to determine whether efficiency occurred. Efficiency in terms of forming synergies is dependent on the idea that the quality of what is being produced will enhance the value of the merged institution after a merger. However, there is no way to measure the quality of multidisciplinary research being produced as a result of the integration. This limitation makes it difficult to conclude whether the integration improved the efficiency of the schools despite the indication that multidisciplinary projects increased.

There is also no way to verify whether enhanced multidisciplinary research has occurred at a broad level with the data available. The interviews with administrators are subject to social desirability biases that may unintentionally enhance how well Rutgers is doing in meeting this goal. It is also likely that major changes with respect to multidisciplinary work will take some time to become fully realized. Research that can quantitatively assess these goals is suggested to overcome some of these limitations. Additionally, since relationships may take some time to be established and produce meaningful work, further research in several years is needed.

Economies of Scale

Another way organizational efficiency of a traditional M&A can be measured is through the realization of economies of scale when that average cost decreases as output increases (Besanko & Braeutigam, 2013; Patterson, 2000). Analyses of economies of scale in higher education “relate the size (usually measured by the number of students) to the cost per unit of size” (Patterson, 2000, p. 259). Economies of scale are seen when two universities combine and become a leaner university as a result of an M&A because duplicative processes between the two universities are eliminated. Economies of scale can be detected at the program level, but that requires overlap between the programs offered by both universities which may not be present in all M&As. Universities may also have difficulty scaling down programs for a variety of reasons, such as faculty from one or both universities being tenured or unionized (Klein, 2011), or the

university wishing to expand its scale and/or scope in a particular field (Eastman & Lang, 2011).

Economies of scale are most often observed with administrative offices that can be centralized, such as human resources, payroll, and information technology (Eastman & Lang, 2001; Mintzberg, 1983). These economies of scale often take time to be realized, with much of the literature suggesting that it can take several years for economies of scale to be realized (Pinheiro et al., 2016; Skodvin, 1999, 2014). Furthermore, economies of scale are often seen after large transitional costs are undertaken at the beginning of an M&A (Eastman & Lang, 2001; Mintzberg, 1983; Pinheiro et al., 2016) such as consultant fees and purchasing software that integrates the university systems.

According to information gathered from the interviews, economies of scale were expected after Rutgers and UMDNJ integrated. While it was not predicted that the universities would reach perfect efficiency, eliminating many of the duplicative processes was anticipated. All interviewees mentioned that the economies of scale were hoped for in the administrative operations such as human resources, payroll, and information technology (IT). Additionally, very few economies of scale were expected to occur at the program level with the nursing schools being the only program with any meaningful overlap.

Through interviews conducted with the stakeholders, some individuals (n=4) pointed out that creating economies of scale and eliminating redundancy were clear goals of the integration. Two additional individuals were interviewed

after the initial interview process, specifically for their working knowledge of the economies of scale after the integration. These individuals were able to shed additional light on whether economies of scale were realized and where they might be observed since quantifiable data were limited at the time of this study.

Some quantitative data were evaluated to determine broadly whether any efficiencies were created. Data on university reported annual total expenses per full-time equivalent student²³ for the 2010-11, 2011-12, 2013-14, and 2014-15 academic years were collected from the Integrated Postsecondary Education Data System (IPEDS) database which is maintained by the Institute of Education Sciences, an evaluation arm of the U.S. Department of Education. Data were not available for the 2015-16 academic year at the time of analysis. Rutgers data were reported to IPEDS with New Brunswick, Newark, and Camden combined. UMDNJ data were not reported to IPEDS for the 2012-13 academic year, so that year was removed from the analysis. UMDNJ data were combined with Rutgers data to evaluate whether the collective expenses would decrease after the integration. Expense data were adjusted to constant July 1, 2015 dollars based on inflation measured by the Consumer Price Index (CPI).

Expenses per full-time equivalent student for Rutgers and UMDNJ collectively, along with all AAU public institutions, are presented in Table 6.1. Public AAU institutions that are part of the Big 10 Academic Alliance were plotted in Figure 6.1. Overall, expenses for most institutions were steady or had minor

²³ Defined as the total number of full-time students + 1/3 part-time students. Includes both graduate and undergraduate students

growth across all years. Trends for Rutgers and UMDNJ were stable between the pre-integration years of 2010-11 and 2011-12 and post-integration years of 2013-14 and 2014-15, but there was a sharp decline of \$8,586.95 per student between 2011-12 and 2013-14, which suggests that the collective Rutgers-UMDNJ expenses declined after the integration. However, the immediate drop in the expenses between 2011-12 and 2013-14 may have been unrelated to efficiency as not all of UMDNJ was integrated with Rutgers. The School of Osteopathic Medicine (SOM) and University Hospital (UH) were included in UMDNJ's IPEDS submission in the pre-integration years, and were not included in the integration with Rutgers. SOM was merged with Rowan University, and UH became a separate entity overseen by the State. Economies of scale are unlikely to occur immediately after an M&A and are more gradual in nature. This sudden decline is most likely due to Rutgers not reporting SOM and UH's expenses in the post-integration years. Additional information was needed to verify whether economies of scale had been realized at this point.

