Effects of Responsibility Center Management System on Financial Performance Indicators among 50 Public Universities

by

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Abstract

The purpose of this study was to determine if a decentralized budget system, such as a Responsibility Center Management (RCM) system, improves a university's key performance indicators (KPIs), specifically, operating revenue, tuition revenue, contracts and grants revenue, and operating expenses. There are limited empirical studies that examine whether or not a school that has implemented an RCM system is better off for doing so. This quantitative multiple case study was designed to analyze whether there are patterns or trends among schools that implement an RCM system and those that have not, based on the financial performance of the institution. The study compared annual changes in university financial indicators, over the same ten-year period from 2007-2016.

Analyses of the data suggested that in most instances the application of an RCM budget model did not result in a significant annual improvement to financial results among the four key financial indicators (operating revenue, tuition revenue, contracts and grants revenue, and operating expenses). Further, for those specific years in which the results of this research showed there was a significant financial improvement by RCM schools, there was no statistical difference when the researcher considered the length of time a school had been implementing an RCM system. Although the findings of this study seem to indicate in most instances there are not any direct financial improvements to the specific financial indicators tested, by implementing an RCM budget system, the study did show there were no years in which a school was worse off financially for using RCM.

The implications of this study are particularly important for higher education leaders and administrators that are considering whether to implement an RCM system or considering whether to continue using an RCM system. The findings can help leaders at colleges and universities better understand and manage financial expectations of implementing such an RCM system, as the direct financial improvement attributed to RCM may be limited.

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Chapter I: Introduction

The success of any institution of higher education relies upon sound financial management and the utmost fiduciary duty. A university's educational, research, outreach, and service initiatives cannot be achieved operating in an atmosphere of fiscal naivety or negligence (Bar & McClellan, 2010). Therefore, proper finance and accounting structures enable colleges and universities to remain competitive with peer institutions by encouraging fiscal responsibility and providing accurate and timely financial data to the decision-making process. Over the past decade, leaders at colleges and universities across the U.S. have shown increased interest in more sophisticated approaches to budgeting and financial management (Birnbaum, 2000; Vonasek, 2011). This interest is well-warranted as universities face fiscal challenges in a complex and competitive higher education landscape (Zemsky, Wegner, & Massy, 2006).

Adding to the pressures of competition, institutions of higher education face environmental challenges to resource management (Weisbrod & Asch, 2010). Among these challenges are reduced state appropriations, increased tuition reliance, and the ever-increasing cost of personnel. According to Szatmary (2011), "American universities, especially public institutions, have confronted a funding crisis in recent years that will only worsen…..every institution must maximize its existing resources – including budgeting models – so that university leaders can make the most informed decisions" (p. 69). Therefore, it is imperative that higher education institutions address the funding shortfall by enhancing revenue in other areas or by generating new revenue streams.

In the 1970s, appropriations from state governments subsidized about 80% of public colleges' and universities' budgets. However, by the end of the decade, funding had dropped to about 65% (Cekie, 2008). In the 25-year period between 1985 and 2010, state appropriations

decreased from 77% to 60% when calculated as revenue per student (Curry, Laws, & Strauss, 2013). According to the National Association of College and University Business Officers (NACUBO) 2017 Planning and Budgeting Forum, the average state is annually spending $7,267 per college student or 18% less per student than before the 2008 recession (Hundriser, 2017).

Meanwhile, colleges and universities are increasing their reliance on tuition as evidenced by steady increases in tuition as a percentage of total revenue. According to a National Center for Education Statistics (NCES) report comparing the periods of 2009-2010 and 2014-2015 at public universities, tuition and fee revenue per full-time equivalent (FTE) student increased by 22% (NCES, 2016). By continually increasing reliance on revenue from students and their families, universities have partially mitigated their financial strains. However, universities have often raised tuition at a pace above the benchmark Consumer Price Index (CPI) measure to help offset lost revenues. This strategy, raising tuition faster than the CPI, is unlikely to continue indefinitely because it is not sustainable (Mayer, 2011). Therefore, tuition increases are no longer a financial panacea as colleges and universities have likely reached a point in which they cannot continue to shift the additional tuition burden to students and their families.

Compounding the stagnant or decreasing revenue issues facing higher education institutions is the simultaneous increase in costs. A review of public university income statements revealed that personnel costs, a combination of salaries, wages, payroll taxes, and benefits, are the largest of all operating costs (Desrochers & Kirshstein, 2014). Attracting and retaining valuable faculty and staff will often require committing to salary amounts that exceed the inflation rate, which makes it problematic to decrease personnel costs significantly (Gose, 2006). Moreover, because the higher education enterprise is labor intensive, eliminating or reducing these costs is problematic. Of course, many faculty members are tenured and,

therefore, cannot be easily dismissed. Additionally, the upward trend of benefit costs, such as healthcare, impacts higher education more dramatically than less labor-intensive industries (Adams & Shannon, 2006).

Whether under financial strains or not, some colleges and universities may not be strategically equipped from a budget perspective to meet future fiscal challenges. Across the higher education landscape, "the tendency has been to build and add on without consideration of what is no longer working well, what is no longer worth doing, and what needs to be changed.…(since) hard decisions (have been) in short supply" (Lazerson, 2010, p 190). Hossler's (2006) study found the following:

> During the last decades of the twentieth century higher education moved from primarily being seen as a public good to being seen as a private good. This shift is consistent with less public support and higher tuition rates, and with a shift to the privatization of higher education (p. 111).

Priest, St. John, and Boon (2006) noted that the process of privatization in public institutions began in the 1980's as colleges and universities began transforming from "low-tuition institutions that are largely dependent on state funding to provide mass enrollment opportunities at low prices into institutions dependent on tuition revenues and other types of earned income as central sources of operating revenue" (p. 2). Unless these financial pressures are addressed using contemporary fiscal management strategies, higher education institutions may be forced to reduce program offerings (Eckel, 2002).

Typically, higher education budgeting practices have been focused upon a centralized fund system (Hearn, Lewis, Kallsen, Holdsworth, & Jones, 2006). The more common and oldest centralized budgeting approach in higher education is considered to be Incremental Budgeting

(IB). The IB model uses the same base budget from one year to the next and allows only for slight changes to revenue or expenses as determined by the university's central administrative unit. Curry (2006) described IB as annual planning based on incremental increases or decreases to the previous year's budget. The limitations associated with this type of overly simplistic budget model are self-evident. However, more sophisticated budget approaches are emerging.

For example, in response to the financial pressures universities are facing, some schools have elected to adopt a Responsibility Center Management (RCM) budgeting system. Unlike IB, RCM emphasizes decentralized financial accountability for both revenue and costs. RCM offers financial incentives to the different units on campus, both academic and non-academic, with the idea that this will improve financial performance (West, Seidita, Di Mattia, & Whalen, 1997). The guiding principle of a decentralized budget system, such as an RCM system, is that the deans of colleges are closer and more responsive to their unit's financial matters and are better informed of the transactions associated with revenues and expenses (Strauss & Curry, 2002). Moreover, a decentralized system, such as the system offered using RCM, encourages strategic allocations more so than a centralized budget system, which utilizes fiscal allocation based solely on the prior year. Using RCM principles, an academic unit with increased enrollment would receive a greater tuition revenue allocation than a unit with decreasing enrollment or with reduced student credit hours. With an RCM budget system, revenue flows to match what is actually driving the revenue.

Furthermore, RCM operates on the principle that units or responsibility centers should be held accountable for their expenses. University expenses are strategically managed under an RCM system because expense drivers are clearly identified and tied to the responsible units. For example, a facility expense for a particular unit, department, or college within a university with

greater square footage than one with less square footage will be assigned a higher allocation of overall university facility expense. In addition to total square feet of facilities, typical allocation factors used to assign expenses include full-time equivalent employees and number of students. Other possible metrics used to allocate university expenses include credit hours instructed and total direct expenses budgeted for a particular unit.

An RCM budget system is a decentralized method that has been employed by forward thinking higher education institutions, and empowers academic and non-academic units to maintain and manage their revenue and costs. Advocates of RCM suggest its implementation encourages deans and other unit leaders to make decisions that favorably impact the financial and academic success of their areas, which, in the aggregate, benefits the university as a whole (Volpatti, 2013).

Statement of the Problem

State and federal funding of higher education has decreased across the country, which results in a need for institutions to replace decreased appropriation revenue (Weisbrod & Asch, 2010). Some schools have offset the loss of governmental appropriations by relying more heavily on student tuition (Weisbrod & Asch, 2010). As colleges and universities shift some of their financial strain to students in the form of higher tuition, vulnerability is created for students and their families who must spend more for higher education (Espenshade & Radford, 2009). As enrollments grow across the country, student debt has significantly increased for students and their families (Dwyer, McCloud, & Hodson, 2012). Thus, schools relying on tuition increases year after year may not be able to count on this continuing revenue source indefinitely.

Another revenue item that higher education institutions are being forced to closely manage is that of endowment earnings. In 2001 and 2002, many higher education institutions

lost endowment values due to stock market losses, which mark the first time in almost 30 years that schools experienced a decline in their endowment investments (Adams & Shannon, 2006). During 2008, university endowment losses averaged 23% (Weisbrod & Asch, 2010). During periods of volatility in the stock markets in the United States and other world markets, it is not uncommon for schools to see their endowment balances fluctuate by 10% from year to year (Marshall, 2009). Endowment earnings, which colleges rely on to fund specific programs, scholarships, and high demand faculty members, come under strain during periods of volatility. These equity markets not only affect what universities earn on their endowments' principal, but the markets also play an important role in affecting contributions from individuals and corporations (Weisbrod & Asch, 2010).

Therefore, increasing reliance on tuition, decreasing endowment balances, credit tightening, and declining private contributions are pressuring higher education institutions (Weisbrod & Asch, 2010). No one of these sources of revenue is soley responsible for the mounting financial pressures many universities are experiencing. However, taken together, these pressures combine to influence the budget management practices of American higher education. This is a serious matter because our nation depends on our colleges and universities to produce the human capital needed to compete and contribute to its leadership role in the global economy (Weisbrod & Asch, 2010).

To summarize, higher education institutions face a variety of budget challenges and are now rethinking long-term fiscal strategies to achieve their goals (Weisbrod & Asch, 2010). Some universities have implemented strategies to grow existing revenue, while others have focused on generating entirely new revenue streams (Curry et al., 2013). In addition to growing revenue sources, universities have approached budget issues by more closely managing

expenses, although the labor-intensive nature of higher education and rising personnel costs combine to make this difficult from a centralized budgeting perspective. Schools that have adopted RCM budgeting systems have done so in an attempt to be more efficient in allocating resources and managing expenses (Deering, 2015).

In addition, there is a lack of research examining how a university's implementation of an RCM system affects the school's key performance indicators (KPIs) of operating revenue, tuition revenue, contracts/grants revenue, and operating costs/expenses.

Purpose of the Study

The purpose of this study was to determine whether a decentralized budget system (i.e., RCM) improved a university's KPIs. There are limited empirical studies examining whether a school that has implemented an RCM system was better off for doing so. This particular study was designed to investigate whether there are patterns or trends among schools that either implement an RCM system or do not use an RCM budgeting system. The study was based on the financial performance of an institution as the key dependent variable.

Additionally, the study attempted to analyze specific revenue items including contract/grant and tuition line items. A rigorous statistical analysis of specific university revenue items may reveal the success with which a school acquired incremental revenue, and whether or not this success was related to the implementation of an RCM budgeting system.

Research Questions

The following research questions will guide the study:

1. Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?

2. Is there a relationship between annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?
3. Is there a relationship between annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?
4. Is there a relationship between changes in university operating expenses by those who have implemented RCM systems and those that have not?

Significance of Study

There have been fewer state fiscal resources available to higher education over the past three decades according to the State Higher Education Executive Officers (SHEEO) (State Higher Education Executive Officers, 2014). SHEEO reported that full-time equivalent student enrollment grew 49% from 1989-2014 from 7,473,599 to 11,137,541. Accounting for both inflation and enrollment growth, educational appropriations per FTE declined 24% over the past 25 years (SHHEO, 2014). Financial and budgetary pressures are expected to continue in higher education. As a result of these financial challenges, many university leaders face difficult choices regarding how best to manage financial constraints at their institutions. According to Dickeson (2006), in the *Secretary's Commission on the Future of Higher Education*, "Even when institutional costs go up, state subsidies are decreasing, and public concern about affordability may eventually contribute to an erosion of confidence by reductions in funding" (p. 6). Leaders must continue to balance these financial pressures, while also delivering high quality academics and fulfilling their respective institutional missions. This balancing act will be difficult as colleges and universities evaluate the fiscal performance of academic programs. Unfortunately, information and data needed to support timely decision-making are not always readily available (Mayer, 2011).

Hence, the goal of increasing revenue, while other revenue streams are leveling out or decreasing, as well as containing the escalating costs and expenses that higher education institutions face, are all areas of interest for the many different constituents and stakeholders in higher education. Moreover, the financial success and the ability of a school to produce highly sought after graduates that are capable of competing in the world economy should be of interest to university governing boards, and administrative and academic leaders, which include deans and department heads (Geiger, 2015). Moreover, the financial stability of a university should be of interest to anyone who supports the well-being of the academic institution including employees, students and parents, and employers who are looking for graduates who are academically prepared to contribute to their organization.

Many institutional leaders have raised questions about the sustainability of their current business models, whether IB or other simplistic approaches, and whether their institution is prepared strategically to overcome mounting financial challenges in order to fulfill their academic mission (Eckel, 2002). A budgeting system at a public institution is linked to the broader economic and public policy in which the institution operates (Priest, Becker, Hossler, & St. John, 2002). Therefore, the academic success of a school is linked to the financial stability of the institution. Many universities have implemented an RCM budget system, while other schools are considering implementation in hopes of addressing these financial issues.

The value of addressing this important budget issue lies in the application of the theory that an RCM budgeting system can lead to measurable favorable changes in a university's financial results. Determining what changes have occurred to a university's KPIs, based on the implementation of an RCM system, could provide useful information to institutions that are contemplating implementation of a decentralized budget system. Based on results of KPIs,

schools of higher learning could decide whether to implement and invest in an RCM system. Additionally, findings from this study could provide an understanding of the perceptions and expectations that participants had about implementing a decentralized system.

Limitations

The following factors limited the study:

1. The universities included in this case study were the top 50 public universities from the 2018 Wall Street Journal/Times Higher Education ranking of top U.S. colleges (Wall Street Journal, 2017). The ranking methodology used in the Wall Street Journal/Times Higher Education rankings was based on each higher education institution's resources (30% of ranking), engagement (20%), outcomes (40%), and the environment (10%). As a result, the generalizability of the study's results were limited.
2. RCM budget systems are typically modified and tailored to the needs of each college using variations of the system that were deemed appropriate for that specific institution. Therefore, there is no one RCM system that fits all schools. The fact that RCM systems vary from one university to the next may result in many variations and differences among universities, thus making generalization more difficult. Additionally, some universities may apply a hybrid approach in which only certain units on campus used an RCM budget system, while other units continued to use a centralized budget approach.
3. Schools operated in different financial climates based on economic situations and the policies of the state and location.

4. The study used data from fiscal years 2007 to 2016 and did not take into account years prior to 2007. By only using fiscal years from 2007-2016, the study may not have captured significant RCM budget system improvements in years prior to 2007. For example, a school that implemented an RCM system in 2001 could have seen significant financial improvement in the five years following implementation through 2006 and the improvement levels off beginning in 2007.

Delimitations

The following factors delimited the study:

1. The study used only four-year public research universities.
2. The period for data analysis was ten years (fiscal years from 2007-2016).
3. Financial data collected were based on year-end financial reports.
4. Independent public accounting firms audited financial data and statements studied.

Assumptions

The underlying assumptions of this study were:

1. Outside factors, such as demographic, social, political, and economic factors have affected each of the 50 public universities selected in generally the same way during the period tested (2007-2016).
2. The third party audited financial statements used to access and compare results were accurate financial statements.

Definitions

The section provides definitions for the terms used in the study to ensure consistency of interpretation of these terms throughout the process.

- *Budget*: Consists of plans, controls, commitments, and amount of expected revenue and expenses for a particular institution for a given period in the future (typically one year). According to Strauss and Curry (2002), the budget process begins by estimating annual revenues and expenses, through examining program priorities, while considering proposed increments for the upcoming year. Strauss and Curry (2002) concluded that the process ends by balancing expenditures to expected revenues.
- *Centralized Budgeting System*: Budgeting decisions are determined from a central unit and allocations, from both a revenue and a cost perspective, are made to the other academic units and business units based on the decisions made by the central unit (Barr & McClellan, 2010).
- *Certified Public Accountant (CPA)*: an accounting professional who has passed the Uniform CPA examination and has met additional state certification and experience requirements (Lee, 1995).
- *Decentralized Budgeting System*: According to Strauss and Curry (2002), in a decentralized budgeting system, central administration gives individual colleges or units across campus the fiscal responsibility to make budgeting decisions (see *Responsibility Center Management*).
- *Incremental Budgeting*: This is the most common form of budgeting in higher education (Linn, 2007). This particular budget model typically uses the same budget from one year to the next allowing for only minor changes in revenue and expense distribution (Vandament, 1989).