Table 6.1 Total Expenses per Full-time Equivalent Student				
Public American Association of Universities (AAU)	2010-11	2011-12	2013-14	2014-15
Georgia Institute of Technology-Main Campus	\$66,854.92	\$69,917.96	\$70,463.04	\$70,331.03
Indiana University-Bloomington	\$35,456.19	\$34,815.97	\$36,716.74	\$36,766.80
Iowa State University	\$39,002.46	\$38,350.29	\$36,320.63	\$36,462.38
Michigan State University	\$47,991.05	\$47,274.42	\$47,519.38	\$48,079.94
Ohio State University-Main Campus	\$95,318.73	\$92,783.35	\$96,958.09	\$97,835.83
Pennsylvania State University-Main Campus ²⁴	\$44,651.04	\$104,744.28	\$103,139.70	\$106,161.54
Purdue University-Main Campus	\$44,015.90	\$43,805.31	\$46,269.69	\$44,940.18
Rutgers University-All	\$71,314.16	\$69,667.39	\$61,080.44	\$60,712.13
Stony Brook University	\$101,167.53	\$103,912.10	\$102,981.96	\$105,783.13
Texas A & M University-College Station	\$47,597.12	\$45,365.53	\$50,824.00	\$49,756.07
The University of Texas at Austin	\$52,383.70	\$51,812.62	\$51,978.95	\$52,846.44
University at Buffalo	\$39,801.55	\$39,013.84	\$38,376.30	\$39,416.54
University of Arizona	\$48,167.88	\$47,896.51	\$48,162.98	\$48,107.15
University of California-Berkeley	\$65,595.39	\$67,134.19	\$73,817.99	\$73,208.69
University of California-Davis	\$110,031.93	\$113,798.04	\$119,529.33	\$116,643.26
University of California-Irvine	\$83,863.37	\$86,305.47	\$86,998.05	\$85,658.52
University of California-Los Angeles	\$137,249.88	\$143,194.65	\$148,928.43	\$154,155.06
University of California-San Diego	\$114,459.85	\$124,407.83	\$137,052.99	\$132,995.04
University of California-Santa Barbara	\$40,109.76	\$43,483.10	\$42,772.02	\$44,131.41
University of Colorado Boulder	\$40,185.17	\$39,836.62	\$43,511.69	\$44,798.33
University of Florida	\$55,997.16	\$53,855.20	\$56,117.32	\$58,584.98
University of Illinois at Urbana-Champaign	\$54,698.73	\$54,157.05	\$59,490.28	\$60,635.95
University of Iowa	\$94,728.19	\$103,264.92	\$109,249.24	\$109,961.58
University of Kansas	\$44,728.07	\$47,514.43	\$49,083.14	\$48,712.52
University of Maryland-College Park	\$47,534.86	\$47,875.23	\$51,516.50	\$51,112.27
University of Michigan-Ann Arbor	\$142,048.97	\$144,530.85	\$150,626.26	\$154,916.58
University of Minnesota-Twin Cities	\$67,523.66	\$65,954.16	\$71,788.08	\$70,149.08
University of Missouri-Columbia	\$65,341.47	\$63,845.68	\$64,882.94	\$65,062.63
University of Nebraska-Lincoln	\$41,657.12	\$41,199.39	\$43,369.20	\$44,660.39
University of North Carolina at Chapel Hill	\$104,589.80	\$102,476.66	\$107,966.85	\$116,186.42
University of Oregon	\$34,299.47	\$34,322.32	\$37,152.11	\$38,114.03
University of Pittsburgh-Pittsburgh Campus	\$33,397.43	\$72,021.96	\$69,089.48	\$70,295.87
University of Virginia-Main Campus	\$110,739.02	\$112,598.06	\$117,635.52	\$126,047.96
University of Washington-Seattle Campus	\$109,383.87	\$108,249.88	\$113,741.44	\$115,667.50
University of Wisconsin-Madison	\$65,639.63	\$63,141.46	\$65,119.47	\$63,982.67

²⁴ Pennsylvania State University-Main Campus opened its University Park Medical Regional Campus in 2011 which increased total expenses per full-time equivalent student in 2011-12

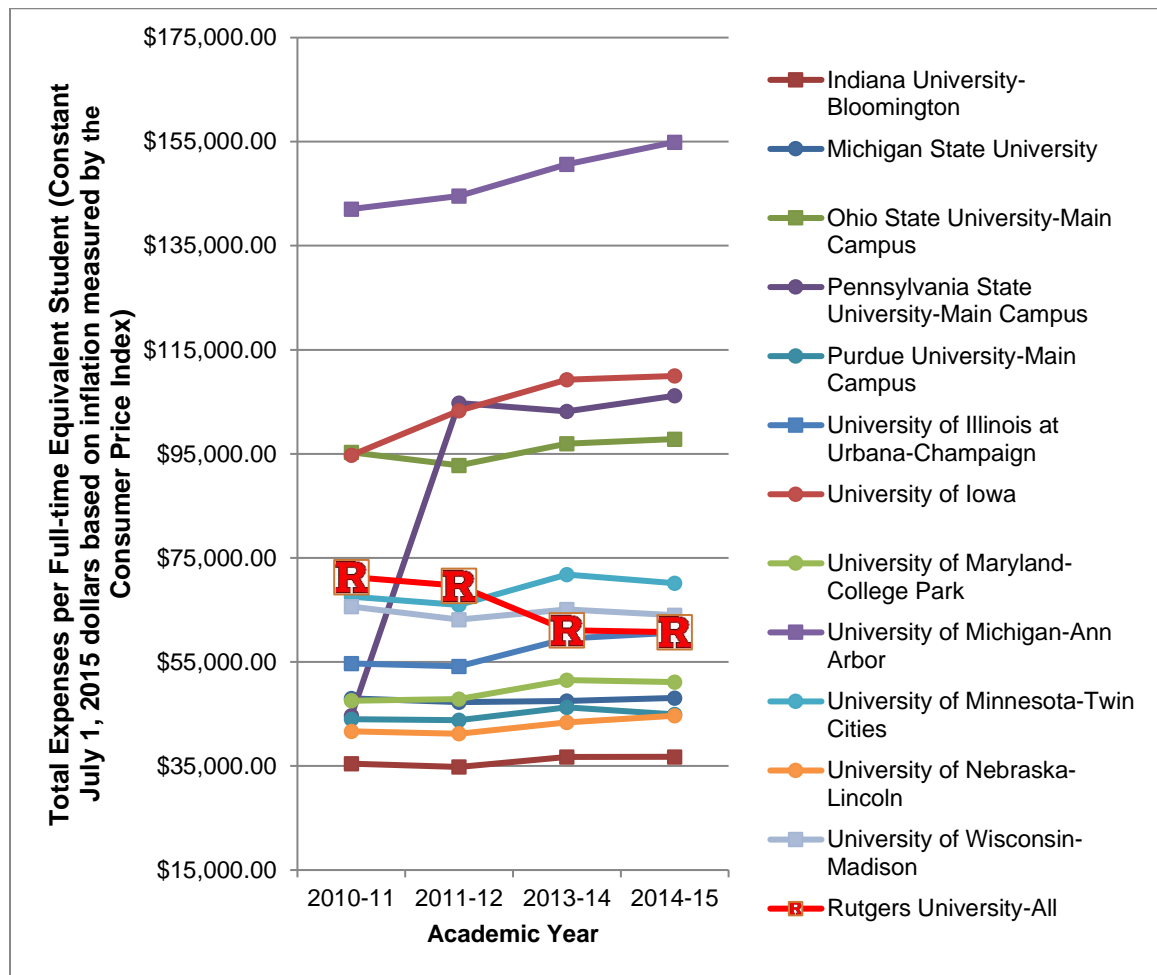


Figure 6.1 Total Expenses per Full-time Equivalent Student

To verify whether economies of scale had been realized, information was collected from the two additional individuals from Rutgers-New Brunswick who possessed working knowledge of any economies of scale after the integration. Both individuals had monitored different aspects of the integration and were familiar with the expenses associated with university. Both individuals confirmed that the sudden decline with expenses was associated with SOM and UH not being included in the integration.

Furthermore, expenses were stable between 2013-14 and 2014-15 because very little had been done to combine the institutions. Essentially, the institutions were still operating as separate universities with different policies, IT systems, and academic calendars. According to one individual, “Very little was being done to fully integrate the universities for the first two years post-integration.” The other individual echoed the same sentiment, “We were really just one university in name with completely separate systems which made some of the simplest things to do very complicated.” The major reason was because there was still a considerable amount of logistics that needed to be worked out after the integration. “The largest barrier was negotiating with faculty unions, and that took more time than anyone anticipated,” one individual expressed. There are now 21 unions at Rutgers post-integration²⁵. The collective bargaining took almost two years to be accomplished, and only at that point could meaningful transformations be made.

Significant changes to integrate the university IT systems began approximately 2.5 years after the integration and required personnel who were familiar with each university’s procedures. The School of Nursing (SON) also had difficulty realizing any economies of scale. SON was the only school that contained two merged schools from Rutgers and UMDNJ, and because SON was on two different systems, two separate operations had to be maintained there as well. Overall, the expenses in the third-year post-integration are expected to increase, because the upfront transitional costs to integrate the

²⁵ 10 belonged to Rutgers and 11 belonged to UMDNJ

systems were considerably large. One individual explained, “The initial costs to merge the systems cost the university a lot of money, but that money is an investment. HR is now merged which makes dealing with that data a lot easier, although the transition wasn’t easy. Other systems are in the works, which will just continue to make life easier in the future.” These transitional expenses according to both individuals include purchasing new software, converting over to the new system, employee training, and hiring consultants to oversee parts of the transition. However, over time these transitional expenses should decrease as duplicative functions will be streamlined into one system.

Economies of scale for the university were not observed three years after the integration. Data from IPEDS show there were no upfront transitional costs in the first two years post-integration. Additional information gathered from interviews revealed that negotiations between the two universities were still ongoing for two years, and transitional expenses did not begin until the third-year post-integration. Therefore, while no economies of scale are realized three years post-integration, the university may experience economies of scale at a later point since changes did not begin to occur until a few years after the integration.

Discussion

Two theoretical frameworks can be applied here to help frame the findings of this study; transactional cost theory (TCT) and resource dependence theory (RDT). Transactional cost theory is studied in the field of economics and can be applied

to economies of scale. Resource dependence theory is an organizational theory and can be better applied to the formation of synergies.

Transaction cost theory (TCT) is most commonly applied in the field of economics (Ketokivi & Mahoney, 2016) and is applicable to M&As as institutions organize themselves to minimize transaction costs (Pi, 2013; Tong, 2010).

Transaction costs can be defined as the costs for the economic system's operation (Arrow, 1969; Williamson, 1979, 1985), which includes contract costs, labor, and regulation (Williamson, 1979). Transaction cost theory is used to better understand how individuals make decisions that yield cost-effective outcomes (Ketokivi & Mahoney, 2016; Williamson, 1999). According to TCT, organizations would minimize transaction costs by merging.

Transaction cost theory is mostly applicable to analyzing economies of scale that deal with transaction costs. Institutions likely only need one human resources department, one legal department, one public relations department, etc. The Rutgers-UMDNJ integration did intend to minimize transactional costs. However, Rutgers and UMDNJ continued to operate separately for two years post-integration with no economies of scale even being attempted. Three years post-integration, processes were finally developed to integrate the two institutions. Therefore, transaction costs did not appear to be reduced three years after the Rutgers-UMDNJ integration.

Resource dependence theory (RDT) is a framework used for understanding organizational and environmental relations (Drees & Heugens,

2013) and is frequently applied in the literature that examines M&As both in the private and public sector. This theory suggests that organizations must secure resources from the marketplace that are critical for growth and survival (Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Pinherio et al., 2016). The scarcity explained by these resource dependencies leads to the formation of inter-organizational arrangements such as mergers, acquisitions, and alliances.

The architects of the integration had hoped that the formation of synergies through enhanced multidisciplinary research projects would secure more resources from the higher education marketplace. The aim was that Rutgers-UMDNJ could strengthen its market power and capture a larger portion of resources as a combined university, rather than as separate universities. Multidisciplinary research projects can increase the amount of research dollars for a university and enhance recruitment of top faculty and students who are interested in a broader selection of research opportunities (Skodvin, 2014). The findings in this study suggest that multidisciplinary research opportunities increased post-integration, such as an increased number of joint grant applications being filed, and more research being done in collaborative centers and institutes. However, the findings also have significant limitations, most notably the inability to measure the quality of these projects. Therefore, it becomes difficult to corroborate whether increased multidisciplinary research at Rutgers-UMDNJ secured more resources from the higher education marketplace.

The two methods used to evaluate whether the Rutgers-UMDNJ integration was efficient, formation of synergies and economies of scale, had different findings. As predicted, there is evidence that supports the formation of synergies between Rutgers and UMDNJ, but not yet economies of scale. The finding that economies of scale have not yet been achieved is robust, and supported both by descriptive quantitative and qualitative analyses. The evidence that supports the formation of synergies is weaker but shows promising results as it appears that multidisciplinary research opportunities have grown as a result of the integration. However, a conspicuous limitation with this result is measuring the impact multidisciplinary research has on increasing the value of the institution post-merger.

Limitations about interview mix are addressed in Chapter 4, but it is important to mention them again here since this chapter relies heavily on qualitative analysis in the absence of good quantitative data. While the individuals interviewed are well-versed in the inputs and outputs of the integration, they are also prone to bias. Many of the conclusions here rely on the word of stakeholders who invested a lot in the integration and are hopeful to see positive results. Therefore, the overall conclusion that even though efficiencies are not currently present, but will be realized in time, may be too optimistic.