- *Key Performance Indicators:* the measurable value that demonstrates how effectively an organization is achieving its business objectives. Often used as part of a balanced scorecard or to connect strategic goals with operational and financial results, KPIs combine several metrics and indicators to yield objective performance (Smith, 2003). KPIs are used in both the private and public sectors to identify areas of achievement (Burke & Modarresi, 2000).
- *Responsibility Center Management (RCM)*: Decentralized budgeting system where revenues are allocated to academic and other units in proportion to the revenues that they bring into the institution (Linn, 2007). Typical metrics for allocating such revenue may be student credit hours, the number of students, and so forth. Metrics, such as square feet of facilities or number of employees, drive the allocation of costs and expenses. There are many names for RCM including Incentive Based Budgeting (IBB), Responsibility Center Budgeting (RCB), Decentralized Budgeting, Contribution Margin Budgeting, Cost Center Budgeting, and Revenue Responsibility Budgeting. In its purest form, RCM enables units to retain the revenue they generate and be responsible for the costs they incur or generate (Priest & Boon, 2006).
- *Zero-Based Budgeting*: This particular budget model justifies each activity and program on an annual basis. The basic premise of this budget system is "every activity and program is significant and must be readjusted each year" (Lasher & Greene, 1993, p. 447).

Organization of the Study

Chapter I presented the introduction, statement of the problem, purpose of the study, research questions, significance, limitations and delimitations, assumptions, and definitions of

key terms of the study. Chapter II contained a review of related literature about pressures facing higher education institutions and RCM budgeting systems. Chapter III reported the quantitative methods, instrumentation, and data collected in the study. Chapter IV contained the results of the analysis and discussion thereof. Chapter V included a summary of the study, conclusions, implications, recommendations for further practice and research, and concluding thoughts.

Chapter II: Literature Review

The success of any institution of higher education relies upon sound financial management and the utmost fiduciary duty. A university's educational, research, outreach, and service initiatives cannot be achieved operating in an atmosphere of fiscal naivety or negligence (Barr & McClellan, 2010). Therefore, proper finance and accounting structures enable colleges and universities to remain competitive with peer institutions by encouraging fiscal responsibility and providing accurate and timely financial data to the decision-making process. Over the past decade, leaders at colleges and universities across the U.S. have shown increased interest in more sophisticated approaches to budgeting and financial management (Birnbaum, 2000; Vonasek, 2011). This interest is well-warranted as universities face fiscal challenges in a complex and competitive higher education landscape (Zemsky et al., 2006).

Adding to the pressures of competition, institutions of higher education face environmental challenges to resource management (Weisbrod & Asch, 2010). Among these challenges are reduced state appropriations, increased tuition reliance, and the ever-increasing cost of personnel. According to Szatmary (2011), "American universities, especially public institutions, have confronted a funding crisis in recent years that will only worsen….every institution must maximize its existing resources – including budgeting models – so that university leaders can make the most informed decisions" (p. 69). Therefore, it is imperative that higher education institutions address the funding shortfall by enhancing revenue in other areas or by generating new revenue streams.

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This review of the literature related to the Responsibility Center Management (RCM) budgeting system and its impact on higher education institutions was organized around the following five topics: (1) Funding for Higher Education Institutions, (2) Costs for Higher Education Institutions, along with cost containment strategies, (3) Budgeting Methods for Higher Education Institutions, with an emphasis on RCM, (4) Rationale for and impediments to the implementation of RCM in higher education, and (5) Key Performance Indicators and RCM. This literature review included analyses of topics related to how higher education institutions elected to implement RCM budgeting systems.

Funding for Higher Education Institutions

State appropriations. As costs have risen for higher education institutions, combined with state subsidy declines, many colleges and universities across the nation have struggled to create balanced budgets (Dickeson, 2006). According to Lyall and Sell (2006), in the 1980s, over half of a typical university's operating expenses were covered by taxpayers. However,

more recently, this percentage has decreased to less than a third. According to Weisbrod and Asch (2010, p.28), "State funding is a very important portion (27 percent) of public college and university revenues, which provide education to about 75 percent of all students." To partially offset decreased state appropriations, schools have relied on increases in other revenue, namely tuition (Lyall & Sell, 2006). According to Dickeson (2006), in the 2006 Secretary's Commission on the Future of Higher Education, "From 1995 to 2005, average tuition and fees at public four-year institutions rose 51%" (p. 10), because state funding had declined to the lowest levels in the past two decades. Decreased state funding, and increasingly higher reliance on financial support from students and their families, has contributed to potential students questioning the value proposition of college degrees (Vedder, Denhart, & Robe, 2013).

As states have faced budget uncertainty themselves, it is only reasonable to expect that appropriations to public universities have been shrinking. States have been facing increasing pressure to expand entitlement spending (Weisbrod & Asch, 2010). The biggest reason was the rising cost of Medicaid (Hovey, 1999; Kane, Orszag, & Gunter, 2003). Shrinking budgets and competing priorities, along with public resistance to increased taxes, state legislators found themselves in the unenviable position of deciding where to allocate fiscal resources (Cheslock & Gianneschi, 2008). In addition to entitlements, legislators have been deciding how to allocate funds across what many people consider essential expenditures, such as elementary and secondary education, public welfare, highways and roads, and health education. These tough decisions resulted in many states allocating less to higher education budgets, which many consider discretionary budget items, than in previous years (Kane et al., 2003; SHEEO, 2007). Decreasing appropriations from states has not been the only reduced revenue issue facing higher education institutions. Cutbacks in federal support have been occurring (Gose, 2005).

Tuition reliance. Many colleges and universities determine their tuition and fees rates during the budgeting process. According to Weisbrod and Asch (2010), tuition has been the largest revenue category for four-year, non-profit higher education institutions' revenue, averaging 31%. Because schools are trying to calculate the highest practicable tuition revenue from students, these increases have become a growing burden to students and their families. Financial vulnerability has been created for students who borrow heavily for their education, especially students from lower economic background (Espenshade & Radford, 2009). The problem of shifting fiscal burdens to students has been more acute at public universities, which have been the primary focus to expansion of higher education (Bowen, Chingos, & McPherson, 2009).

Correspondingly, nearly two-thirds of college students graduated in 2012 with debt, with the average over $26,000 (Chen & Wiederspan, 2014). Perna, Kvaal, and Ruiz (2017) found that 40 million Americans owed $1.2 trillion in outstanding federal student loan debt, triple the debt load since 2008. Increased borrowing coincided with relaxed credit rules as the deregulation of the banking industry allowed borrowing with little or no collateral and despite the poor credit ratings of some borrowers (Smith, 2010). Increased enrollment and easier borrowing by students, accompanied by massive foreign investment in the U.S. financial sector led to expanded capital available for loans (Krippner, 2005). At the intersection of increased enrollment and easier accessibility to credit, there has been an explosion of student debt since the 1990s (College Board, 2009).

The use of year-after-year tuition increases are no longer certain for universities because students are questioning its unfairness. For example, protests over tuition increases in the University of North Carolina System, included student demands for voting seats on the Board of

Governors (Johnston, 2015). In response, many colleges and universities have turned to discounting gross tuition, or "sticker price," in an effort to help students and their families reduce tuition burdens. According to Valbrun (2018), the National Association of College and University Business Officers' (NACUBO) report, the 2017 Tuition Discounting Study, the trend of discounting full-time tuition edged closer to 50% in the 2016-2017 academic year. This report provided information on how much colleges and universities have effectively been undercutting their tuition by awarding students scholarships and grants and revealed that the average discount rate for full-time freshmen reached 48.2% in the academic year, which is an all-time high and surpassed the 48.0% average tuition discount from the previous academic year of 2015-2016 (Valbrun, 2018). Data from the NACUBO 2017 Tuition Discounting Study indicated that discount to students in the academic year of 2016-2017 had increased at a rate that offsets increases in gross tuition (Seltzer, 2017).

Endowment exposure. Another revenue component that has created a fiscal challenge to higher education financial leaders relates to the volatility of endowment balances and earnings, which are tied closely to the U.S. equities market. Higher education institutions have found themselves exposed to fluctuations in markets that directly impact endowment earnings. In 2001 and 2002, many institutions lost endowment values due to stock market losses, which marked the first time in nearly 30 years that schools experienced a decline in their endowment investments (Adams & Shannon, 2006).

Endowment earnings have been relied upon by universities to fund specific programs, scholarships, and high demand faculty members. When stock markets fluctuate, university earnings fluctuate, as well. During the "Great Recession of 2008" in which the stock market collapsed, colleges incurred substantial endowment losses averaging 23% (Weisbrod & Asch,

2010). The market downturn in 2007 and resulting loss of endowment earnings and capital also impacted at least one private, Ivy League research university. According to Marshall (2009), the wealthiest school in the world, Harvard University, felt the simultaneous pinch of a 22% decline in its endowment and subsequent loss of liquidity. Because of Harvard's liquidity having been closely tied to the failing equity market, the university did not have the financial resources to fulfill some of its financial commitments, which resulted in budget cuts and raised tensions with faculty (Marshall, 2009).

With lower endowment earnings or even losses in endowment capital balances, many schools were forced to reduce expenditures to offset market declines. During Fiscal Year 2008-2009, according to the Association of Research Libraries (ARL), a survey sent to 123 institution members indicated that drastic steps were needed to decrease library budgeted expenditures to counter the loss of income from a variety of sources, particularly endowment earnings (Lowry, 2011). The survey also highlighted that, in hopes that endowment capital balances will return to normal after the "Great Recession of 2008," endowment expenditures were being reduced.

Prior to the recession, volatility in the stock market has existed. According to a National Association of College and University Business Officers (NACUBO) 2002 endowment report, which surveyed 660 higher education institutions, endowments lost about 6% of their value from the previous 2001 fiscal year (NACUBO, 2002). This decrease was the first two-year consecutive decline since 1974 (Lyons, 2003).

Later in the decade, according to Lord (2010), findings presented at the NACUBO 2010 Endowment Management forum, fiscal year 2009 was the worst year in university endowment performance since NACUBO's annual surveys began in 1971. NACUBO's President and CEO,

John Walda, and the executive director of Commonfund Institute, John Griswold, provided details of the 2009 NACUBO–Commonfund Study during the same forum (Lord, 2010):

> The average endowment declined 18.7 percent in the fiscal year ended June 30, 2009. This far exceeded the previous record decline of 11.4 percent in 1974, with the total loss of all educational endowments in the study approaching $100 billion over the recent one-year period. The category of largest endowments (those with assets exceeding $1 billion) experienced the worst returns – averaging losses of 20.5 percent. As a result of the losses, the number of institutions with endowment assets greater than $1 billion dropped from 75 in 2008 to 52 in 2009. (p.1)

According to the 2016 NACUBO-Commonfund Study of Endowments (NACUBO, 2017), which included data gathered from 805 U.S. colleges and universities, institutions' endowments lost an average of 1.9% for the 2016 fiscal year. The report stated that the negative return, coupled with the uncharacteristic low 2.4% return on principal reported for the previous year 2015, contributed significantly to a decline in the long-term 10-year average annual returns to 5.0% from the previous year's 6.3%. Similar to the fiscal year 2015, the fiscal year 2016 long-term return figure was well below the median 7.4% that most institutions needed to maintain their endowments' purchasing power after inflation and investment management costs (NACUBO, 2017).

Endowment losses, shortfalls in state funding, combined with tuition revenue strains, happened simultaneously for many universities (Weisbrod & Asch, 2010). No one of these sources of revenue is solely responsible for the mounting financial pressures schools have experienced. However, taken together, these pressures have combined to greatly influence American higher education. According to Weisbrod & Asch:

> When a drop in the endowment of 25 percent occurs, the three-year average falls about 8 percent at a school where 15 percent of the budget comes from the endowment, but the decline in total revenue of 15 percent of the 8 percent – 1.2 percent – is tractable……And if a school receives 20 percent of its revenue from the state and the state cuts its allocation by a significant 10 percent, the decrease of 10 percent of the 20 percent is another 2 percent of total revenue. Cuts, individually small, are adding up. Now we can begin to see the college fiscal problem in perspective. Schools are experiencing a very "rainy day," as the perfect storm of cuts in multiple sources of revenue produces a torrent of fiscal stress (2010, p. 29).

Costs for Higher Education Institutions

Pressures to control costs. In addition to financial pressures caused by tightening of revenue, costs have risen as well. Universities raised all the money they can and, in turn, have spent all the money they raised (Bowen, 1980). Unfortunately, at times, there has not been enough revenue raised to satisfy the demands of university leaders who wanted to preserve their standing, build legacies, and fund new programs (Bok, 2009). The result has been that fixed and overhead costs have grown, referred as "the administrative lattice" (Zemsky & Massy, 1990).

Furthermore, poor expenditure information has been a barrier to control costs at many colleges and universities (Adams & Shannon, 2006). According Dickeson (2006), university finances are complex and are made more so by accounting processes that "confuse costs with revenues and obscure production costs, reflecting a broader problem: inadequate attention to cost measurement and cost management within institutions" (p. 11). Furthermore, Day (1993) concluded that there has not been a consistent costing methodology in higher education. Despite these limitations, internal management reports at universities focused on costs such as salaries,

travel, and research, while ignoring costs related to facilities, administration, and other overhead (Adams & Shannon, 2006).

Worsening the fiscal issues facing higher education institutions has been the simultaneous increase in certain costs. The primary expense of institutions has been personnel costs, a combination of salaries, wages, payroll taxes, and benefits (Desrochers & Kirshstein, 2014). Attracting or retaining valuable faculty and competent staff has required universities to commit salary amounts that have exceeded the inflation rate, which has made it problematic to decrease personnel costs significantly (Gose, 2006). Because health care has been a significant and rising component of university benefits costs, the higher education industry has been impacted more dramatically than many other industries (Adams & Shannon, 2006).

Higher education institutions have struggled to contain their discretionary costs and have been forced to implement new strategies to control costs (Davies, 2005). According to Dickeson (2006), in the 2006 Secretary's Commission on the Future of Higher Education:

> Colleges and universities have few incentives to contain costs because prestige is often measured by resources, and managers who hold down spending risk losing their academic reputations. As pressures on state funding for higher education continue, institutional attention to cost and price control will inevitably become an urgent priority for internal institutional accountability and public credibility. (p. 11)

Outsourcing. Colleges and universities have sought strategies to improve their bottom-line and cash flow in an effort to combat financial pressures. Outsourcing has been championed as part of the solution to funding dilemmas facing higher education (Schibik & Harrington, 2004). One such strategy that many institutions have implemented is the outsourcing of specific administrative functions for the school. In a survey conducted at Jacksonville State University,

school officials stated that cost containment and revenue generation were the top two reasons for outsourcing (Gose, 2005). Certain functions or areas that colleges and universities have been outsourcing include food services, custodial services, information technology, security or public safety, and bookstore management.

According to a survey conducted by UNICCO, a Massachusetts based facilities maintenance organization, 91% of higher education institutions outsourced at least one type of campus service in 2002, which is up from 82% in 2000 (Angelo, 2005). It has become more common for schools to outsource because it was more economical and productive to use an outside vendor rather than internal employees. A significant driver of a school's decision to outsource has been cost containment. Outsourcing certain functions were shown to be economical because schools have been pressed to streamline operations to meet financial challenges (Davies, 2005).

The food service function has been one popular area for outsourcing by institutions. In the past, large universities usually internally managed their food service, but a trend has been for these institutions to outsource dining, driven primarily for financial reasons (Adams & Shannon, 2006). In the survey by UNICCO, 61% of higher education institutions outsourced food services (Angelo, 2005). Often with the outsourcing of dining, the outside contractor has invested in refurbishments of existing dining locations or even in the construction of new dining venues, which has saved schools from investing capital into a non-core mission of a school. At the University of Southern Mississippi in Hattiesburg, the school reaped the benefits of Aramark upgrading the dining facilities with new designs (Angelo, 2005).

In addition to outsourcing the food service function, another popular outsourced function has related to the management of the school's bookstores. According to the UNICCO survey,

the second most likely area to be outsourced was the bookstore, at 52% (Angelo, 2005). Similar to the dining function, higher education institutions do not necessarily have a core competency to deliver the highest level of bookstore management. Gose (2005) noted that in 2004, the University of Georgia outsourced its bookstore management and one year later had realized a $300,000 per quarter improvement in the bookstore's profitability. By outsourcing the management to a company in the business of optimizing bookstores, the University of Georgia bookstore displayed 70% of the store's inventory, whereas, previously under school management, the bookstore had 70% of the inventory in storage (Gose, 2005). Bookstore management companies likely have more of a core competency in inventory display and related control than does a university. This more efficient inventory approach has improved inventory turnover, which has been directly linked to the store's bottom-line and ultimately a university's bottom-line. At Georgia Institute of Technology, the school had been running their bookstore profitably, but the unit head in the school's auxiliary services, spoke on the decision to outsource their bookstore management, had a different angle. The unit head stated that the school wanted to bring in better marketers for the store, which in turn, would bring more non-students into the store, competing more successfully with existing Atlanta bookstores (Gose, 2005).

In addition to schools having considered outsourcing dining and bookstore operations, two of the most popular areas to hire outside companies, schools have looked at other areas to outsource (Wekullo, 2017). The result has been that outsourcing has reached further into the depths of higher education institutions and has impacted areas that in the past had not traditionally been outsourced for cost containment purposes (Johnson & Graman, 2015). One such area that had not been traditionally outsourced by schools has related to on-campus housing (Wekullo, 2017). Many development companies have provided a complete turn-key housing

operation for schools that choose to hire developers to manage campus housing. In a typical arrangement, developers have invested in the infrastructure and capital to build new housing units on university property or have refurbished existing ones, having paid a fee to the school. The opportunity and reason for schools to turn over their housing responsibilities have risen, as many schools have grown their number of students, while having looked for ways to improve the school's bottom-line.

Information technology (IT) has been another area outsourced by certain colleges and universities (Yarbrough, 2011). Temple University outsourced its IT work to SunGard, including the management of the school's mainframe computer and entire data center. Temple's IT vice president stated that cost was the main reason for the outsourcing decision, but the decision also allowed the school to bring in more IT expertise from SunGard (Angelo, 2005). According to Wekullo (2017), higher education institutions in the U.S. spent $6.6 billion on outsourcing IT in 2015, much more than the $4.6 billion spent by the U.S. federal government during the same year.

Outsourcing has even touched a college's classroom teaching area, previously thought to be off-limits to the idea of outsourcing (Yarbrough, 2011). Certain schools have outsourced selected courses and academic programs, which have allowed colleges to reduce costs, and offered a more diverse classroom experience and possibly improved the overall quality of the course offering (Coplin, 2006). These types of teaching contractors have been used to deliver a specific course over a wide number of schools, which has allowed for the course costs to be spread out and may have resulted in an overall lower specific course delivery cost than that of a traditional class.

In addition to more common outsourced functions, some higher education institutions have been aggressively looking at other non-traditional areas to outsource. At least one school (City Colleges of Chicago) has chosen to outsource its entire finance operation, having moved its budgeting, financial reporting, accounting, purchasing, among other areas, to American Express (Gose, 2005). The outsourcing of the finance function in this particular case has confirmed that schools have considered many types of responsibilities to outsource, the goal of which has been to improve efficiencies, in order to contain costs.

Consortia. In addition to outsourcing, another key strategy that schools have implemented to help offset stagnant revenues and rising expenses has related to joining consortia. A consortia, in the higher education industry, has represented a group of colleges and universities pooled together for certain services, in hopes of obtaining a better price for such services. According to Sabo (2010), consortia activity was started in the higher education industry in the 1950's. During this time, the presidents of the Big 10 schools decided to pool their resources together to purchase a sophisticated telescope, which otherwise would have been unobtainable for the individual schools (Sabo, 2010). Many schools have now entered into consortium groups as a strategy for cost control (Adams & Shannon, 2006).

One such area that schools have pooled together their resources, in hopes to manage rising costs more effectively, relates to healthcare, the costliest benefit offered to faculty and staff of institutions (Dunleavy, 2013). In 2013, eleven colleges and universities in the Boston area created a health insurance consortium, for the primary reason of lowering costs of higher education (Jackson, 2016). According to Jackson (2016), through these types of health insurance consortia across the country, participating institutions have saved more than $10 million in the first two years of existence, saving mainly in the area of administrative costs.

Another area in which certain schools have leveraged consortia is in the area of insurance, including property, general liability, and vehicle coverage. The Indiana University System has been one such system, which has used consortia activity to provide an economy of scale, yielding savings in administrative costs relating to insurance coverage (Adams & Shannon, 2006). Similarly, the University System of Georgia has pooled together its 35 university system campuses across the state, through consortial activity to become more efficient, reduce administration, while directing savings from the program back into the academic mission of the system (Hayes, 2015). The chancellor of the University System of Georgia led the effort to consolidate and stated that the "Great Recession in 2008" was a wake-up call for the higher education industry, because of significant budget cuts (Hayes, 2015).

Due to economic challenges, the pressure has been on for schools to be more collaborative. According to the former vice chancellor of administration at the University of California, Davis (UC Davis), schools have been in survival mode, and have been more willing to put aside turf battles (Sabo, 2010). At UC Davis, forming consortia or consolidating efforts with other organizations extended beyond higher education institutions, as the school has collaborated with the city, county, and state agencies in a consortia relating to emergency management responsibility. This particular consortia activity allowed UC Davis to purchase more equipment and to apply for federal grants, otherwise not available, making the schools valuable resources stretch further (Sabo, 2010).

Other cost-containment strategies. In addition to schools strategically having implemented outsourcing arrangements with vendors or joining consortia with other organizations, schools have become more creative in finding other strategies to contain costs and to offset revenue declines. One school chose a cost containment strategy and elected to become

self-insured for health care. As Dunleavy (2013) noted, Marywood University became self-insured to combat double-digit annual rate increases the school had been seeing in health care expenses. To help control health care costs, the university was aggressive in educating their faculty and staff of the better health care decisions they could make that would have a direct impact on future premiums, in an attempt to contain health care cost increases (Dunleavy, 2013).

Colleges and universities have been searching for and finding ways to contain costs and improve their bottom line. As revenues have become stagnant or have even decreased, colleges and universities have been strategically looking at new and improved ways to control costs. Certain schools have chosen to outsource functions, while other schools have created or joined consortia, while others have devised other strategies to manage costs.

Budgeting Methods for Higher Education Institutions

Budgeting. Adoption of a budget in a public sector, such as public universities, has resulted from matching the decision and planning process with the resources available at the organization. Budgeting has been the process of having allocated these available, or soon to be available, resources to the strategic and prioritized needs of the organization or university (Linn, 2007). The budget has proved to be an important tool to control and safeguard the assets of the university. The use of accounting principles established by the Governmental Accounting Standards Board (GASB) - the independent organization that establishes accounting and financial reporting standards for U.S. state and local governments – has provided important tools through the Generally Accepted Accounting Principles (GAAP) (GASB, 2007). The GASB has developed and issued pronouncements, or accounting standards, intended to promote valid and reliable financial reporting of results, which has been critically useful to the board of trustees, financial institutions, taxpayers, and other constituents of a public university. Therefore, the

budget has played an integral role relating to financial accountability and the financial reporting objectives as established by GASB.

Dropkin, Halpin, and LaTouche (2007), found that a budget "is a plan for getting and spending money to reach specific goals by a specific time" (p.3). According to Maddox (1999), a budget has had five different purposes in not-for-profit organizations: putting the business strategy into operations, allocating resources, providing incentives, giving control, and providing a means of communication to internal and external audiences. Therefore, the budget has been one channel in which a public university has enacted its mission, vision, and strategic priorities. Mayhew (1979, p. 54) summarized the definition of a budget, in that a budget has been a "statement of educational purpose phrased in fiscal terms."

According to a report from the National Center for Education Statistics [NCES] (Core Finance Data Task Force, 2003), in an educational environment:

> Budgeting is an invaluable tool for both planning and evaluating. Budgeting provides a vehicle for translating educational goals and programs into financial resource plans- that is, developing an instructional plan to meet student performance goals should be directly linked to determining budgetary allocations. The link between instructional goals and financial planning is critical to effective budgeting and enhances the evaluation of budgetary and educational accountability. (p. 1)

According to Linn (2007), a budget model represents this:

> A budget is a method of accomplishing many managerial tasks. A budget is not only a means of planning for various revenue streams, a control mechanism for an administration to keep from spending too much, a procedure for controlling its units, a process to coordinate the many activities that an institution undertakes, and a way to

> communicate to all its stakeholders a summarization of the activities that the various units will undertake, but it is also a technique for setting the organization's priorities by allocating scare resources to those activities that officials deem to be the most important and rationing it to those areas deemed less vital. Following the priorities set in a budget is a key element in determining the direction of the organization and its future success or failure. The budget is based on a formal plan, such as a strategic plan, that the institution follows similarly as to following a roadmap. The creating and following of budgetary priorities is essential, even during relatively favorable financial times, while a downturn in financial circumstances only makes this more difficult and even more crucial. Consequently, budgets are a key element in determining the direction of the organization and its future success or failure (pp. 20-21).

Budgeting approaches. Budget systems at colleges and universities have evolved over the last century. As institutions of higher education have become increasingly complex over the years, budgeting has been used by institutions in dealing with "present and future problems in an organized fashion" to reduce uncertainties (Meisnger & Dueck, 1984; p. 6). Budgets have served three primary purposes for higher education institutions (Linn, 2007). First, a budget is a forecast of revenue and expenses (thereby a projection of the net position of a university for the year); second, a budget has served as a roadmap for rational and efficient allocation of resources; third, a budget has provided a framework to guide decisions and activities by university leadership, faculty, and staff (Linn, 2007).

Budget systems have been needed to provide department heads and other managers the financial tools they need to make a wide variety of financial decisions. Each type of a particular budget system typically has provided both advantages and disadvantages to colleges and

universities. These varying budgeting models have been improved upon over the years, combined with technological advances in computer and data systems, which have allowed for new and innovative budgeting models being enhanced from previous models (Whalen, 2002).

Budget systems used at higher education institutions have been based on and developed from the private sector (Lasher & Green, 1993). Academic institutions have fought for at least a century to separate their business models from those of corporate entities, as Thorstein (1918, p. 259) argued, "The intrusion of business principles in the universities goes to weaken and retard the pursuit of learning, and therefore to defeat the ends for which a university is maintained." This philosophy of separation among higher education institutions and business entities has continued into the 21st century (Hendley, 2000).

Colleges and universities have faced financial struggles similar to what private businesses have faced, as both public and private industries have encouraged fiscal responsibility. An organization (whether higher education or otherwise) has needed sufficient revenue to cover expenses to remain competitive. There has been pressure for colleges and universities to manage resources appropriately and to adopt budgeting methods from the corporate world to help them achieve their goals (Kirp, 2003).

Below is an overview of seven budget models used in higher education institutions: Incremental Budgeting, Zero-Based Budgeting, Activity-Based Budgeting, Formula Budgeting, Performance-Based Budgeting, Centralized Budgeting, and Responsibility Center Management. By reviewing these types of budget methods used at higher education institutions, it is important to note that each method described is not mutually exclusive from each other. Hence, these methods have elements that may have contributed to the development of an RCM budgeting system.

Incremental budgeting (IB). IB has been a traditional budgeting system that has looked at funding levels from the prior year, to determine funding levels for a current year. Only new, or incremental revenue, has been allocated using the IB. This particular system has used essentially the same budget year after year, and has allowed for only minor changes in revenue levels and resource distribution (Vandament, 1989). In this type of budget system, any budget cuts that have occurred are typically across-the-board reductions with each unit participating in the cuts (Strauss & Curry, 2002). IB has assumed the previous year budget has already been justified and has been used as a base to make changes to the following year (Linn, 2007).

Advantages. According to Linn (2007), IB has been the most used system among the budget models in the higher education industry. This method has been attractive to public universities because it has been relatively easy to implement while allowing units to plan for multiple years into the future, due to the predictability of the model (Curry, 2006). According to Lasher and Green (1993), IB has mitigated conflict among resource competitions because every budget item has been treated the same while the system has provided budgetary stability during times of fiscal stability.

Disadvantages. Just as IB has provided budgetary stability during fiscal stability, during times of fiscal volatility, this system has been limited in its vision. With this model, it is difficult to determine where costs have incurred, which is problematic in implementing cost containment strategies (Linn, 2007). This type of model is a non-aggressive approach to management and budget-decision making, with little incentives to justify programs (Lasher & Green, 1993). According to Linn (2007), with IB, strategic changes cannot be made to the model without breaking its incremental nature.

Zero-based budgeting (ZBB). ZBB has required that each item in the budget be justified during the development of the annual budget, year-after-year. Peter A. Phyrr originally developed ZBB in the late 1960s, as Texas Instruments was one of the first adopters of this particular budgeting system (Lasher & Greene, 1993). "The basic premise behind ZBB has been that every activity and program has to be significant and must be readjusted each year through a series of 'decision packages'" (Lasher & Greene, 1993, p. 447).

Advantages. The ZBB budget model has perhaps been the best budget model for controlling unnecessary costs because each expenditure must be re-justified and re-approved. With the ZBB, all resource allocation has had a purpose, mitigating unnecessary spending as compared to other models. According to LaFaive (2003), ZBB has made budget discussions more meaningful during review sessions, while having reduced the entitlement mentality concerning cost increases.

Disadvantages. The disadvantages of ZBB have included the fact that no budget history has been assumed, which does not recognize continuing commitments, including faculty tenure, and has typically been a budgeting model that is highly time-consuming (Lasher & Green, 1993).

Activity-based budgeting (ABB). ABB has been a method of budgeting in which revenues generated from instructional and research activities are allocated directly to the unit responsible for the activity. With this type of budget model, universities allocate or award financial resources to units or activities that have seen the most significant form of return (HRC, 2012).

Advantages. According to the Hanover Research Council (HRC, 2012, p.1), "If the University can accurately state where revenues are coming from and link these revenues to broader strategic objectives, this method (ABB) may increase revenue moving forward."

Disadvantages. Implementation of an ABB system has required more time and management of the budgeting process than other budgeting models. According to the HRC (2012),

> Comments made by Interim University of Washington provost Mary Lidstrom suggest that implementation of an activity-based model requires substantial resource commitment, which may not be feasible for some institutions. Lidstrom, commenting on the University of Washington's decision to push back the implementation of its activity-based model (a decision influenced in part by the impact of the 2008 recession), noted that "No other university has been able to implement something like this in less than three years, and we were trying to do it in less than two (p. 1).

Formula Budgeting (FB). This type of budget system has relied on the use of specified criteria in allocating resources. Introduced in the early 1950s, FB was used to ensure equitable and rational distribution of resources (Brinkman, 1984; Meisinger & Dubeck, 1984). According to Boutwell (1973, p. 43), FB "has been a model that has generated all types of visions in the minds of university budget officers, legislators, trustees, faculty, students and university administrators….. each constituent group may have their own definition of the term". FB has used mathematical relationships and formulas to determine allocations of fiscal resources to produce the desired output (Boutwell, 1973). For example, in higher education, these formulas would have allocated university needs to projected enrollments.

Advantages. One advantage of FB has been the system having been relatively easy to determine the amount of resources allocated to a unit, which has resulted in a simpler overall budgeting process (Linn, 2007). One study found that approximately 66% of the state systems of higher education in the United States have made use of formula funding at some point in their

budgeting process (McKeown-Moak, 2006). According to Brinkman (1984), this type of budget model has provided an equitable distribution of funds among institutions and allowed for a useful framework through which universities communicate with the state legislature.

Disadvantages. The FB model has been more rigid than other models, making it less likely to have fostered innovative practices or new programs (Linn, 2007). According to Moss and Gaither (1976), Formula Budgeting has been a linear approach to funding, so as student enrollments may have declined, formulas generated proportionately fewer funds. As public universities have faced financial pressures, using a system that does not promote innovative or entrepreneurial approaches has likely been problematic during financially stressful periods.

Performance-based budgeting (PBB). As the name implies, PBB has allocated resources according to the unit's performance outcomes. As PBB emerged in the 1940s, it represented a shift to a management orientation having focused on programs and activities (Meisinger & Dubeck, 1984; Lasher & Greene, 1993). According to Barr and McClellan (2010), the attainment of specific performance measures having driven resource allocation has been the premise of PBB's central feature. For example, a department head that has followed the PBB budgeting model may have encouraged faculty to work towards lowering the WDF rate (withdrawn with failure). In this example, the department head's goal has been to lower the WDF rate from 25% to 15% based on established performance incentives, meeting that goal for two consecutive academic years would have provided funding for new department resources.

Advantages. Lasher and Greene (1993) stated that one of the advantages of PBB is that the model has focused on achievements and results, rather than on inputs and processes. By having focused on results, PBB may have resulted in greater accountability and transparency by linking the funding of public institutions to the delivered outcomes. According to a report

released by Virginia Tech researchers, the PBB has been more likely to be legislatively mandated (HRC, 2012).

Disadvantages. In some cases, during times of fiscal stress at a university, the PBB method has produced an inconsistent actual disbursement of resources, as compared to the budgeted formula in place (Barr & McClellan, 2010). Another disadvantage to using this budget model, has been in the selection of the performance indicators, along with the different definition of success among these indicators among different groups on campus (Layzell, 1998).

Centralized budgeting (CB). CB systems have required a university's central level administration to make key budgeting decisions, rather than the key decisions being made at the unit or individual college level. When using a CB system, the particular institution's overall priorities and goals have driven the decision process (Barr & McClellan, 2010).

Advantages. According to Barr & McClellan (2010), with a CB system, less debate or tension has surrounded the budget, compared to other budget models. According to William Lasher, a professor emeritus of higher education at the University of Texas at Austin, many higher education institutions have considered utilizing a CB system during periods of financial constraints (Stripling, 2010).