Most mergers are planned to yield long-term economies of scale in which costs decrease as output increases. Economists have often found that the cost curve is U-shaped for M&As, when economies of scale are followed by a period of diseconomies of scale where costs increase as output decreases (Besanko &

Braeutigam, 2013). Neither economies of scale nor diseconomies of scale have been found in this case, thus the cost curve has not presented itself yet.

However, studying the long-term cost curve of higher education M&As is important to determine whether M&As can be used as a successful cost savings strategy for universities. Because of this, it is important that future research be done in another 5-10 years to examine whether any efficiencies have been realized, and if not, investigate those reasons further as well.

CHAPTER 7: CONCLUSION

In this dissertation, I examined a case study of an M&A in higher education. Higher education M&As appear to be growing in the United States and abroad as a means to reduce fiscal pressures and enhance an institution's competitive edge (Eastman & Lang, 2001; Goedegebuure & Meek, 1991; Harman & Harman, 2008; Pinheiro et al., 2016; Seltzer, 2017; Skodvin, 2014). This dissertation illustrates the complexity of an M&A in higher education and how this complexity can be unique to a case. It is important to note that the outcomes found in this study may not be transferable to others, but the importance of this paper is the framework it provides for how to evaluate the outcomes of an M&A. In the first chapter, I posed six broad research questions: First, what were the reasons for the Rutgers-UMDNJ integration? Second, how was the Rutgers-UMDNJ integration designed? Third, how was the Rutgers-UMDNJ integration implemented? Fourth, was the integration effective? Fifth, was the Rutgers-UMDNJ integration efficient? Finally, which, if any, of the existing M&A theories provide a useful framework for the Rutgers-UMDNJ integration? The following sections summarize the findings as they relate to these questions. I then address study limitations, some suggestions for future research, and policy recommendations.

What were the reasons for the Rutgers-UMDNJ integration?

Information collected from the stakeholder interviews revealed that there were several reasons for the integration, which varied by stakeholder affiliation.

Rutgers wanted to enhance its reputation, particularly among its AAU peers, by

adding a medical school to the university. The State of New Jersey also had an interest in combining Rutgers and UMDNJ, but the final push came when Governor Christie took office. Governor Christie used his experience with UMDNJ as U.S. Attorney to restructure higher education in the State of New Jersey, something he reportedly hoped to accomplish in his first term as governor. The schools in UMDNJ-New Brunswick wished to be part of Rutgers due to the latter's geographical proximity and historical ties for some time, and earlier drafts of this merger faced very little scrutiny. On the other hand, the prospect of UMDNJ-Newark schools being included in the M&A faced quite a bit of pushback. Due to the public shame and weakened autonomy of UMDNJ after the deferred prosecution, the schools in UMDNJ-Newark had very little influence in the final decision to merge. However, there were several accommodations made to the final legislation with UMDNJ-Newark in mind, which fortified the merger and will be discussed in the next two sections.

Based on my findings, the reasons for the integration appear to be straightforward. Rutgers wanted a medical school, and the merger of Rutgers and UMDNJ appears to have enhanced the profile of the State's largest research university. Therefore, after a decade of discussion about what appeared to be a beneficial change to the State's public higher education, it only made sense that Governor Christie would have utilized his experience with UMDNJ, as well as his platform, to make the integration come to fruition. The problems at UMDNJ significantly weakened the university's power, and its reputation likely would have taken years to recover. Additionally, UMDNJ never had the status that Rutgers

had so, despite the resistance from UMDNJ, there were numerous benefits to UMDNJ resulting from its merging with Rutgers.

How was the Rutgers-UMDNJ integration designed?

The legislation of the 2012 New Jersey Health Sciences Restructuring Act described how the Rutgers-UMDNJ integration was designed, while information from the interviews provided insight behind some language used in the legislation. Following are several main points addressed in the legislation:

- All UMDNJ units, with the exception of the Cancer Institute of New Jersey (CINJ), would establish a new unit (which was later established at the Rutgers School of Biomedical and Health Sciences, often referred to as RBHS) with its own chancellor who would report to the Rutgers University President.
- Rutgers School of Biomedical and Health Sciences would be treated like a campus with its own budget.
- The Chancellor of RBHS would be required to be “based at Rutgers University-Newark” (New Jersey Health Sciences Restructuring Act, 2012, p.86).
- An affiliation with UMDNJ and University Hospital (UH) had to be maintained, and UH would continue to serve as the main teaching hospital for New Jersey Medical School (NJMS) and New Jersey Dental School (NJDS); however, UH (which belonged to UMDNJ) would become a

standalone medical center owned by the State of New Jersey and governed by its own Board of Directors.

- All UMDNJ schools based in the City of Newark had to remain there, and all RBHS schools in New Brunswick, with the exception of Nursing, had to remain in Middlesex County.
- The Cancer Institute of New Jersey (CINJ) had to report separately and directly to the Rutgers University President.
- A Chancellor of New Brunswick had to be created and be an individual other than the Executive Vice President of Academic Affairs who oversees activities at all of Rutgers' campuses.
- The Board of Governors at Rutgers was expanded from 11 to 15 members, with the Governor appointing eight (formerly six) members (New Jersey Health Sciences Restructuring Act, 2012).

It became clear through the interviews that much of the language in the legislation was designed for UMDNJ to maintain the strong presence within the City of Newark. Many in Newark felt that the integration would pull the presence of medical education away from Newark and toward New Brunswick, which was where much of Rutgers' central administration was located. Additionally, changes to the Board of Governors were made, and a Chancellor in New Brunswick was appointed, to ensure RBHS had adequate leadership representation. The separate reporting of CINJ came from the center's desire to further distance itself from the former UMDNJ's fallen reputation.

My findings suggest that the legislation was too constraining. Similar pieces of legislation are created with a bit more flexibility, as authors typically leave room for future changes that may not be immediately foreseen. This legislation allowed for little flexibility in changes without the need for new or amended bills, even those that might be beneficial to the university in the future. For instance, merging the two medical schools similar to how the law schools in Camden and Newark and the business schools in Newark and New Brunswick operate cannot be done under this piece of legislation.

How was the Rutgers-UMDNJ integration implemented?