Disadvantages. With a CB model, different colleges or units have not necessarily been incentivized to generate new ideas or product offerings, which has likely resulted in undesired revenue containment. By not having offered autonomy nor much incentive to have controlled costs, this budget method has inhibited proper budget management (Barr & McClellen, 2010).

Table 1 compiles an overview of the advantages and disadvantages of the budgeting models from the literature review. The following part of this dissertation will describe RCM in depth.

Table 1

Advantages and Disadvantages of Selected Budget Models

Type of Budget	Advantages	Disadvantages
Incremental Budgeting	• Most used budget model • Easy to implement • Predictability into future years • Mitigates conflict among resource allocations • Non-aggressive	• Limited in its vision during times of fiscal volatility • Status quo • Difficult to determine where costs have occurred • Little incentives to justify programs
Zero-Based Budgeting	• Controls unnecessary costs • Mitigates spending • Meaningful budget review • Reduces entitlement mentality	• Highly time-consuming • Ad hoc nature • Does not recognize continuing commitments
Activity-Based Budgeting	• Promotes revenue enhancement • Links budget to strategic objectives	• Time-consuming • Substantial resource commitment
Formula Budgeting	• The budget process is simplified • Equitable distribution • Enhances communication with the state legislature • Objectivity	• Rigid budget method • Does not foster innovation • Linear approach • Unable to determine long-term outcomes
Performance-Based Budgeting	• Focuses on achievements and results • Greater accountability • Improved transparency	• Inconsistent disbursement of resources • Potential bias (selection of performance indicators and defined success)
Centralized Budgeting	• Less debate and tension • Closer monitoring and controlling of expenditures • Lends itself to mid-year adjustments	• Not incentivized to generate new ideas • Inhibits good budget management
Responsibility Center Management (RCM)	• Promotes entrepreneurship • Flexible • Decentralization (decisions made by those impacted) • Accountability • Effective use of resources • Sharing of financial information	• Competition among units/colleges • Budget/bottom-line driven academic decisions • Lack of central controls

Responsibility Center Management (RCM)

RCM concept. There have been multiple names for RCM, including incentive-based budgeting (IBB), value-based budgeting (VBB), value-centered management (VCM), and

responsibility center budgeting (RCB), among others (Priest et al., 2002; Hearn et al., 2006). According to Barr and McClellan (2010), an RCM system:

> locates responsibility for unit budget performance at the local level. Units are either investment centers, revenue centers or cost centers. Investment centers, such as athletic departments or hospitals, generate revenue and costs, but also have significant assets to manage as well. Revenue centers are those units with the capacity to generate the revenues necessary to cover their expenses. Also, these units are taxed to cover their share of central institutional services and to support the operation of cost centers. Cost centers are units that provide programs and services that do not allow for the generation of sufficient revenue to cover operating expenses (p. 75).

One of the earlier users of an RCM system was the University of Pennsylvania in the early 1970's, responding to a financial crisis across many colleges and universities across the country (Curry et al., 2013). According to Lang (1999), the strengths of RCM have been most suited to large research universities. In the late 1980's, Indiana University-Purdue University Indianapolis (IUPUI) became the first public university to implement an RCM model (Stocum & Rooney, 1997). Over the last several decades, other institutions, both private and public, have implemented such a system.

With this decentralized system, revenues have been typically allocated to the units based on a systematic process, using such metrics as credit hours produced or number of students, among other metrics. Certain general and overhead expenses have been typically allocated using a system based on square footage, the number of employees, and so forth for the unit, while direct expenditures have been charged directly to the units themselves. The RCM model has

shifted much of the financial responsibility from central administrative departments at an institution, to deans and other unit managers.

As RCM budget systems have specifically shifted the budget responsibility to the unit or college level, universities which have implemented RCM hope this shift will lead to improved performance and response to opportunities and challenges that face the unit. The RCM model has encouraged units to become more innovative and entrepreneurial than would have occurred with a more centralized approach (Lang, 1999). Advocates of RCM have suggested its implementation has encouraged deans to have made decisions that favorably impacted the financial and academic success of their areas, which in the aggregate, has benefited the university as a whole (Volpatti, 2013).

According to Zierdt (1999), RCM originated from Harvard's president James Bryant Conant. As president of Harvard from 1933-1953, Conant once stated, "Every tub stands on its bottom" (Dubeck, 1997, p. 81). The "tub" that Conant is referring to relative to RCM was the different academic units of a university, and the "bottom" referred to each unit having responsibility for its "bottom" – line. Without RCM, academic units "often have the authority to make changes within programs and staffing, but are not held financially responsible and accountable for their actions" (Zierdt, 1999, p. 348). According to Linn (2007), "In RCB, the central administration gives its units both academic authority and fiscal responsibility" (p. 25). The origins of an RCM system were to clarify roles and responsibilities between local and central units, which allowed cause and effect through revenue and indirect cost allocations and resulted in an emphasis on local academic planning and decision making in a cost/benefit context, and unleashed entrepreneurship (Strauss & Curry, 2002).

One of the benefits of RCM has been the transparent sharing of financial information regarding cost for campus resources, such as space, technology, accounting, finance, procurement, insurance and other overhead. Lang (1999, p. 8) described the sharing of financial information in this way, "RCM encourages interest in the identification and cost of 'backrooms.'" Goldstein (2005) states:

> Without RCB/RCM or one of its variants, many overhead costs are borne centrally and absorb institutional resources before allocations for other purposes are made. When costs are treated in this manner, faculty and staff tend to lack an appreciation of the true cost of the services being used on the campus. On the other hand, when they have access to this information, it changes the demand for services and resources. (p. 172)

Lang (1999, p. 2) stated that an important step in the RCM budget process has been the assignment of central indirect costs and overhead to the academic units. These allocated costs typically have included:

- Institutional administration, governance, and management
- Development and alumni relations
- Financial management
- Human resources management
- Internal audit
- Academic support services (for example, libraries and academic computing)
- Student services
- Academic administration (for example, research administration)
- Occupancy costs
- Debt service

- Taxes, fees, and levies

RCM systems have had an allocative mechanism that has distributed cost centers to academic units. Examples of the allocation principle have included finance/accounting overhead having been allocated based on gross expense budgets per academic unit, or student services having been allocated based on student headcount in each college on campus.

The RCM budgeting method has made exceptions or provisions for units that generated deficits. Goldstein (2005) found:

> In addition to chargeback operations, campuses also impose a tax on the external revenues generated by profit centers. The tax proceeds are combined with other central revenues to create a subvention pool that funds centers that are unable to generate sufficient revenues to finance their operations. (p. 172)

RCM objectives and principles. According to Duderstadt (2009), who was the President of the University of Michigan from 1988 to 1996, RCM has had three primary objectives:

> First, it enables resource allocation decisions to be driven by the values, core missions, and priorities of the university rather than by external forces. Second, since it replaces the traditional fund accounting systems by an accurate knowledge of the true resource flows throughout the university, it provides a far more strategic framework for the allocation decisions. Finally, RCM allows both academic and administrative units to participate, as full partners with the central administration, in making these resource allocation decisions. (p.12)

Lang provided a summary of the operating principles surrounding RCM:

- All costs and income generated by each college, faculty, or department are attributed to that unit, appear in its budget, and are under its control.

- Incentives are created and monopolistic barriers removed to allow each academic unit to increase income and reduce costs according to its academic plans and priorities.
- All costs of administrative and service units are "grossed up" and attributed to academic units. No costs are left unattributed, and the attributed costs themselves include overheads and indirect costs. (For example, the attributed costs of the human resource department include its occupancy costs).
- Decisions about optimal balances between costs and revenue are made by the academic units. They set priorities. They link plans and budgets.
- Restrictions on line-by-line budgets are relaxed or eliminated. Each academic unit allocates the global revenue base available to it (1999, p. 3).

Implementation of RCM

Rationale for implementing RCM in higher education institutions. Universities that have embarked on such a system have pointed to a similar theme of addressing decreased revenue, coupled with increased expenses, as the driver of the decision to move away from a centralized financial system approach (Zierdt, 1999). RCM was developed to help address the shifting burden of education across the nation, in which the 25-year period between 1985 and 2010 saw state appropriations decreasing from 77% to 60% of educational revenue per student (Curry et al., 2013). In the fiscal year 1991, UCLA had generated a bottom-line shortfall of $19M, a shortfall not temporary, but permanent - resulting in the school having to make significant cuts to its operating budget (Wilms, Teruya, & Walpole, 1997). The solution for UCLA was implementing a new financial system to meet the changing economic environment. At the University of New Hampshire (UNH), the school had completed a cumbersome and highly centralized $7M cost-cutting exercise to balance its books, which prompted the school to

switch to a more decentralized financial system (Leitzel, Corvy & Hiley, 2004). The decade leading up to IUPUI's implementation of RCM saw a mix of tight funding, coupled with rising costs, which demanded that their university become more efficient and effective from a financial standpoint (Stocum & Rooney, 1997).

The financial hardships that higher education institutions have faced have not strictly affected large public universities, but community colleges as well. Due to primarily labor costs that had increased, the head of the Iowa State Department of Education announced that the Iowa Valley Community College District had faced imminent bankruptcy, which resulted in the implementation of a new derivative RCM system, contribution margin budgeting, within the community college system (Tambrino, 2001).

Financial strains have impacted other areas of universities, to include athletic departments. Rising costs of the Georgia Tech athletics department led to the school having developed an RCM approach to more efficiently manage its budget, as many of the school's athletic programs had been in survival caused by the tightened cost environment (Strupeck, Milani, & Murphy, 1993). As financial pressures have increased, community colleges to athletic departments within large public universities, have implemented RCM budgeting systems.

As with most financial modeling systems, there have been advantages to having employed RCM models. Strengths of having implemented a more decentralized financial system have included enhanced academic performance, as critical financial decision making has been shifted from a centralized unit to various heads of colleges/departments across campus (Tambrino, 2001). Other strengths of having implemented a RCM budget system have included the creation of incentives for well-managed units, and increased the transparency and shared information among administrators, deans, and department heads (Scarborough, 2009).

One of the benefits of having a more decentralized RCM financial model has surrounded enhanced academic performance. IUPUI found that the system was a significant factor in elevated academics at the university, which included improved teaching, expanded course offerings, and enhanced general academic and research programs (Stocum & Rooney, 1997). At UNH, similar results to IUPUI were realized, as the implementation of an RCM model improved academics. Certain university leaders at UNH concluded that the model allowed the school to link academic planning much more closely with resource allocation that ultimately fostered academic quality improvement through systematic program review and assessment (Leitzel et al., 2004). UCLA's budget shortfall dictated that the school embarked with an RCM system first and foremost to manage academic priorities by strategically having aligned revenues and costs to appropriate academic priorities (Wilms et al., 1997).

Another advantage to having implemented an RCM system has been that certain key financial decisions have been shifted down to the responsible bottom-line manager of an area. Under RCM, deans and unit heads have been vested with fiscal responsibility commensurate with their academic authority, which has given them the responsibility to have planned for revenue budgets (Tambrino, 2001). In exchange for this shared revenue approach, deans and department heads have taken responsibility for expenses in their respective areas. Since virtually all of the revenues are generated by colleges or units across a particular campus, and most of it has been spent by them as well, it is appropriate that these groups have made the decisions about spending (Stocum & Rooney, 1997). With an RCM system having shifted responsibility down, it has empowered colleges and units to make their own financial decisions and either enjoy or suffer the impact of poor financial decisions (Scarborough, 2009). The bottom-line for an RCM system has been the unit head (i.e., dean, department manager) has been responsible for their

unit, which has resulted in the person responsible for the financial results of the college/unit having made the key decisions.

Another advantage that has surrounded RCM are the financial incentives that the system puts in place, incentives that have often led to more entrepreneurial mindsets among campus leaders. Under an RCM model, a dean or department head who has properly managed his/her unit's financial performance has added faculty lines, upgraded facilities, and increased faculty travel budgets - incentives that had not been available under older, more centralized financial models (Scarborough, 2009). IUPUI found during its first decade of having implemented RCM that a key to its success was the built-in incentives to maximize income and contain costs (Stocum & Rooney, 1997). The incentives offered using such a budget system have led to entrepreneurial enterprise development. To offset the crowding out of discretionary components of state budgets by increased demands, privatization across college campuses has emerged, and has resulted in incentives for all entrepreneurial activities (Curry et al., 2013).

Additionally, at Georgia Tech, the implementation of RCM led to new revenue-generating ideas for its baseball program, such as scoreboard and wall advertising, which created incentives for the program (Strupeck et al., 1993). These newly created sources of revenue allowed the baseball coaching staff to manage costs needed to run a more financially competitive program. At the University of Toledo (UT), the school adopted an incentive funding formula as part of its RCM system, that allocated additional financial resources to colleges that had enrollment growth (Scarborough, 2009). By additional resources being created via the RCM model, the colleges across UT were incentivized to grow enrollment. An incentive-based financial model, such as RCM, has allowed for financial awards that had not been previously available with centralized financial models.

Another advantage of RCM has been the transparent sharing of financial information among central administrators, deans, and department heads, among others across campus. Since allocation of revenue and certain overhead costs are distributed down to units across the university, the mechanism and metrics that have determined the allocation have been widely known, as have been the various line items that have determined revenues and expenses. The idea of increased transparency has been consistent with the higher education framework of shared governance and broader themes of effective corporate governance and has resulted in one of the model's biggest strengths (Scarborough, 2009). The administration at UCLA chose to change its financial system to a decentralized one, and made the flow of funds much more visible, understandable and manageable, the result of which was allowing administrators and faculty leaders to better align UCLA's financial resources with the university's strategy (Wilms et al., 1997). With the RCM implementation at UCLA, the school developed their new budget model, and allowed the sharing of information during the process to be more open with many stakeholders across the university having participated (Wilms et al., 1997).

Hence, by improved sharing of information under RCM, it has likely been much more evident how the university has worked from a financial perspective than with a centralized system. The degree of how the university has worked financially and the relationships between budgets, academic outputs, program quality, and shared services for administrative units, have been significantly increased by using an RCM system (Curry et al., 2013). This increased financial acumen was evident in the Georgia Tech athletic program, which previously had coaches thinking they were operating programs for as little as $100,000, when they were running them for over $250,000, after taking into account allocation of shared overhead (Strupeck et al., 1993). By sharing of financial knowledge, department heads and unit managers have been better

able to understand what their units have brought in from a revenue perspective, as well as what their program has cost in totality, after consideration of overhead charges.

Similarly, according to a report published in 2000, RCM's transparency principle allowed the Indiana University's (IU) Bloomington campus to more effectively allocate limited resources during a time of declining state appropriations (Theobald & Thompson, 2000). Additionally, Zorn's (2006) task force report noted that IU realized some additional advantages by having more transparency under RCM. Among these advantages at IU, according to the task force report, were the successful fiscal management by the deans of academic units in times of scarce resources, improved responsiveness to students by readily increasing course offerings based on their interests and needs, and enhanced multi-year fiscal planning by deans and directors (Zorn, 2006). Therefore, having increased transparency of the financial data under a RCM system has likely improved fiscal resource management of institutions.

In summary, the following includes the rationale for having implemented an RCM system at a higher education institution. According to Gros, Louis, and Thompson (2002), RCM has provided the following incentives:

- Incentives for students by increasing the quality of professors and student services
- Incentives for faculty by allowing faculty to become more valuable in-service roles and teaching in the classroom.
- Incentives for staff by increasing rewards
- Incentives to maintain and improve quality as students choose their majors because of the quality of the program (p. 94).

Strauss and Curry (2002) provided a list of strengths of RCM as well:

- RCM can encourage good academic and administrative outcomes,

- RCM yields self-correcting organizations,
- RCM expresses and quantifies the strategic plan,
- Subventions are not self-correcting,
- Subventions are not welfare,
- RCM helps realize the objectives of collegial governance,
- RCM focuses proper attention on revenue,
- RCM facilitates responsible management of entrepreneurial activities,
- RCM aids cost analyses and trade-off studies,
- RCM provides explicit recognition and support for institutional priorities,
- RCM focuses attention on cost control, price restraint, and educational outcomes, and
- RCM encourages the provision of efficient, competitive administrative services (pp. 22-31).

Impediments to the implementation of RCM in higher education institutions. There have been impediments or disadvantages of having initiated or used an RCM system across higher education institutions. The following section of this chapter will discuss several of these weaknesses that have included potential increasing of tensions and mistrust among administration and faculty, possible competing priorities between colleges and units, driving of decisions based mostly or entirely by financial ramifications, and the adding of financial complexity to the role of the dean or department head.

During UCLA's implementation of a new RCM system, mistrust between administrators and faculty was evident, as was mistrust within faculty regarding the new financial model. As colleges across the UCLA campus began looking differently into expenditures, this sharing of information became problematic, as individual faculty questioned other faculty on their

expenditures (Wilms et al., 1997). As Iowa Valley Community College District had begun using a decentralized model, one challenge the college confronted was the enhanced fiscal awareness throughout the organization, and with the transparent sharing of the revenues and expenses with faculty and staff members, "these dollars became all too real" (Tambrino, 2001, p.34). Georgia Tech's RCM system in the athletic deparment created the question of fairness, as certain coaches perceived an unequal distribution of resources as compared to other sports programs within the athletic department, leading some coaches to believe either too little revenue or too much of the expense allocation had been made to their particular sport (Strupeck et al., 1993). At IUPUI, leadership felt their RCM model was not necessarily perfect, as it did not resolve tensions between administration and faculty over certain program costs and accountability (Stocum & Rooney, 1997)

A second impediment to implementing an RCM system has been the possible creation of competition among units on campus. For example, allocation of tuition revenue using an RCM approach typically has allowed the allocation to occur based on the number of students enrolled in a particular college. This tuition allocation metric has potentially created competition among colleges within a university, especially if the net annual change in total students across the university has been zero. The Iowa Valley Community College District learned that their RCM system created internal competition for students, which was one of the lessons learned from their implementation (Tambrino, 2001). At UT, as the school began using a decentralized system, one of the weaknesses was endless conversations and arguments about revenue and indirect cost methodologies among different units on campus (Scarborough, 2009). Therefore, the allocation of expenses across a given campus had created potential tension among colleges and units, as any rule change had created winners and losers. Potential tension caused by competition, has not

only been among units, but has included competition between units and central administration. RCM budget systems have resulted in individual units having considered to perform or fund their specific version of what central services has been providing (Curry et al., 2013).

A third weakness identified by schools using an RCM system has been the tendency of schools to base decisions mostly or entirely by financial ramifications. Since RCM has been a financially driven system, some decisions may have been made strictly using financial data, not having considered other non-financial criteria. If left to operate without guidelines ("every tub on its bottom"), RCM may have led to academic program decisions having been made based mainly on financial reasoning. At IUPUI, five years after RCM had been implemented, a survey completed by deans, chairs, and faculty, found that many believed RCM focused too much on financial ramifications, at the expense of academic consequences (Stocum & Rooney, 1997). At UCLA, as the transition to a centralized RCM system had taken place, many thought that important resource allocation decisions were being made without complete information having been considered, leading some to believe the system had been financially reactive (Wilms et al., 1997). At the Iowa Valley Community College District, one challenge stated by its leadership was that the school's RCM system resulted in having changed academic priorities, without considering the side effects (Tambrino, 2001). Another example of RCM systems having impacted academic decisions based too strongly on financial reasons, has related to colleges across campuses having created rogue or duplicative courses. The development of rogue courses have mostly been driven by the bottom-line that RCM systems have advocated, and has led to many of these courses having had poor quality or having been inconsistent with the university's mission (Curry et al., 2013).

Finally, implementation of RCM systems has likely added financial complexity to the role of dean or academic department head, a job function some may have found to be outside of their expertise. According to Scarborough (2009), UT found that implementing an RCM system caused some deans and department heads to struggle regarding understanding and managing the demands of such a system. At UCLA, financially inexperienced academic leaders were asked to make important financial decisions within the decentralized budgeting system (Wilms et al., 1997). With the implementation of RCM at Georgia Tech, coaches had responsibilities overseeing their sport from a business perspective, rather than from a coaching or student athlete perspective, something coaches did not necessarily have the skills needed to be successful (Strupeck et al., 1993).

In summary, according to Strauss and Curry (2002), weaknesses of implementing an RCM budget model have included:

- Decisions are driven by financial considerations
- RCM raises barriers among disciplinary programs between colleges on campus,
- Financial incentives may promote inappropriate faculty behavior,
- Tensions are exacerbated,
- Barriers between colleges on campus may arise,
- Colleges may offer inappropriate incentives
- College optimization may prevent university-wide optimization,
- Successful colleges or programs get richer, while those units that struggle become poorer,
- RCM encourages prevarication, and

- The sharing of public information through greater transparency invites meddling (pp. 13-21).

Key Performance Indicators and RCM

Performance indicators have provided information on specific outcomes within a higher education institution. The use of key performance indicators have had two main objectives, first, to have improved institutional performance, and second, to have increased accountability (Burke & Serban, 1998). There has been much research over time to determine performance of faculty members, academic departments, and entire institutions in higher education (Baird, 1986, 1991; Braxton & Bayer, 1986; Creamer, 1998; Golden & Carstensen, 1992; Tein & Blackburn, 1996). Higher education institutions have needed to be more accountable to stakeholders in providing evidence of productivity and efficiency in their operations (Porter & Toutkoushian, 2006). The use of performance indicators have provided information on trends in the university's input, process and output measures, and has resulted in administrators being able to have assessed the overall financial health of the university (Toutkoushian & Danielson, 2002). Having researched RCM and the use of performance indicators, Toutkoushian and Danielson stated "there is a great need to measure institutional performance and determine if and how it has changed after moving to RCM. This measurement is increasingly being done through the use of institutional performance indicators" (p. 206).

Performance indicators have not only been used in universities across the U.S., but in institutions around the world. According to Pounder (2000), "a major development in higher education worldwide over the past two decades has been the preoccupation with institutional performance measurement. Institutions of higher education have increasingly come under governmental and societal pressure to demonstrate value for money performance" (p. 66). Other

researchers have concluded similarly when studying performance indicators used in higher education worldwide. According to Taylor (2001b), when determining performance, indicators played an increasingly important role in many western governments' approach to the management of universities:

> Performance indicators have emerged as a method used internationally to manage and assess higher education. Performance indicators have been implemented in countries, from the UK to Australia. Labeled as essential management information and a management tool as well as claimed to bring about numerous benefits (e.g., improved accountability and planning) performance indicators are expected to be increasingly used by the governments of the future (p. 42).

RCM has been a system that has relied on performance measures among revenue line items, as well as expense line items across a university. As RCM has reached its intended objectives, costs and revenues have been properly defined and measured, as well appropriately assigned to accomplish the institution's mission (Whalen, 2002). Whalen found, "RCM provides an avenue for communicating the vision for change both up and down the organization and for empowering those who will carry it out" (p. 22). Strauss and Curry (2002) conducted research that showed RCM had aligned with the assessment movement, in which accountability measurement was controlled by outcomes, rather than controlled by inputs. Rhoades and Slaughter (2004) concluded similarly, "there has been a shift to an outcomes model of assessment versus input-based assessment" (p. 46).

Toutkoushian and Danielson (2002), researched the impact of RCM on an institution's performance indicators, and advised stakeholders by stating:

> Administrators seeking to evaluate the impact of RCM on an institution need to recognize the limitations that the ceteris paribus issue imposes on them when using performance indicators. Advocates for RCM will be tempted to attribute positive changes in indicators to the implementation of RCM, and opponents of RCM will tend to blame the new budgeting system for any negative changes in indicators. (p. 215)

Cave and Weale (1992), when speaking of measuring key performance indicators, emphasized the importance of the indicators not being manipulated or even being manipulable by the institutions, giving credence to having used performance indicators that were measurable in the normal course of a university conducting business.

The key performance indicators used in this study were limited to changes in operating revenue (including tuition revenue), contracts/grants revenue, and operating expenses. Key performance indicators have helped determine institutional performance among public universities that have implemented an RCM budgeting system.

Operating revenues (including tuition revenue). As the research showed, one strength of implementing an RCM system at a higher education institution has been the formation of entrepreneurial ideas which may have resulted in new revenue streams or enhanced revenue. According to Paulsen and St. John (2002), implementing an RCM system should have produced increased opportunities for revenue generation. Because RCM has put the budgetary responsibility on the individual unit or academic area, increased revenue has been needed to cover typically increased costs of the unit. One positive characteristic of an RCM system has been the rewarding of a new revenue enhancement idea or a cost containment strategy. According to Gros et al. (2002), RCM will "create an environment that stimulates resource growth and in which efficient resource use is rewarded" (p. 94). Tuition revenue has been a

critically vital revenue to manage. According to Whalen (2002), schools and departments have come to value and pay more attention to student recruitment and retention. Because previous research has shown that RCM has promoted revenue enhancement, changes to operating revenues has been a positive indicator for year-over-year changes.

Contracts and grants revenue. The literature has shown that RCM has created incentives for an academic unit to increase revenue and has rewarded the unit for such revenue generation. One way for an academic unit or department to have increased revenue is through external contracts and grants revenue. According to Leslie, Oaxaca, & Rhoades (2002), at a university that has utilized an RCM budget system, the "money generated from contracts and grants is relatively high" (p. 68). Some universities have implemented a strategy to grow existing contract and grant revenue to offset lost revenue from certain revenue streams (Curry et al., 2013). Therefore, an RCM budget system has encouraged faculty to have increased contracts and grants revenue, which has resulted in the year-over-year change for this line item to have been a positive indicator.

Operating expenses. As the literature review has shown, one goal of implementing an RCM system has been to manage costs more effectively. Because there is enhanced transparency of financial information under an RCM system, all university cost units have been subjected to greater accountability. Additionally, since each revenue-producing unit has been incentivized to manage its bottom-line closely, costs and expenses have been likely to be more closely analyzed under an RCM system, as compared to a centralized budgeting system. Wellman (2006) indicated that student affordability has been dependent on college prices stabilizing, which has brought more attention for the need to have controlled costs at a higher

education institution. Because RCM has promoted the containing of costs, the indicator for this area has been a negative indicator for year-over-year changes.

Summary

Economic pressures on higher education institutions have resulted in financial strains for university administrators (Weisbrod & Asch, 2010). Once covering 80% of a university's operating budget, state appropriations now cover less than a third (Cekie, 2008; Lyall & Sell, 2006; Weisbrod & Asch, 2010). The result is that public universities have received assistance from state governments, rather than having received most of their support from state governments. Tuition increases that have occurred across higher education institutions, in hopes to have mitigated the loss of state appropriations, have reached a level in which future tuition increases may not be sustainable (Mayer, 2011). Endowments, from a principal perspective, as well as from an annual earning perspective, are exposed to fluctuations in both the U.S. and world markets.

Not only have university administrators found management of revenue streams challenging, but simultaneous increase in costs, has compounded the fiscal strains facing institutions. Because universities have spent all the money they have raised, fixed and overhead costs have grown significantly across campuses (Bowen, 1980; Zemsky & Massy, 1990). The higher education industry has been labor intensive, costs that have represented 75% of a university's overall cost structure (Desrochers & Kirshstein, 2014). Considering healthcare has been such a significant component of benefit costs, the ever-increasing insurance/ health care costs have impacted the higher education enterprise more dramatically than industries outside higher education (Adams & Shannon, 2006). Many universities have implemented or considered outsourcing functions to offset rising costs. Additionally, universities have joined consortia, as

well as have become creative in other cost containment strategies to help manage costs that have risen.

To further address these financial strains caused by both internal and external factors, many universities have considered implementing an RCM budget model. The literature review examined the strengths of implementing such a model, which included having increased accountability and greater promotion of entrepreneurship while efficiencies and effectiveness of university resources have been increased. The use of performance indicators has been one way administrators have assessed the overall health of a university (Toutkoushian & Danielson, 2002). According to Serban and Burke (1998), the use of key performance indicators has had two main objectives, first, improved institutional performance and second, increased accountability. The quantitative analysis of data and the identification of potential trends between public universities that have implemented an RCM budget system and those universities that have not may provide a basis for future analyses of measures and interpretation of the results. Current research that has compared key financial performance indicators among schools using an RCM system and schools not using this approach has been limited. Given this limitation, the current study may provide a viable resource for contributing to the research and understanding of how an RCM budget system may have impacted performance indicators. This information may be useful to universities considering implementation or continued use of an RCM budgeting system.

Chapter III: Research Design and Methodology

The success of any institution of higher education relies upon sound financial management and the utmost fiduciary duty. A university's educational, research, outreach, and service initiatives cannot be achieved operating in an atmosphere of fiscal naivety or negligence (Bar & McClellan, 2010). Therefore, proper finance and accounting structures enable colleges and universities to remain competitive with peer institutions by encouraging fiscal responsibility and providing accurate and timely financial data to the decision-making process. Over the past decade, leaders at colleges and universities across the U.S. have shown increased interest in more sophisticated approaches to budgeting and financial management (Birnbaum, 2000; Vonasek, 2011). This interest is well-warranted as universities face fiscal challenges in a complex and competitive higher education landscape (Zemsky et al., 2006).

Adding to the pressures of competition, institutions of higher education face environmental challenges to resource management (Weisbrod & Asch, 2010). Among these challenges are reduced state appropriations, increased tuition reliance, and the ever-increasing cost of personnel. According to Szatmary (2011), "American universities, especially public institutions, have confronted a funding crisis in recent years that will only worsen…..every institution must maximize its existing resources – including budgeting models – so that university leaders can make the most informed decisions" (p. 69). Therefore, it is imperative that higher education institutions address the funding shortfall by enhancing revenue in other areas or by generating new revenue streams.

Research Questions

The following research questions will guide the study:

1. Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?
2. Is there a relationship between annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?
3. Is there a relationship between annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?
4. Is there a relationship between changes in university operating expenses by those who have implemented RCM systems and those that have not?

This study examined how the implementation or use of a Responsibility Center Management (RCM) budgeting system impacted key financial performance indicators and compared these indicators to public universities that have not implemented such a decentralized system. The null hypothesis states that there are no significant differences in selected performance indicators between universities that use RCM and universities that do not use RCM.

Shareia (2016) described a quantitative case study to include document analysis to establish the validity of data. Hartley (2004) found that multiple-case studies are a detailed investigation, often with data collected over a period of time, for multiple organizations, with an emphasis on providing an analysis. Therefore, the research method used in this study is a quantitative multiple-case study. It includes a selection of 50 public research institutions and the key performance indicators occurring at these institutions from fiscal years 2007-2016. The case study approach is a common method to research the social science disciplines, including the business field (Yin, 2009). Yin added, “using the case study method allows the investigator to

retain the holistic and meaningful characteristic of real-life events" (p. 4). According to Fraenkel, Wallen, and Hyun (2015), "The results of multiple-case studies are often considered more compelling, and they are more likely to lend themselves to valid generalizations" (p. 433).

This chapter detailed the approach used with these sections: research, design, methodology, research questions, data collection, and data analysis.

Research Design

According to Lang (1999), RCM is most beneficial for universities that are large and complex. It is important that the data (key financial indicators) be available and easily accessible, as is the case with public universities. Therefore, the research design included selecting the top 50 public universities in the U.S. using the 2018 Wall Street Journal/Times Higher Education's US College Rankings (Wall Street Journal, 2017). The metrics used by the WSJ/THE rankings, to determine the top universities in the U.S., emphasizing how well a university prepares a student for life/career after graduation (WSJ, 2017). According to the Wall Street Journal (2017), the WSJ/THE rankings:

> Are based on 15 key indicators that assess colleges in four areas: Outcomes, Resources, Engagement, and Environment. Outcomes comprise 40% of the weighting and measure things like the salary graduates earn and the debt burden they take on. Resources, with a 30% weighting, is mainly a proxy for the spending schools put into instruction and academic services. Engagement, drawn mostly from a student survey and with a 20% weight, examines views on things like teaching and interactions with faculty and other students. Environment, at 10% assesses the diversity of the university community. (R5)

According to the Wall Street Journal (2017), the WJS/THE rankings included performance indicators to answer the most important questions students and their families have

when deciding on whom to trust with their higher education. The questions the WJS/THE rankings attempted to answer were: Does the university have sufficient resources to teach the student?; Will the students be engaged and challenged by the professor/instructor?; Does the university have a good academic reputation?; What type of campus community is there?; and how likely is the student to get a good job upon graduation?

The Times Higher Education (2017), stated that the WJS/THE rankings data came from a variety of sources: the U.S. government or Integrated Postsecondary Education Data System, the U.S. Department of Education's Federal Student Aid and College Scorecard, the Bureau of Economic Analysis, the Academic Reputation Survey, and Elsevier's bibliometric dataset. According to the Times Higher Education (2017), the overall methodology of the WSJ/THE rankings explored four key domains:

1. Resources: Does the university have the capacity to deliver teaching effectively? The Resources area represents 30% of the overall ranking:
    - Finance per student (11%)
    - Faculty per student (11%)
    - Research papers per faculty (8%)
2. Engagement: Does the university effectively engage with its students? The Engagement area represents 20% of the overall ranking:
    - Student engagement (7%)
    - Student recommendation (6%)
    - Interaction with teachers and students (4%)
    - Number of accredited programs (3%)

3. Outcomes: Does the college generate good and appropriate outputs? Does it add value to the students who attend? The Outcomes area represents 40% of the overall ranking:
    - Graduation rate (11%)
    - Value added to graduate salary (12%)
    - Value added to loan default (7%)
    - Academic reputation (10%)
4. Environment: Is the university providing a learning environment for all students? Does it make efforts to attract a diverse student body and faculty? The Environment area represents 10% of the overall ranking:
    - Proportion of international students (2%)
    - Student diversity (3%)
    - Student inclusion (2%)
    - Staff diversity (3%)

Key financial performance indicators. As detailed in the review of the literature, key performance indicators provided data about the financial performance of the universities in the sample. The performance indicators used for this study included:

- Operating revenues
- Tuition revenues
- Contracts and grants revenues
- Operating expenses

Ten-year trend analysis and RCM. The study determined annual changes in key financial performance indicators from 2007-2016, for the fifty universities sampled. While

determining the annual change in performance indicators, the study identified which universities use an RCM budget model, and which universities do not use such a model, for each year in the ten-year analysis from 2007-2016.