Information collected from the interviews revealed that the integration was implemented with fidelity to the design. There were a few slight exceptions, including the Chancellor of RBHS reportedly spending equal time in New Brunswick and Newark, and CINJ's daily operations being managed by the Chancellor of RBHS while still officially reporting to the University President. However, the design outlined in the legislation was largely carried out as was specified. This was not difficult to do, given how much detail was outlined in the legislation.

While it is usually positive that a program is implemented with loyalty to its design, I find that the constrained language in the legislation unintentionally made things more difficult than they needed to be. For instance, the language that stated the Chancellor of RBHS must be physically located in Newark ignored the responsibilities the Chancellor also had on the New Brunswick campus,

which, according to interviews, were largely neglected under UMDNJ's previous leadership. Furthermore, this may complicate any potential expansion of RBHS to other locations in the State.

Was the Rutgers-UMDNJ integration effective?

Descriptive analyses on tier rankings and federal R&D expenditures, and an interrupted time series on incoming students, were conducted to evaluate several goals laid out in the legislation that fortified the Rutgers-UMDNJ integration. The goals evaluated for effectiveness were to enhance the reputation of Rutgers nationally and internationally, increase federal research funds, enhance educational opportunities for the residents of the State, strengthen recruitment of top students, and retain the brightest high school students (reduce "brain drain"). Analyses revealed the following results:

- The descriptive results from QS and THE demonstrated that the reputation of Rutgers did not improve on an international level after the integration was implemented.
- The descriptive results from USNWR showed that the reputation of Rutgers neither improved nor declined after the integration was implemented.
- Federal R&D expenditures (descriptively) increased for Rutgers post-integration, but this increase does not appear to be due to newly acquired resources.

- Undergraduate acceptance did not increase in any of the Rutgers-New Brunswick schools, and significantly decreased for SAS, SEBS, and SOE.
- SAT scores significantly improved for incoming students at SAS and Pharm post-integration.
- Interest in a health science major increased post-integration for incoming students at SEBS, but decreased for SAS post-integration.

The results showed minor progress with some of the integration's goals, but many of the measured outcomes revealed no significant changes post-integration. The Rutgers admissions data showed that SAT scores improved at SAS and Pharm, and declined at RBS-NB. Because RBS-NB did not contain any health science majors, these findings suggest that the SAT score increase is related to the integration. The finding at SAS is of particular importance, as its undergraduate enrollment is the largest at Rutgers-New Brunswick. Reported interest in health sciences majors among incoming undergraduate students at SEBS also increased in the post-integration period.

The results are promising even if the analysis shows that some of these goals have yet to be fully realized. As previous literature indicated, the interim assessment of three years was too early to see full growth in these measurable goals, given that research has suggested that M&As in higher education tend to see results several years later (Pinherio et al., 2016; Skodvin, 1999). Following up with these analyses in perhaps another 5-7 years should be done to see if any more movement can be detected.

Was the Rutgers-UMDNJ integration efficient?

Efficiency was evaluated in two different ways: through the formation of synergies (i.e., the value of the combined institution is greater than the sum of two parts) (Skodvin, 2014); and economies of scale (i.e., the reduction in the per-unit cost of production when the volume of output is stable or enhanced) (Bess & Dee, 2008; Eastman & Lang, 2001; Patterson, 2000). I find some evidence that supports the formation of synergies between Rutgers and UMDNJ, but not for economies of scale. The finding that economies of scale have not been realized is robust, and supported both by quantitative and qualitative analyses. The evidence that supports the formation of synergies is weaker but shows promising results, as it appears that multidisciplinary research opportunities have grown as a result of the integration.

The lack of substantial movement in the efficiency assessment appears to congeal with the results of the effectiveness assessment. Again, this is not too surprising given that previous literature has suggested it may take several years for the results of an M&A to be fully realized (Pinherio et al., 2016; Skodvin, 1999).

The effectiveness and efficiency assessments revealed that many of the measurable goals were not fully realized, which can be seen as a large disappointment to proponents of the integration. My findings suggest that three years is not enough time to realize efficiency outcomes for an M&A of this scale. Perhaps at a smaller university, three years may be adequate. However, even at

some smaller universities like OISE and FEUT in Canada, which were discussed in the literature review, it was estimated that cost savings would not be realized for at least ten years (Eastman & Lang, 2001). It was still important to evaluate outcomes that measure efficiency three years post-integration to detect whether any efforts were being made that might eventually lead to significant cost savings at Rutgers. It appears that it is moving in a positive direction, but may take several years to realize.

Which, if any, of the existing M&A theories provide a useful framework for the Rutgers-UMDNJ integration?

There were six theoretical frameworks discussed at the outset of this dissertation: 1) multiple streams theory (MST); 2) advocacy coalition framework (ACF); 3) monopoly theory; 4) empire-building theory; 5) resource dependence theory; and 6) transactional cost theory (TCT). These frameworks were found to be useful in framing M&As in higher education or the private sector, or may have been used to study cases in which there was a major organizational change.

The monopoly and empire-building theories were the least applicable to this case, which is appropriate as they are largely used in studies that analyze private sector M&As (quite different from M&As in nonprofit higher education). However, these theories may be applicable to M&As among for-profit institutions. The two policy frameworks, MST and ACF, helped frame the implementation assessment, which was a largely policy-driven process. However, they are not a good fit for the effectiveness or efficiency assessments. Transaction cost theory,

on the other hand, helped frame the efficiency assessment but was not well suited to the implementation or effectiveness assessments, as related costs were not associated with these assessments.

Clearly the main goal of this case – and arguably the main goal for most M&As in higher education – is to secure more resources and protect universities engaging in a merger or acquisition from competition. This is what makes RDT the most applicable framework to use in this case, and why it was used throughout the study. The framework was used to evaluate all aspects of the implementation, effectiveness, and efficiency assessments, and was the most widely cited framework in previous research that evaluated M&As in higher education. Therefore, it is easy to conclude that RDT should be applied to other studies that evaluate M&As in higher education.