Quantitative multiple-case analysis

The quantitative case study research approach included comparing the annual changes in the key financial performance indicators among universities over the ten-year period (2007-2016) while considering whether or not the university was utilizing the RCM budget system for each particular year. The comparing of universities involved analyzing the data to identify significant trends over the ten-year period among the universities, specifically, the annual financial changes among RCM universities compared to annual financial changes among non-RCM universities.

Research Questions

The research questions for the study were as follows:

1. Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?
2. Is there a relationship between annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?
3. Is there a relationship between annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?
4. Is there a relationship between changes in university operating expenses by those who have implemented RCM systems and those that have not?

Data Collection

The pertinent financial data used for this study (operating revenue, tuition revenue, operating expenses, contracts and grant revenue, and net position) were collected for each of the fifty universities over each year of the ten-year period (2007-2016). Data were collected by examining each university's annual audited financial statements, which accompany the Independent Auditor's Report. The Governmental Accounting Standards Board (GASB) establishes financial reporting standards for governmental entities, such as public colleges and universities, and requires these higher education entities to follow accepted accounting principles (GASB, 2017).

Financial statement preparation is the responsibility of university management (AICPA, 2017). Large public universities, like the ones included in this research, typically have a team of highly qualified financial professionals, many with CPA designations, along with advanced degrees, preparing and reviewing university financial statements for accuracy and reasonableness. Because the university accounting and finance staff, led by the university's chief financial officer, are highly trained in their financial field, it is reasonable to assume the annual financial statements are a reliable instrument to use in this study (see Appendix A for instrumentation/financial statement construct).

Data Analyses

Statistical analyses, utilizing both an Analysis of Variance (ANOVA) and an Analysis of the Covariance (ANCOVA) were applied to the data. According to Judd, McClelland, and Ryan (2011), ANOVA are statistical models having a single categorical predictor. Further, ANCOVA are models having both categorical and continuous variables (Judd et al., 2011). According to Taylor and Innocenti (1993), the use of ANOVA and ANCOVA approaches have both been useful statistical procedures for data analyses. Furthermore, statistically adjusting for the effects

of covariates has provided more accurate interpretation of results (Taylor & Innocenti, 1993). The analyses were used in this study to evaluate and identify significant trends and changes in the annual changes among the key performance indicators between the public universities using an RCM system and those universities using a centralized budgeting approach. The independent variables are grouped variables based on budget type (RCM vs. non-RCM) and years utilizing RCM for the top 50 public universities identified in the 2018 WSJ/THE rankings. The dependent variables were the year-over-year percentage change in the performance indicators (operating revenue, tuition revenue, contracts and grant revenue, operating expenses, and net position). SPSS (Statistical Package for the Social Sciences), one of the most popular statistical analysis software packages, was used for the statistical analysis (Shannon, 2004).

Additional information was obtained for each of the fifty schools in the study, including research classification according to the Carnegie Classification of Institutions of Higher Education, which was obtained from the Integrated Postsecondary Education Data System (IPEDS). In addition to compiling research classification, enrollment information was obtained for each school, via data obtained from IPEDS. According to Jaquette and Parra (2013), IPEDS have been increasingly used by higher education researchers to evaluate outcomes.

Concerns for Reliability and Validity

Joppe (2000) defined reliability as the extent to which results are consistent over time and an accurate representation of results. According to Joppe (2000, p.1), "if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable." The instrument in this study are financial statements, which are the responsibility of university management (GASB, 2017). Having reliable financial statements in this study is

supported by the fact each university has a highly trained team of financial and accounting professionals, led by a chief financial officer, to perform this function.

Joppe (2000, p. 1) provided the following of what validity is in quantitative research, in that "validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are." In this particular study, by relying upon audited financial statements, certified as being accurate by an independent auditor, the validity of the research instrument has been supported (AICPA, 2017).

Summary

This study examined how using an RCM budget model impacts key performance financial indicators, by comparing annual changes between public universities that use RCM to public universities that do not use an RCM budget model over the same ten-year period. The study consisted of selecting 50 public universities as part of the research (selected by taking the top 50 ranked public universities from the 2018 Wall Street Journal/Times Higher Education's US College Rankings). The study statistically analyzed (through the use of SPSS) annual changes in performance indicators at each selected university, for each year between 2007-2016, to determine and identify if any significant trends occurred for universities that either used or did not use an RCM budgeting system.

Chapter IV: Analysis and Discussion of the Data

The success of any institution of higher education relies upon sound financial management and the utmost fiduciary duty. A university's educational, research, outreach, and service initiatives cannot be achieved operating in an atmosphere of fiscal naivety or negligence (Bar & McClellan, 2010). Therefore, proper finance and accounting structures enable colleges and universities to remain competitive with peer institutions by encouraging fiscal responsibility and providing accurate and timely financial data to the decision-making process. Over the past decade, leaders at colleges and universities across the U.S. have shown increased interest in more sophisticated approaches to budgeting and financial management (Birnbaum, 2000; Vonasek, 2011). This interest is well-warranted as universities face fiscal challenges in a complex and competitive higher education landscape (Zemsky et al., 2006).

Adding to the pressures of competition, institutions of higher education face environmental challenges to resource management (Weisbrod & Asch, 2010). Among these challenges are reduced state appropriations, increased tuition reliance, and the ever-increasing cost of personnel. According to Szatmary (2011), "American universities, especially public institutions, have confronted a funding crisis in recent years that will only worsen…..every institution must maximize its existing resources – including budgeting models – so that university leaders can make the most informed decisions" (p. 69). Therefore, it is imperative that higher education institutions address the funding shortfall by enhancing revenue in other areas or by generating new revenue streams.

Research Questions

The following research questions will guide the study:

1. Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?
2. Is there a relationship between annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?
3. Is there a relationship between annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?
4. Is there a relationship between changes in university operating expenses by those who have implemented RCM systems and those that have not?

As stated in Chapter 1, colleges and universities have been impacted by declining state appropriations, increasing student financial aid resulting in lower tuition revenue, increasing the volatility of endowment balances and related earnings, credit tightening, and declining private contributions. Additionally, a university leadership has had to manage rising costs, especially the personnel (and related employee benefits) costs of the institution, which is typically the most significant cost line item for the university. University leaders have to continue to balance these financial pressures, while delivering high academic quality and fulfilling their respective institution missions. The implementation of an RCM budgeting system is one strategy leaders of certain universities have employed to enhance revenue and control costs, in hopes of better balancing the financial pressures they face. The purpose of this study was to determine if a decentralized budget system improves a university's key performance indicators (KPIs). The value of addressing this issue was in the application of the theory that decentralized budgeting, such as an RCM system, can lead to measurable favorable changes in a university's financial

results. These outcomes could provide useful information to institutions that are contemplating the implementation of an RCM budgeting system. Based on these outcomes, these schools of higher learning could decide to implement such a system, decide not to invest in an RCM system, or decide to discontinue utilizing such a decentralized system.

Analyses

Statistical Package for the Social Sciences (SPSS) was used to run quantitative statistical analyses of the data. Analysis of data was done primarily through using the Analysis of Variance (ANOVA) and an Analysis of Covariance (ANCOVA) techniques. For this research study, raw financial data for each of the variables used in the study (annual operating revenue, tuition revenue, contracts/grants revenue, and operating expense amounts) was converted to percent change from year-to-year during the 10-year period from the fiscal year 2007 through the fiscal year 2016. The result led to nine time points of percent changes from year-to-year for each identified variable. For example, the 2008 percent change represented the percent change between 2007 and 2008 annual amounts; the 2009 percent change represented the percent change between 2008 and 2009 annual amounts.

Fifty public universities were selected for the research project (see Appendix B for a list of 50 selected Universities used in the study). Fourteen of the 50 schools (28%) utilized an RCM budget system either for the entire 10-year period of the study or at some point during the ten-year period (see Appendix C for a list of universities selected implementing RCM at some point during the 10-year study). Research classification was obtained for each of the 50 universities, based on the Carnegie Classification of Institutions of Higher Education. The Carnegie Classification is a framework for recognizing and describing institutional diversity in U.S. higher education (Carnegie, 2018). Forty-two of the fifty schools (84%) are classified as R1 institutions

representing highest research activity among universities, five of the fifty schools (10%) are classified as R2 institutions representing higher research activity, and three of the schools (6%) were classified as not being R1 or R2 institutions. Additionally, for purposes of the study, enrollment information was obtained via IPEDS for each of the public schools and used in the analysis of the data.

Operating Revenue

In order to investigate research question #1 (Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?) an ANOVA was conducted, comparing universities utilizing an RCM and those who do not and the percent change in operating revenue across the years 2007-2016 (nine year-over-year changes). According to the data analysis, out of the nine years examined, only one year, 2015 (representing change between 2014 and 2015 years), of operating revenue was identified as showing a statistically significant change between RCM and non-RCM schools ($F_{1,48} = 7.390$, $p = .009$). Thus, whether or not a university used an RCM system, had no statistical impact on annual changes in operating revenue, except for the annual change in 2015, which found operating revenue to be statistically higher for schools that used an RCM system. See Table 2 (below) for the findings between annual changes in operating revenue over the ten-year period as compared to schools either using or not using an RCM budget system.

Table 2

ANOVA Results for Operating Revenue Percent Change (RCM vs. Non-RCM Schools)

Operating Revenue Year Change	*F*	*p*	Mean (Non-RCM)	Mean (RCM)
2008	.031	.862	0.058	0.061
2009	.011	.917	0.087	0.067
2010	.963	.331	0.067	0.059
2011	3.287	.076	0.082	0.062
2012	.185	.669	0.057	0.051
2013	.031	.860	0.045	0.043
2014	1.542	.220	0.037	0.024
2015	7.390	.009	0.044	0.081
2016	.275	.602	0.045	0.050

To further examine possible relationships, an ANOVA was conducted using variance of higher granularity, which was the amount of time a university had been using an RCM budget system and its potential impact to the operating revenue dependent variable. In this particular test, the utilization of an RCM system was noted as one of three levels: long-term (used by school all 10 years of the period), mid-term (implemented and used by school less than five years of the period), and no RCM use anytime during the 10 years. Once again, 2015 was identified as being a statistically significant change between schools using RCM and schools not using an RCM system, when analyzing the operating revenue variable, ($F_{2,47} = 3.632$, $p = .034$). Thus, whether or not a university had used an RCM system for all ten years, less than five years, or had not used an RCM system at all, had no statistical impact on annual changes in operating revenue, except for the annual change in 2015. See Table 3 (below) for the findings between annual changes in operating revenue over the ten year period as compared to the three levels of RCM implementation (long-term, mid-range, or not used at all).

Table 3

ANOVA Results for Operating Revenue Percent Change (Length of RCM Implementation)

Operating Revenue Year Change	*F*	*p*
2008	.015	.985
2009	2.742	.075
2010	.616	.544
2011	1.662	.201
2012	.165	.848
2013	.596	.555
2014	1.422	.251
2015	3.632	.034
2016	.195	.823

Due to statistical significance found within the 2015 fiscal year annual change for the three RCM level ANOVA, a specific multiple-comparison posthoc test was performed using the Bonferroni Procedure. No statistical significance was found using the Bonferroni posthoc test. The closest significance for the specific 2015 annual change found was comparing schools that had been long-term users of an RCM system as compared to those schools that had used this type of budget system less than five years, with $p = .068$. Thus, there was no statistical difference in changes in operating revenue based on the multiple comparisons among the three different RCM utilization levels. Had the researcher used a more liberal posthoc test, such as the Least Significant Difference (LSD) test, the result of the posthoc test may have been significant.

When examining overall operating revenue changes from 2007-2016, grouped by use or non-use of an RCM budget system, an ANOVA was used, which found no statistical significance ($F_{1,48} = .018$, $p = .894$), which is in line with all but one year of the statistical analysis run using the operating revenue variable. Thus, whether a university used an RCM budget system at any

point during the ten-year study, did not statistically affect the overall ten- year change in operating revenue from 2007 to 2016.

When examining the overall operating revenue change from 2007-2016, while analyzing the RCM three level utilization, an ANOVA was used, which found no statistical significance ($F_{2,47}$ = .477, p = .624), which is in line with all but one year of the statistical analysis run using the operating revenue variable. Thus, whether a university used an RCM budget system for the entire ten-year period, less than five years, or not at all at any point during the ten-year study, did not statistically affect the overall ten-year change in operating revenue from 2007 to 2016.

Two ANCOVAs were conducted (controlling for research ranking as well as for undergraduate enrollment among the fifty universities) to take into account the possibility of other variables possibly impacting these results. When controlling for research ranking (either R1, R2, or neither), the percent change in 2015 was, again, operating revenue was statistically significant with ($F_{2,47}$ = 4.465, p = .017). Thus, controlling for research rankings did not statistically impact the changes in operating revenue except for the percent change in 2015, when analyzing whether or not the university had implemented an RCM system.

When controlling for enrollment among the universities, percent change in the year 2015 for operating revenue was statistically significant with ($F_{2,47}$ = 4.227, p = .021). Thus, controlling for enrollment did not statistically impact the changes in operating revenue except for the percent change in 2015, when analyzing whether or not the university had implemented an RCM system.

Additionally, a mixed ANOVA was run, comparing schools that have implemented a RCM budget three years or longer in the study (n = 9) as compared to schools that had not implemented RCM or had implemented less than three years in the study (n = 41). In this

comparison, annual changes in operating revenue for each of years 2014, 2015, and 2016 were examined for statistical significance. For this particular mixed ANOVA, sphericity could not be assumed, so Greenhouse-Geisser was used. During this particular test, no statistical significance was found within-subjects effects (p = .06, p = .87). *P* value for the between-subjects effects was (p = .46).

Finally, a correlation was run to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in operating revenue for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016. For year 2014, r = -.55, p = .13. For year 2015, r = -.30, p = .39. For year 2016, r = -.19, p = .52. To further examine a correlation between operating revenue and number of years the particular school had implemented an RCM budget system, a curvilinear relationship was assessed. There was not a significant statistical relationship for neither Quadratic nor Cubic correlations.

Tuition Revenue

In order to investigate research question #2 (Is there a relationship between annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?) an ANOVA was conducted, comparing universities utilizing an RCM and those not utilizing such a budget system, and the percent change in this variable across the 2007-2016 fiscal years (nine year-over-year changes). According to the data analysis, out of the nine years examined, none of the tuition revenue variable years was identified as showing a statistically significant change between RCM and non-RCM schools. Thus, whether or not a university used an RCM system, had no statistical impact on trending for annual changes in tuition revenue. See

Table 4 (below) for the data between annual changes in tuition revenue over the ten-year period as compared to schools either using or not using an RCM budget system.

Table 4

ANOVA Results for Tuition Revenue Percent Change (RCM vs. Non-RCM Schools)

Tuition Revenue Year Change	*F*	*p*	Mean (Non-RCM)	Mean (RCM)
2008	.163	.688	0.091	0.086
2009	.136	.714	0.090	0.095
2010	.245	.623	0.091	0.083
2011	.243	.625	0.096	0.088
2012	.722	.400	0.104	0.092
2013	1.087	.302	0.072	0.055
2014	1.087	.302	0.049	0.037
2015	.088	.768	0.057	0.053
2016	.027	.870	0.055	0.057

To further examine possible relationships, an ANOVA was conducted using a variance investigation of higher granularity, which was the amount of time a university had been using an RCM budget system and its potential impact to the tuition revenue dependent variable. In this particular test, the utilization of an RCM system was noted as one of three levels; either long-term (used by school all 10 years of the period), mid-term (implemented and used by school less than five years of the period), or had not been implemented or used anytime during the 10 years. Once again, there were no years identified as being a statistically significant change between schools using RCM and schools not using an RCM system, when analyzing the tuition revenue variable. Thus, whether or not a university had used an RCM system for all ten years, less than five years, or had not used an RCM system at all, had no statistical impact on annual changes in tuition revenue. See Table 5 (below) for the findings between annual changes in tuition revenue

over the ten-year period as compared to the three levels of RCM implementation (long-term, mid-range, or not used at all).

Table 5

ANOVA Results for Tuition Revenue Percent Change (Length of RCM Implementation)

Tuition Revenue Year Change	*F*	*p*
2008	.192	.826
2009	.803	.454
2010	.141	.869
2011	.285	.754
2012	1.756	.184
2013	.998	.376
2014	.576	.566
2015	.098	.907
2016	.014	.986

When examining overall tuition revenue changes from 2007-2016, grouped by use or non-use of an RCM budget system, an ANOVA was used, which found no statistical significance ($F_{1,48}$ = . 616, p = .436), which is in line with the statistical analysis run using the tuition revenue variable. Thus, whether a university used an RCM budget system at any point during the ten-year study, did not statistically impact the overall 10-year change in tuition revenue from 2007 to 2016.

When examining the overall tuition revenue change from 2007-2016, while analyzing the RCM three level utilization, an ANOVA was used, which found no statistical significance ($F_{2,47}$ = .350, p = .706), which is in line with the statistical analysis run using the tuition revenue variable. Thus, whether a university used an RCM budget system for the entire ten-year period, less than five years, or not at all at any point during the ten-year study, did not statistically affect the overall ten-year change in operating revenue from 2007 to 2016.

Two ANCOVAs were conducted (controlling for research ranking as well as for undergraduate enrollment among the fifty universities) to take into account the possibility of other variables possibly impacting these results. When controlling for research ranking (either R1, R2, or neither), percent change in no one year of tuition revenue was statistically significant. Similarly, when controlling for enrollment among the universities, percent change in no one year for tuition revenue was statistically significant.

Additionally, a mixed ANOVA was conducted, comparing schools that have implemented a RCM budget three years or longer in the study (n = 9) as compared to schools that had not implemented RCM or had implemented less than three years in the study (n = 41). In this comparison, annual changes in tuition revenue for each of years 2014, 2015, and 2016 were examined for statistical significance. For this particular mixed ANOVA, sphericity was assumed. During this particular test, no statistical significance was found within-subjects effects (p = .16, p = .46). *P* value for the between-subjects effects was (p = .56).

Finally, a Pearson correlation technique was used to determine the nature of the relationship between RCM schools (14) and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in tuition revenue for these particular years. There was a statistical significance found when reviewing 2015 with r = -.627, p = .05, indicating in 2015, the percent change of tuition appears to have a negative correlation. The downward trend in the 2015 tuition revenue may indicate that for this particular year's change, tuition revenue decreased as the number of years a school had been implementing RCM increased. No statistically significant correlation was found between these two variables for either 2014 or 2016. For year 2014, r = -.19, p = .62. For year 2016, r = -.33, p = .25. To further examine a correlation between tuition revenue and number of

years the particular school had implemented an RCM budget system, a curvilinear relationship was assessed. There was not a significant statistical relationship for neither Quadratic nor Cubic correlations.

Contracts and Grants Revenue

To answer research question #3 (Is there a relationship between annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?) an ANOVA was conducted, comparing universities utilizing an RCM and those who do not and the percent change in contracts and grants revenue across the 2007-2016 fiscal years (nine year-over-year changes). According to the data analysis, out of the nine year-over-year changes examined, none of the contracts and grants revenue variable years was identified as showing a statistically significant change among RCM and non-RCM schools. Thus, whether or not a university used an RCM system, had no statistical impact on annual changes in contracts and grants revenue. See Table 6 (below) for the findings between annual changes in contracts and grants revenue over the ten-year period as compared to schools either using or not using an RCM budget system.

Table 6

ANOVA Results for Contracts and Grants Revenue Percent Change (RCM vs. Non-RCM Schools)

Contracts and Grants Revenue Year Change	*F*	*p*	Mean (Non-RCM)	Mean (RCM)
2008	.072	.790	0.038	0.046
2009	.255	.616	0.068	0.036
2010	.644	.426	0.100	0.073
2011	1.129	.293	0.092	0.053
2012	.021	.886	(0.005)	(0.001)
2013	.057	.813	0.011	0.018
2014	.306	.583	(0.023)	(0.033)
2015	.785	.380	.0007	0.043
2016	1.955	.168	0.017	0.039

To further examine possible relationships, an ANOVA, was conducted using a variance investigation of higher granularity, which was the amount of time a university had been using an RCM budget system and its potential impact to the contracts and grants revenue dependent variable. In this particular test, the utilization of an RCM system was noted as one of three levels; either long-term (used by school all 10 years of the period), mid-term (implemented and used by school less than five years of the period), or had not been implemented or used anytime during the 10 years. Once again, there were no years identified as being a statistically significant change between schools using RCM and schools not using an RCM system, when analyzing the contracts and grants revenue variable. Thus, whether or not a university had used an RCM system for all ten years, less than five years, or had not used an RCM system at all, had no statistical impact on annual changes in contracts and grants revenue. See Table 7 (below) for the data between annual changes in contracts and grants revenue over the ten year period as compared to the three levels of RCM implementation (long-term, mid-range, or not used at all).

Table 7

ANOVA Results for Contracts and Grants Revenue Percent Change (Length of RCM Implementation)

Contracts and Grants Revenue Year Change	*F*	*p*
2008	.196	.823
2009	.439	.648
2010	.520	.598
2011	.561	.574
2012	.077	.926
2013	.545	.583
2014	.641	.532
2015	.402	.671
2016	1.151	.325

When examining overall contracts and grants revenue changes from 2007-2016, grouped by use or non-use of an RCM budget system, an ANOVA was used, which found no statistical significance ($F_{1,48} = .126$, $p = .724$), which is in line with the statistical analysis run using the operating revenue variable. Thus, whether a university used an RCM budget system at any point during the ten-year study, did not statistically affect the overall 10-year change in contracts and grant revenue from 2007 to 2016.

When examining the overall contracts and grants revenue change from 2007-2016, while analyzing the RCM three level utilization, an ANOVA was used, which found no statistical significance ($F_{2,47} = .075$, $p = .927$), which is in line with the statistical analysis run using the contracts and grants revenue variable. Thus, whether a university used an RCM budget system for the entire ten-year period, less than five years, or not at all at any point during the ten-year study, did not statistically impact the overall ten-year change in contracts and grants revenue from 2007 to 2016.

Two ANCOVAs were conducted (controlling for research ranking as well as for undergraduate enrollment among the fifty universities) to take into account the possibility of other variables possibly affecting these results, When controlling for research ranking (either R1, R2, or neither), percent change in no one year of contracts and grants revenue was statistically significant. Similarly, when controlling for enrollment among the universities, percent change in no one year for tuition revenue was statistically significant.

Additionally, a mixed ANOVA was conducted, comparing schools that have implemented a RCM budget three years or longer in the study (n = 9) as compared to schools that had not implemented RCM or had implemented less than three years in the study (n = 41). In this comparison, annual changes in contracts and grants revenue for each of years 2014, 2015, and 2016 were examined for statistical significance. For this particular mixed ANOVA, sphericity could not be assumed, so Greenhouse-Geisser was used. During this particular test, no statistical significance was found within-subjects effects (p = .07, p = .94). *P* value for the between-subjects effects was (p = .59)

Finally, a Pearson correlation technique was used to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in contracts and grants revenue for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016. For year 2014, r = -.51, p = .16. For year 2015, r = .22, p = .55. For year 2016, r = -.25, p = .39. To further examine a correlation between contracts and grants revenue and number of years the particular school had implemented an RCM budget system, a curvilinear relationship was assessed. There was not a significant statistical relationship for neither Quadratic nor Cubic correlations.

Operating Expenses

In order to answer research question #4 (Is there a relationship between changes in university operating expenses by those who have implemented RCM systems and those that have not?) an ANOVA was conducted, comparing universities utilizing an RCM and those who do not and the percent change in operating expenses across the 2007-2016 fiscal years (nine year-over-year changes). According to the data analysis, out of the nine years examined, only one year, 2011 (representing change between 2010 and 2011 years), of the operating expense variable was identified as showing a statistically significant change between RCM and non-RCM schools ($F_{1,48} = 4.339$, $p = .043$). Thus, whether or not a university used an RCM system, had no statistical impact on annual changes in operating expenses, except for the annual change in 2011, which showed that universities using an RCM system had a statistically lower increase to operating expenses than universities that did not use RCM during 2011. See Table 8 (below) for the findings between annual changes in operating expenses over the ten-year period as compared to schools either using or not using an RCM budget system.

Table 8

ANOVA Results for Operating Expense Percent Change (RCM vs. Non-RCM Schools)

Operating Expense Year Change	*F*	*p*	Mean (Non-RCM)	Mean (RCM)
2008	.287	.595	0.078	0.072
2009	1.275	.264	0.046	0.057
2010	.377	.542	0.025	0.019
2011	4.339	.043	0.051	0.035
2012	.323	.572	0.044	0.052
2013	.029	.865	0.046	0.048
2014	.493	.486	0.047	0.040
2015	.024	.877	0.047	0.049
2016	.961	.332	0.052	0.041

To further examine possible relationships, an ANOVA was conducted using a variance investigation of higher granularity, which was the amount of time a university had been using an RCM budget system and its potential impact on the operating expenses dependent variable. In this particular test, the utilization of an RCM system was noted as one of three levels; either long-term (used by school all 10 years of the period), mid-term (implemented and used by school less than five years of the period), or had not been implemented or used anytime during the 10 years. No one year was identified as being a statistically significant change between schools using RCM when considering each of the three possible utilization levels when analyzing the operating expenses variable. Although there was a significant difference between an RCM school and a non-RCM school in regards to operating expense change for the year 2011, there was no significant impact in the difference among the length of time a school had been utilizing RCM for this particular year. A statistical difference was found during the 2015 three RCM level ANOVA. Due to statistical significance found within the 2015 fiscal year annual change, a specific multiple-comparison posthoc test was performed using the Bonferroni Procedure. No statistical significance was found using the Bonferroni posthoc test. Thus, whether or not a university had used an RCM system for all ten years, less than five years, or had not used an RCM system at all, had no statistical impact on annual changes in operating expenses. See Table 9 (below) for the data between annual changes in operating expenses over the ten-year period as compared to the three levels of RCM implementation (long-term, mid-range, or not used at all).

Table 9

ANOVA Results for Operating Expense Percent Change (Length of RCM Implementation)

Operating Expense Year Change	*F*	*p*
2008	.565	.572
2009	2.495	.093
2010	.856	.431
2011	2.149	.128
2012	.898	.414
2013	.245	.784
2014	2.71	.764
2015	3.605	.035
2016	.570	.569

When examining the overall operating expense change from 2007-2016, and whether or not a university used an RCM budget system, an ANOVA was used, which found no statistical significance ($F_{1,48}$ = .001 , p = .970), which is in line with all but one year of the statistical analysis run using the operating expense variable. Thus, whether a university used an RCM budget system at any point during the ten-year study, did not statistically affect the overall 10-year change in operating expenses from 2007 to 2016.

When examining the overall operating expense change from 2007-2016, while analyzing the RCM three level utilization, an ANOVA was used, which found no statistical significance ($F_{2,47}$ = .847, p = .435), which is in line with all but one year of the statistical analysis run using the operating expense variable. Thus, whether a university used an RCM budget system for the entire ten-year period, less than five years, or not at all at any point during the ten-year study, did not statistically impact the overall percent change in operating expenses from 2007 to 2016.

Two ANCOVAs were conducted, controlling for research ranking as well as for undergraduate enrollment among the fifty universities, to take into account the possibility of

other variables possibly impacting these results. When controlling for research ranking (either R1, R2, or neither), percent change in no one year of operating expenses was statistically significant. Similarly, when controlling for enrollment among the universities, percent change in no one year for operating expenses was statistically significant.

Additionally, a mixed ANOVA was conducted, comparing schools that have implemented a RCM budget three years or longer in the study (n = 9) as compared to schools that had not implemented RCM or had implemented less than three years in the study (n = 41). In this comparison, annual changes in operating expenses for each of years 2014, 2015, and 2016 were examined for statistical significance. For this particular mixed ANOVA, sphericity was assumed. During this particular test, no statistical significance was found within-subjects effects (p = .68, p = .67). *P* value for the between-subjects effects was (p = .57).

Finally, a Pearson correlation technique was used to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in operating expenses for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016. For year 2014, r = -.07, p = .86. For year 2015, r = -.11, p = .76. For year 2016, r = -.05, p = .88. To further examine a correlation between operating expenses and number of years the particular school had implemented an RCM budget system, a curvilinear relationship was assessed. There was not a significant statistical relationship for neither Quadratic nor Cubic correlations.

Summary

This chapter presented the various findings and analyses of the data collected concerning whether year-over-year changes to operating revenue, tuition revenue, contracts and grants

revenue, or operating expenses, are impacted by whether or not a university has implemented an RCM budget system. The findings presented above were based on analyzing ten-year financial statement data from 2007-2016 across 50 public higher education institutions, for these specific KPIs. The study analyzed the financial results while comparing schools that use an RCM budget system, to those that do not use an RCM budget system. The research found that the annual change to operating revenue was statistically higher in 2015 for schools that used an RCM system as compared to schools that did not use this budget system. The research found that there was a statistically significant difference with operating expense change from 2010 to 2011, with RCM schools having a lower increase in operating expenses as compared to non-RCM schools. For all other years, when comparing annual changes to operating revenue and operating expenses, as well as all years of annual changes for tuition revenue and contracts and grants revenue, there were no statistically significant differences among the KPIs when considering if a school is or is not using an RCM budget system. Additionally, a mixed ANOVA was run for each of the KIPs for each of the years 2014-2016, comparing schools that had implemented RCM three years or longer compared to schools that had not implemented RCM, or had implemented less than three years. The result of the mixed ANOVA for each of the indicators showed no statistical significance. Finally, a correlation was run to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in the KPIs for these particular years. No statistically significant correlation was found between these variables for either 2014, 2015, or 2016.

Chapter V: Conclusions

The success of any institution of higher education relies upon sound financial management and the utmost fiduciary duty. A university's educational, research, outreach, and service initiatives cannot be achieved operating in an atmosphere of fiscal naivety or negligence (Bar & McClellan, 2010). Therefore, proper finance and accounting structures enable colleges and universities to remain competitive with peer institutions by encouraging fiscal responsibility and providing accurate and timely financial data to the decision-making process. Over the past decade, leaders at colleges and universities across the U.S. have shown increased interest in more sophisticated approaches to budgeting and financial management (Birnbaum, 2000; Vonasek, 2011). This interest is well-warranted as universities face fiscal challenges in a complex and competitive higher education landscape (Zemsky et al., 2006).

Adding to the pressures of competition, institutions of higher education face environmental challenges to resource management (Weisbrod & Asch, 2010). Among these challenges are reduced state appropriations, increased tuition reliance, and the ever-increasing cost of personnel. According to Szatmary (2011), "American universities, especially public institutions, have confronted a funding crisis in recent years that will only worsen…..every institution must maximize its existing resources – including budgeting models – so that university leaders can make the most informed decisions" (p. 69). Therefore, it is imperative that higher education institutions address the funding shortfall by enhancing revenue in other areas or by generating new revenue streams.

Research Questions

The following research questions will guide the study:

1. Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?
2. Is there a relationship between annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?
3. Is there a relationship between annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?
4. Is there a relationship between changes in university operating expenses by those who have implemented RCM systems and those that have not?

In response to the financial pressures most universities are facing, some schools have elected to implement a Responsibility Center Management (RCM) budgeting system. An RCM budget system's emphasis is on having decentralized financial accountability for both revenue and expenses. Under an RCM system, each unit or college on campus is allocated revenue and expenses based on its particular metrics, such as student credit hours produced, number of full-time employees, or square footage used. A centralized approach to budgeting, a more common budget system in higher education, is a system that involves most, if not all, critical financial decisions being made at the central administrative office of a university. An RCM system, or decentralized approach, shifts this responsibility to deans and unit heads across the campus. Under an RCM approach, there are financial incentives for both academic units and non-academic units to achieve improved financial performance

An RCM budget system, therefore, is a decentralized methodology that has been employed by some higher education institutions, which allows academic and non-academic units

to have the ability to maintain and manage their revenue and costs. The perceived result is that deans and other unit leaders will make decisions that favorably affect the financial success of their areas, which in turn financially benefit the university as a whole. The value of addressing this issue was in the application of the theory that a decentralized budgeting system, such as an RCM system, can lead to measurable favorable changes in a university's financial results.

Chapter 1 presented the study's context, statement of the problem, the purpose of the study, research questions, significance of the study, limitations, delimitations, assumptions, and definitions. Chapter 2 provided an overview of the literature on revenue and costs for higher education institutions, budgeting methods found among universities, specifically the RCM budgeting method, and the rationale for and impediments to the implementation of an RCM budget system. Chapter 3 reviewed the methodology and research design of the study, along with including discussion on the data collection and analysis. Chapter 4 reported the results and related analyses for the study. Finally, this chapter summarizes the purpose of the study, research method used, summary and discussions of the main findings, conclusions, and recommendations for future research studies.

Purpose of the Study

The purpose of this study was to determine if a decentralized budget system improves a university's key performance indicators (KPIs). There are limited empirical studies that research whether or not a school that has implemented an RCM system is better off for doing so. This particular study was designed to analyze whether there are patterns or trends among schools that either implement an RCM system or do not use an RCM budgeting system, based on the financial performance of the institution.

The study also attempted to analyze specific revenue items including tuition and contracts and grants revenue. The analysis of these specific university revenue items may indicate the success at which a school is acquiring incremental revenue, and whether or not this success is related to whether or not a school employs an RCM budgeting system.