Study Limitations

There are a number of limitations in this research that need to be acknowledged. First, the timing of Rutgers' initiation to the Big 10 Academic Alliance was one year after the Rutgers-UMDNJ integration, but was announced right around the time of the integration. The creation of the Rutgers-New Brunswick Honors College in the Fall semester of 2015 was also announced shortly after the integration. Many of the outcomes could have been impacted by the initiation into the Big 10 Academic Alliance or the creation of the Honors College as well. The results from the ITS that measured SAT scores revealed that scores increased for SAS and Pharm at the same time they declined for RBS-NB. Because RBS-

NB was used as a comparison school to disentangle the results that may have accrued from the Big 10 initiation, this finding suggests that the integration may have been related to the increase in SAT scores for these two schools. However, I could only rely on one school as a comparison. There may have been other activities that I am unaware of, which could have affected SAT scores at RBS-NB, including additional schools that did not have health science majors. Similar application requirements to SAS, SEBS, SOE, and Pharm would have made this finding stronger.

Just as in the Rutgers case where the many confounding factors such as initiation into the Big 10 and the establishment of the Honors College had to be contended with, other M&As may also need to a) identify other potential stimuli and b) explicitly recognize and control for such competing stimuli in arriving at the M&A's effectiveness estimates. These other factors may include the economy and other concurrent campus initiatives that may potentially influence the M&A outcomes. Therefore, those evaluating other M&As in higher education must address these confounding factors in order to avoid biased conclusions.

The number and types of individuals interviewed may have led to biased results. I stopped pursuing new individuals, as responses were quite repetitive at times, but addressing a wider array of individuals could have made my qualitative analysis more robust, leading to more differentiation among responses received. Also, my interviews were skewed in favor of Rutgers-New Brunswick for a variety of reasons. First, Rutgers-New Brunswick is where the central administration at Rutgers is located, so most of the top administrators are located on that campus

even if they are familiar with the other campuses. Second, many of those policymakers from the State either did not respond to my request to be interviewed or outright refused, while the majority of those from Rutgers and UMDNJ made themselves available. Finally, given the turnover of staff and faculty at UMDNJ in the wake of its deferred prosecution, there were fewer individuals to contact than there were at Rutgers.

If similar interview protocols are followed in the future, I would suggest interviewing individuals early in the process, even before an M&A is official. The announcement of an M&A may cause distress, particular for the university that is being acquired. Individuals may be less receptive to an interview once an M&A is announced and may also leave the university, making it difficult to interview them at a later time. I would also suggest interviewing more members of the public, rather than just administrators or public officials. While the latter are typically more familiar with the case, the perspectives from members of the public may inspire new ideas or perspectives regarding the case, which could have been a valuable contribution to my work. However, it would be better to interview these individuals early in the process, as the topic would be fresh in their minds.

There were also data availability limitations in this research. Data were not available for all goals, and some data were less than ideal. Graduate student admissions data were not accessible at the time of study, so all student-related analyses were conducted on undergraduate students. This was a significant limitation, as the majority of programs at UMDNJ serve graduate students. Because UMDNJ is largely a graduate school, and belonging to Rutgers may

have enhanced its profile, outcomes were more likely to be positive for graduate programs than undergraduate students. However, as this data was not available, I was unable to evaluate and assert whether the integration had an effect on these programs.

Future research with graduate student admissions data is strongly suggested. If graduate student admissions data had been available, I would have followed the same set of analyses as I did for undergraduate students. However, SAT scores would have been replaced with scores from graduate admissions tests such as the GRE or MCAT.

Also, human resource data was not available at the time of this study and made it difficult to quantitatively analyze faculty recruitment, multidisciplinary research, and economies of scale. Finances that also affected faculty recruitment during the Great Recession would have affected the pre-integration numbers as well, so faculty recruitment was completely omitted from the study. Multidisciplinary research and economies of scale had to be analyzed qualitatively considering these data restrictions.

Data was less than ideal for many of the goals analyzed. As mentioned above, qualitative data needed to be used in lieu of quantitative data for most of the efficiency assessment. I addressed several limitations for using tier rankings as a method for evaluating institutional reputation in Chapter 4, but it is unfortunate that this was the only method by which the reputation of Rutgers could be measured amongst its national and international peers. There were also

time lags with some of the data available. This was the case with the R&D expenditure data and IPEDS data, which did have three years' worth of data post-integration at the time of analysis. Therefore, analysis was only conducted for these two goals with only two years of post-integration data.

The ideal data for this study would have included gathering more robust quantitative data. This includes better reputation data, access to graduate admissions data and HR data, more years of data for R&D expenditures, and a collaborative research database.

Survey data on reputation from various stakeholders such as students and parents (i.e., not just university leaders) would have made for a richer set of analyses. These data would need to have a robust response rate and be representative of the target population in order to be meaningful.

Human resource data, if made available, would have helped answer questions related to the goal of faculty recruitment and economies of scale. However, faculty recruitment data may have also been adversely affected by the Great Recession and its impacts on state appropriations to Rutgers, as well as other factors that affect faculty hiring. If questions about whether the integration played a role in a job applicant's interest were asked on a job application and captured in a database, that information could have informed whether the integration affected faculty recruitment. Further, fields in the HR database that indicated whether a position was eliminated because of economies of scale, either through retirement or layoffs, would have identified areas of cost savings.

A database for collaborative research would have better evaluated the goal of multidisciplinary research. Fields for what departments are involved in a collaborative research project, where the research is being conducted, and when the research was done could have been used to determine whether multidisciplinary research grew post-integration. The IRB at Rutgers has begun to electronically collect some of this data after the integration, but did not have this information available in this format pre-integration, which made it difficult to establish a pre-integration baseline. Further, R&D data would need to be available for the all years of interest, and for a longer period of time.

It is important to emphasize that the results of this study may not be generalizable to other M&As in higher education. This case demonstrates that M&As in higher education are difficult and unique. In many cases, that may be the only similarity. Therefore, the methods are framed to be replicated with the understanding that the outcomes may differ from case to case.

Suggestions for Future Research and Policy Recommendations

Over the past two years that I have spent researching the Rutgers-UMDNJ integration, I have learned that an M&A at an institution like Rutgers is extremely complicated. It is important to differentiate an M&A in higher education from a corporate M&A. Corporations are often cited as examples for how organizations can use M&As to yield effective cost savings in a relatively quick timeframe (Brueller et al., 2014). However, we can see here that M&As with nonprofit universities are very different and primarily slower, as the products produced by

the two industries differ substantially. A corporation produces a product in order to gain larger financial profits, which are more liquid than what a university produces (e.g., research productivity, an education workforce).

As previously mentioned, this case demonstrates that M&As in higher education are challenging. However, it is crucial that these M&As be evaluated to see if the ends justify the means. The effectiveness and efficiency assessments post-integration reveal that intended goals were not fully realized after three years. This is appropriate given that the literature shows that it may take years for an M&A to see results (Eastman & Lang, 2001; Pinherio et al., 2016; Skodvin, 1999).

It is important to assess this case again in the future to determine whether any of the outcomes have been realized. Based on the findings, the current interim analysis may have been premature; nonetheless it served as an important check on the outcome trajectories, especially given the difficulty in assessing when specifically results will be seen. The best suggestion would be to replicate these analyses in another five years or so to determine whether anything has changed. This time assessment is based on the evaluations of other M&As that only assessed efficiency. Georgia reported that outcomes had not yet been realized after six years for their mergers (Gardner, 2017) and OISE/UT estimated cost savings would take approximately ten years to be realized (Eastman & Lang, 2001). This information suggests that it could take up to ten years for the Rutgers-UMDNJ integration – and M&As like it – to realize its goals.

It is also important to note that this case focuses on a public university. While there are some similarities between the two operations in terms of internal organization (e.g., similar leadership with Boards of Governors, university presidents, provosts), the structure and operations of public institutions are often complicated. Public institutions typically have larger enrollments and more involvement from state legislators than private institutions, but ultimately, scale and size are more important factors to consider as to how long it will take for a university to see results. It is important to note that OISE/UT was a much smaller M&A than those in Georgia or Rutgers-UMDNJ, which may have played a role in the time estimate. It is reasonable to think that larger and more complicated universities may take more time to realize their goals. I found that collective bargaining negotiations with the faculty at Rutgers post-integration took nearly two years before meaningful transformations could be made, such as integrating the IT systems. Therefore, the initial estimation of ten years may be too optimistic. An evaluation ten years post-integration may inform the progress of the integration and provide a better estimate of when outcomes may be fully realized.

Further, the implementation assessment reveals a case that was implemented with fidelity to the design, but with shortcomings nonetheless. This was due to the legislation's rather restrictive and inflexible language. The language did not allow leadership at Rutgers to make changes they felt were necessary to improve the institution's operation, such as having CINJ report to the Chancellor of RBHS or allowing similar schools to merge despite their

locations. This is something that would not happen in a private sector M&A, which typically comes with minimal governmental interference.

What do these results mean for other institutions? It is important that institutions manage their expectations with how long it may take to achieve their intended goals. This case has illustrated that institutions do not behave like companies, and higher education M&As are different from corporate M&As. Many institutions may engage in an M&A and expect immediate cost savings, which can happen in a corporate M&A, but is unlikely the case with public higher education mergers. It takes quite a bit of time given the complexity of universities and input from various stakeholders, which is difficult with public institutions, as they can involve policymakers who answer to their constituents.

As mentioned in Chapter 3, geography and history played central roles in the implementation of higher education M&As discussed in the literature review. Both of these factors were also critical to the Rutgers and UMDNJ integration. The relationships among individuals at Rutgers and UMDNJ were rooted in both history and geographical proximity, which facilitated the design and implementation of the integration. This information suggests that both the geography and history of two merging institutions are important, and considerations should be made when designing and implementing future M&As.

What are some alternatives to M&As? This clearly depends on the case. As I mentioned earlier, the cost curve of an organization typically takes the form of one of two shapes. The first is where economies of scale are realized over

time or throughout the range of output produced (a so-called decreasing cost industry), and another in which economies of scale are realized initially, but followed by diseconomies of scale (a U-shaped cost curve). If more organizations are characterized by the decreasing cost curve, then M&As may be a viable solution to struggling institutions. On the other hand, a U-shaped curve or a curve in which economies of scale are never realized in the first place would suggest that M&As are not a sustainable solution for struggling institutions. The alternative would then be shutting these institutions down, which would negatively impact the workforce and economy of the community by leading to shutdowns of other businesses the institution serves, such as restaurants and bookstores.

The current evaluation is only intended to be an interim assessment at three years post-integration, and the primary purpose of this study was to provide a framework for how to evaluate a higher education M&A, with a special emphasis on examining outcome trajectories. The framework for assessment outlined in this study, and not necessarily its outcomes, is what can be generalizable to other studies at this time. Furthermore, linking this body of work with a theoretical framework like RDT will strengthen the relationships among other studies that evaluate similar M&A cases.

Given the lack of literature on this topic, it is important that more institutional M&As be studied and evaluated for implementation, effectiveness, and/or efficiency. It is also important that university leadership and other relevant stakeholders perform their due diligence when engaging in an M&A. This

includes researching the outcomes of other institutional assessments, as well as conducting their own evaluations.

APPENDIX A

Glossary for Commonly Used Acronyms	
AAU	American Association of Universities
ACF	Advocacy coalition framework theory
ARWU	Academic Ranking of World Universities Shanghai Rankings
CABM	Center for Advanced Biotechnology and Medicine
CINJ	Cancer Institute of New Jersey
CIRP	Cooperative Institutional Research Program
CON	College of Nursing
CPI	Consumer Price Index
Dal	Dalhousie University
EOHSI	Environmental and Occupational Health Sciences Institute
FEUT	Faculty of Education at the University of Toronto
GRE	Graduate Record Examinations
GSBS	Graduate School of Biomedical Science
HERD	Higher Education Research and Development
HERI	Higher Education Research Institute
IPEDS	Integrated Postsecondary Education Data System
IT	Information technology
ITS	Interrupted time series analysis
M&As	Mergers and Acquisitions
MCAT	Medical College Admissions Test
MGSA	Mason Gross School of the Arts
MST	Multiple streams theory
MUO	Medical University of Ohio
NCSES	National Center for Science and Engineering Statistics
NJCMD	New Jersey College of Medicine and Dentistry
NJDS	New Jersey Dental School
NJIT	New Jersey Institute of Technology
NJMS	New Jersey Medical School
NSF	National Science Foundation
NYU	New York University
OISE	Ontario Institute for Studies in Education
OISE/UT	Ontario Institute for Studies in Education of the University of Toronto
OLS	Ordinary least squares regression
Pharm	Ernest Mario School of Pharmacy

Poly	Polytechnic University
QS	Quacquarelli Symonds' World University Rankings
R&D	Research and development
RBHS	Rutgers Biomedical and Health Sciences
RBS-NB	Rutgers School of Business-New Brunswick
RDT	Resource dependence theory
RMS	Rutgers Medical School
RWJMS	Robert Wood Johnson Medical School
SAS	School of Arts and Sciences
SAT	Scholastic Aptitude Test
SEBS	School of Environmental and Biological Sciences
SHRP	School of Health Related Professions
SOE	School of Engineering
SOM	School of Osteopathic Medicine
SON	School of Nursing
SPH	School of Public Health
STEM	Science, technology, engineering, and mathematics
SUNY	State University of New York
TCT	Transaction cost theory
THE	Times Higher Education World University Rankings
TUNS	Technical University of Nova Scotia
UBHC	University of Behavioral Health Care
UC	University of California
UH	University Hospital
UMDNJ	University of Medicine and Dentistry of New Jersey
USNWR	U.S. News and World Report
UT	University of Toledo

APPENDIX B

Informed Consent

You are invited to participate in a research study that is being conducted by Victoria Porterfield, who is a PhD candidate in the Edward J. Bloustein School of Planning and Public Policy at Rutgers University. The purpose of this research is to evaluate a unique case in which a large public university is involved in an M&A. An evaluation of the reasons for the merger; its design, implementation, effectiveness, and efficiency will provide an opportunity to understand whether M&As of this magnitude and among public institutions can be accomplished successfully and effectively.

If you agree to be interviewed, the interview will take 30-60 minutes to complete. Approximately 20-30 individuals from Rutgers, UMDNJ-Legacy units, and policymakers involved in the integration will be interviewed.

The study procedures include a semi-structured interview in which specific questions regarding the integration will be asked but follow up questions or prompts may be asked. Handwritten notes will be taken and transcribed within 48 hours of the close of the interview.

This research is confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that some linkage between your identity and the response in the research exists. The only information collected about you includes your association with the integration in the following capacity: Legacy-Rutgers, Legacy-UMDNJ, affiliation with another university (to be named), public official, or private citizen and the location (city and state) of your association. You will be labeled as [a member of Legacy-Rutgers/ a member of Legacy-UMDNJ/a member of another university (to be named)/a public official/ a private citizen]. Any other identifiable information that is obtained in connection with this study will be disclosed only with your permission or as required by law. Please note that we will keep this information confidential by limiting an individual's access to the research data and keeping it in a secure location.

The research team and the Institutional Review Board at Rutgers University are the only parties that will be allowed to see the data, except as may be required by law. All study data will be kept until the completion of the study, and will be destroyed upon publication of study results. Research results will be available at the time of publication.

There are minor risks to participation in this study. While there may not be any direct benefit to you from participating, understanding the reasons, design,

implementation, objectives, and goals of the Rutgers-UMDNJ integration will help Rutgers as well as other institutions considering similar integrations to learn more and enhance their strategies. There may be a risk of reputational harm or employment if I were to record any identifiable information that could be linked to you and if you share any negative experiences and if there were to be a breach of confidentiality. Please keep in mind the only identifiable information that I will record is your affiliation as [a member of Legacy-Rutgers/ a member of Legacy-UMDNJ/ a member of another university (to be named)/ a public official/ a private citizen] as well as the location of your affiliation.

Participation in this study is voluntary. You may choose not to participate, ask me to not make note of something said in the interview, and you may withdraw at any time during the study procedures without any penalty to you. In addition, you may choose not to answer any questions with which you are not comfortable.

If you have any questions about the study or study procedures, you may contact myself, Victoria Porterfield, at: Edward J. Bloustein School of Planning and Public Policy 33 Livingston Avenue New Brunswick, NJ 08901 Tel: 201-787-3650
Email: porterfield@instlres.rutgers.edu

You may also contact my faculty advisor, Radha Jagannathan at:
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Semi-Structured Interview Script

Part (1) REASONS

Can you give me insights on why Rutgers and UMDNJ integrated?

Prompt: State/UMDNJ/Rutgers perspective?

Part (2) DESIGN

How was the RU-UMDNJ integration structured?

Prompt: Initial design?

Final design?

Major players?

Factors that influenced the final design?

Part (3) IMPLEMENTATION

How was the RU-UMDNJ integration implemented?

Prompt: From your perspective?

Major players?

Top-down process?

Part (4) GOALS DEFINITION

The following goals were outlined in the document (provide a written list of goals):

- Enhance the reputation of Rutgers nationally and internationally
- Enhance educational opportunities for the residents of the State
- Strengthen recruitment of top faculty and students
- Retain the brightest high school students (reduce “brain drain”)
- Increase federal (and private) research funds
- Create a climate that fosters highly productive and innovative multidisciplinary projects
- Strengthen partnerships between higher education and healthcare industry in New Jersey
- Increase opportunities to promote and facilitate economic growth in the State of New Jersey, including attracting businesses to the state and creating jobs to keep New Jersey workers in the state

Is this a comprehensive and accurate list?

Prompt (for anything other than an affirmative response): What would you remove or add?

Prompt (for removals): Why would you remove [goal]?

Prompt (for additions): Why do you think this item was not included in the original list?

Part (3) SPECIFIC GOAL DEFINITION

(For each item on the list that was affirmed plus any additions)

How will the integration [goal]?

Probe (Enhance educational opportunities):

For undergraduate students?

For graduate students?

For faculty?

Probe (Strengthen recruitment of top faculty and students):

How will the university strengthen recruitment of top faculty?

How will the university strengthen recruitment of top students?

Probe (Increase federal (and private) research funds):

Donors?

Alumni?

Grants?

Probe (Create a climate that fosters highly productive and innovative multidisciplinary projects):

Students?

Research?

Probe (Strengthen partnerships between higher education and healthcare industry in New Jersey):

Hospitals – Robert Wood Johnson? University Hospital?

Private sector – Local pharmaceutical companies like Johnson & Johnson, Bristol-Myers Squibb, and Merck?

If yes to any of these – do you know who I could contact at Rutgers or any of these other employers with regard to learning more about these specific partnerships?

Probe (Increase opportunities to promote and facilitate economic growth):

Healthcare sector?

Economic growth in NJ?

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