Research Method

This quantitative multiple case study examined how using an RCM budget model is related to key performance financial indicators, by comparing annual changes between public universities that use RCM, as compared to public universities that do not use an RCM budget model over the same ten-year period. The study consisted of selecting 50 public universities as part of the research (selected by taking the top 50 ranked public universities from the 2018 Wall Street Journal/Times Higher Education's US College Rankings). The study statistically analyzed (through the use of SPSS) annual changes in performance indicators at each selected university, annually between 2007-2016, to determine and identify if any significant trends occurred for universities that either used or did not use, an RCM budgeting system.

Summary of Main Findings and Discussion

Main findings. To address the first research question; Is there a relationship between annual changes in operating revenue by universities that have implemented RCM systems and those that have not?; an ANOVA was run comparing RCM universities to non-RCM universities over the ten-year period 2007-2016. When comparing annual changes to the operating revenue line item, it was determined that only one year (2015) had a significant difference ($F_{1,48} = 7.390$, $p = .009$). All other years' annual percent change showed no significant difference when considering whether or not the particular university had implemented an RCM system. When the researcher considered more granularity, taking into account how long the RCM universities

had been implementing an RCM budget system, once again, only the annual percent change in the year 2015 was statistically significant ($F_{2,47} = 3.632$, $p = .034$). Further, as the researcher performed a specific multiple-comparison posthoc test, using the Bonferroni Procedure, no statistical significance was found when using multiple comparisons.

The researcher considered operating revenue change over the entire 10-year period, reviewing to what extent there is a relationship between universities that have implemented an RCM system and universities that have not implemented a decentralized system. The review of this relationship resulted in no statistically significant findings when considering both RCM and non-RCM universities, as well as considering how long RCM universities had been implementing the decentralized system. When considering the operating revenue performance indicator percent change in the year 2015, two separate ANCOVAs were conducted, controlling for the university research ranking, and separately controlling for undergraduate enrollment at each university, neither of which showed a significant difference. Additionally, a mixed ANOVA was run for operating revenue for each of the years 2014-2016, comparing schools that had implemented RCM three years or longer compared to schools that had not implemented RCM, or had implemented less than three years. The result of the mixed ANOVA for this particular indicator showed no statistical significance. Finally, a correlation was run to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in operating revenue for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016.

The finding for the first research question is that there is not necessarily a trend found in annual percent changes to operating revenue when considering if the university implemented or

did not use an RCM system. Although there was one year (2015) that showed higher operating revenue growth for schools using RCM, it was far from a consistent trend. Further, there was no other information learned from this particular year, when considering the length of RCM implementation, research ranking or enrollment size of the school.

To address the second research question; Is there a relationship among annual changes in tuition revenue by universities that have implemented RCM systems and those that have not?; an ANOVA was conducted comparing tuition revenue data over the ten-year period. There were no years for which the percent change in tuition revenue was statistically significant when examining the relationship between RCM and non-RCM schools. The researcher analyzed the amount of time an RCM university had been implementing this particular type of budget system, but no significance was found. Further, when considering the 10-year overall percent change for tuition revenue among the 50 public universities, taking into account whether or not the schools utilized RCM, additionally, how long they had been using RCM, once again, no statistical difference was found when analyzing this particular financial statement line item. Additionally, a mixed ANOVA was run for tuition revenue for each of the years 2014-2016, comparing schools that had implemented RCM three years or longer compared to schools that had not implemented RCM, or had implemented less than three years. The result of the mixed ANOVA for this particular indicator showed no statistical significance. Finally, a correlation was run to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in tuition revenue for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016. The finding of the second research question is that there is not a trend found in annual percent change in

tuition revenue when considering if the university implemented or did not implement an RCM system.

To address the third research question; Is there a relationship among annual changes in contracts and grants revenue by universities that have implemented RCM systems and those that have not?; an ANOVA was conducted comparing contracts and grants revenue data over the period from 2007-2016. Similarly, as with tuition revenue findings, there were no years for which the percent change in contracts and grants revenue was statistically significant when examining the relationship between RCM and non-RCM schools. The researcher analyzed the amount of time an RCM university had been implementing an RCM budget system, again resulting in no significance being found. Further, when considering the 10-year overall percent change for contracts and grants revenue among the 50 public universities, taking into account whether or not the schools utilized an RCM budget system, as well as considering how long they had been using RCM, no statistical difference was found when analyzing contracts and grants revenue. Additionally, a mixed ANOVA was run for contracts and grants revenue for each of the years 2014-2016, comparing schools that had implemented RCM three years or longer compared to schools that had not implemented RCM, or had implemented less than three years. The result of the mixed ANOVA for this particular indicator showed no statistical significance. Finally, a correlation was run to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in contracts and grants revenue for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016. Therefore, the finding of the third research question is that there

is not a trend found in annual percent change to contracts and grants revenue when considering if the university implemented or did not implement an RCM system.

To address the final research question; Is there a relationship between annual changes in operating expenses by universities that have implemented RCM systems and those that have not?; an ANOVA was conducted comparing RCM and non-RCM universities while analyzing annual percent change to operating expenses from 2007-2016. One year (2011) showed a significant change to operating expenses, as RCM schools had statistically significant lower annual percent change when compared to schools not utilizing RCM ($F_{1,48} = 4.339$, $p = .043$). No years other than 2011 showed significant annual percent change. When the researcher considered how long the RCM schools had been using RCM, 2015 was identified as being statistically significant, but as the researcher performed a specific multiple-comparison posthoc test, using the Bonferroni Procedure, no statistical significance was found when using multiple comparisons. Further tests were performed on the operating expenses variable, similarly to tests performed on the other performance indicators, including looking at the overall 10-year change in operating expenses, taking into account whether or not the school used RCM, additionally, how long RCM schools had been utilizing an RCM system, but with no significant differences found among RCM and non-RCM schools. Additionally, a mixed ANOVA was run for operating expenses for each of the years 2014-2016, comparing schools that had implemented RCM three years or longer compared to schools that had not implemented RCM, or had implemented less than three years. The result of the mixed ANOVA for this particular indicator showed no statistical significance. Finally, a correlation was run to determine the nature of the relationship between RCM schools and how many years these particular schools have been implementing RCM as of years 2014, 2015, and 2016, as compared to the percent change in

operating expenses for the particular years. No statistically significant correlation was found between these two variables for either 2014, 2015, or 2016. Therefore, the finding of the final research question is that, although there was one year in which the annual increase to operating expenses was significantly lower for schools implementing RCM, there is not necessarily a trend found in annual percent changes to operating expenses, when considering if the university used an RCM system.

Discussion. Although the results of this test did not necessarily show that implementing an RCM system resulted in significant favorable trends among the four performance indicators closely examined (operating revenue, tuition revenue, contracts and grants revenue, and operating expenses), the results of the test also showed that using RCM does not result in negative trends among these four key financial indicators. In fact, two years of the study (2015 and 2011) showed that RCM had a favorable impact on the operating revenue and operating expense line items, respectively.

Considering the results of this study which indicated that a university is no worse off financially for using an RCM budget system, and may have an improved annual change to a key financial indicator, it is important to understand other more "soft benefits" that a school may realize by implementing such a system. One advantage to RCM, other than direct financial results that may be achieved, is the enhanced transparency about both revenues and expenses of operating a university. Centralized budget systems do not lend themselves to the openness of financial information being shared since critical financial decisions are made only at the central level. With an RCM system, since many units/colleges across campus have a stake in revenue and expense amounts and allocations thereof, the rationale, process, and outcomes of financial decisions are communicated much more clearly than with a centralized system.

Another advantage to having an RCM system, other than for possible financial improvement, is the empowerment that academic and non-academic leaders achieve by being part of the decision process on critical financial matters that affect their areas of responsibility. With higher education leaders across campus having a more participatory role in decision making under a RCM system, they most likely feel more valued with increased job satisfaction, possibly increasing university retention rates among leadership across campus.

It is essential to understand that many variables may have impacted the results of this RCM quantitative study. One such variable was the fact that no one RCM budget system is exactly the same among schools that use an RCM system. For example, prior to implementation of a centralized system, each school likely had a budget committee that included faculty and administrators, to discuss and debate the many nuances and interpretations of an RCM system. The committee recommendations of how best to first adopt an RCM system at a particular school transitioning to a RCM system was likely based on many factors, including the specific strategic initiatives for the university. The result is there are likely framework differences among universities following the same adoption of an RCM system. Each RCM university has made many decisions how best to allocate or not allocate revenue and expenses to the various academic and operating units. There are universities that hold each unit fully accountable for their bottom-line results, while other universities offer the principal of subvention, to aid and support those academic units that would typically show a negative bottom-line. The result is that no one school has the exact same RCM budget model, likely leading to different financial decisions being made among deans and unit heads, even across schools that have implemented RCM.

Another variable that may have impacted the results of this study is the varying economic climates among colleges in different states and different regions of the country. Certain states in the study are in a budget crisis and have been for many years, while other states in this study are in a much stronger financial position. Since the amount of higher education funding for each state is reliant on that particular state's budget situation, state appropriations to public universities differ. This varying state appropriation funding could lead to different financial priorities among universities in different states, impacting financial results used in this study.

Another variable that may have contributed to not finding more statistically significant results between schools that use RCM and schools that do not use RCM is the fact that the majority of the schools in this study do not use RCM. Only fourteen of the universities selected for this study used RCM at some point during the study, with only five of those schools having used RCM during the entire 10-year period of the study. As literature was reviewed, along with research conducted, it was interesting to find that at least two schools included in this study as non-RCM schools were preparing to implement an RCM system; Virginia Tech University planned to implement RCM in FY18, and the University of Alabama at Birmingham plans to implement such a system in FY19.

Conclusions

The findings of this study suggested that in most instances the application of an RCM budget model did not result in a significant annual improvement to financial results among four key indicators (operating revenue, tuition revenue, contracts and grants revenue, and operating expenses). Further, for those specific years in which the results of this research showed there was a significant financial improvement by RCM schools for critical financial performance indicators, there was no statistical difference when the researcher considered the length of time a

school had been implementing an RCM system. Further, as the study took into account the research ranking for the university (i.e., R1, R2); there were no significant findings between financial performance and whether or not a school used an RCM system. Similarly, when controlling for student enrollment, no one year was statistically significant when examining changes to the fundamental financial indicators and whether universities have implemented an RCM system or have not implemented a decentralized system.

Although the findings of this study seem to indicate in most instances there are not any direct financial improvements to the specific financial indicators tested, by implementing an RCM budget system, the study did show there were no years in which a school was worse off financially for using RCM as compared to schools not using RCM. Therefore, as schools consider whether to implement an RCM system, or consider continuing to use an RCM system, the direct financial improvement attributed to RCM may be limited, but other non-financial benefits to using such a system should be considered as well.

Recommendation for Practice and Future Research

A higher education institution that utilizes an RCM budget system (or plans to adopt an RCM system) must design the system to clarify roles and responsibilities between central and local units. Clear roles and responsibilities result in an emphasis on local academic planning and decision making in a cost/benefit context and create a spirit of entrepreneurship (Strauss & Curry, 2002). Since an RCM budget is based on a system of incentives, it is crucial to design the system to appropriately and adequately reward decision makers and their units. It is recommended that desired outcomes should be developed by the university's overall strategy and mission. It is worth noting the time frame for this study was during a very volatile time for the higher education industry, in which state appropriations declined, reliance on tuition increased,

and questions as to the value of higher education were often asked. Although the results of this test showed insufficient financial performance improvement, it should be noted that the results of the test showed no adverse financial outcomes by using an RCM system. When considering other benefits to using RCM, it may very well be in a university's best interest to implement or continue using, an RCM system.

There are three primary recommendations for further study in this area. First, it is recommended that researchers analyze or select universities within one state when comparing schools that have implemented and schools that have not implemented an RCM budget system. By selecting public universities from within one state, any particular state budget issues or varying state appropriations that may impact the schools are more mitigated or consistently applied by selecting in-state schools, as compared to analyzing schools across different states. Second, some private schools have implemented an RCM budget system; it is suggested that scholars analyze the impact for these private schools that have implemented an RCM system, as compared to those private schools that have not implemented such a system. Third, when analyzing schools that have implemented an RCM system as compared to schools that have not implemented an RCM system, it is recommended to include the same number of RCM and non-RCM schools, as to provide for more likely direct comparisons between the two groups.

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Appendix A

Instrumentation/Financial Statement Construct

Instrumentation/Financial Statement Construct

The American Institute of CPAs (AICPA), the world's largest member association representing the accounting profession, sets the U.S. auditing standards for private companies, nonprofit organizations, local, federal and state governments (including public universities). According to the AICPA (2017), a university audit report issued by an independent auditor typically contains the following statements (pp. 101-102):

- We have audited the accompanying financial statements of the University activities, the business-type activities, the aggregate discretely presented component units, each major fund, and the aggregate remaining fund information of the University, as of and for the year ended September 30, 20X1, and the related notes to the financial statements, which collectively comprise the University's basic financial statements as listed in the table of contents.
- Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.
- Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit by auditing standards accepted in the United States of America and the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

- An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements to design audit procedures that are appropriate.
- An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant estimates made by management, as well as evaluating the overall presentation of the financial statements.
- We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.
- In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the University, as of September 30, 20X1, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

The audited financial statements were accessed by viewing each university's website, under the Business & Finance Services portion of the website. For universities for which no audited financial statements were available online or otherwise obtained, the study selected the next highest ranked university in the WSJ/THE rankings. Each public university, as an entity of the applicable state, is required to have a public audit each year. By having an independent audit done on an annual basis, the data collected for this study fully support the concept of validity.

The financial performance indicator amounts (operating revenue, tuition revenue, operating expenses, contracts and grants revenue) obtained from audited financial statements, were compiled for each year between 2007-2016. A calculation was made to determine the percentage change among the indicator amounts for each year between 2007-2016. While accessing each university's website, information on whether or not the university used an RCM budget system was noted for each year of the study, along with the year of implementation.

In addition to obtaining the crucial annual performance indicator data and whether or not the university used RCM, both of which were used to address the specific research questions of this study, other information was collected during the study. Other non-financial data compiled included the student population for each public university, for each of the ten years of the study. The study compiled student enrollment mix among undergraduate and graduate students for each year of the study among all fifty universities. Additionally, the study collected the universities' Carnegie Classification of Institutions of Higher Education for each year of the study (2007-2016).

Appendix B

List of 50 Selected Universities

List of 50 Selected Universities

(Listed alphabetically)

Arizona State University
California Polytechnic State University
Clemson University
Colorado School of Mines
Florida State University
George Mason University
Georgia Institute of Technology
Indiana University
Iowa State University
Michigan State University
Michigan Technological University
North Carolina State
Ohio State University
Pennsylvania State University
Purdue University
Rutgers University
St. Mary's College of Maryland
Stony Brook University
Temple University
Texas A&M University
The College of New Jersey
University of Alabama at Birmingham
University of Arizona
University of California (Davis)
University of California (San Diego)
University of California (Berkeley)
University of California (Santa Barbara)
University of California (Los Angeles)
University of Colorado (Boulder)
University of Connecticut
University of Delaware
University of Florida
University of Illinois
University of Illinois at Chicago
University of Iowa
University of Maryland
University of Massachusetts
University of Michigan
University of Minnesota
University of North Carolina
University of Oklahoma
University of Texas (Austin)
University of Vermont
University of Virginia
University of Washington
University of Wisconsin
Virginia Military Institute
Virginia Polytechnic Institute and State University
Washington State University
William & Mary

Appendix C

List of Selected Universities Implementing RCM

List of Selected Universities Implementing RCM

(Listed Alphabetically)

University	Fiscal Year of Implementation	Retrieved From
Indiana University	1990	http://www.indiana.edu/~obap/rcm-iub.php
Iowa State University	2010	http://planning.president.iastate.edu/finance/resource-management-model/implementation
Ohio State University	2003	http://senate.osu.edu/FISADHOC.pdf
Purdue University	2016	https://www.ipfw.edu/dotAsset/8fd1ac8c-45b4-49a2-8b9e-22765b23a2b8.pdf
Rutgers University	2016	http://ombuds.rutgers.edu/policy-copy/RCM_HFM_FG%20for%20TTH_20141215.pdf
Temple University	2014	https://finance.temple.edu/sites/finance/files/RCM%20at%20Temple%20FY2014_FY2017.pdf
University of Arizona	2016	http://rcm.arizona.edu/faq-page#n396
University of California (Davis)	2013	http://budget.ucdavis.edu/budget-model/documents/Budget-Model-Post-implementation-Review-June-2015.pdf
University of California (Los Angeles)	1997	http://dailybruin.com/1997/09/21/ucla-departments-ease-into-new/
University of Florida	2011	http://cfo.ufl.edu/media/cfoufledu/documents/RCMManual08312012.pdf
University of Michigan	1997	http://ur.umich.edu/9596/Sep25_95/10.htm
University of Minnesota	1996	https://opb.washington.edu/sites/default/files/opb/Budget/Univ-of-Minnesota-Budget-Model-Overview_Nov-2009.pdf
University of Vermont	2016	https://www.uvm.edu/provost/IBB/
University of Virginia	2015	http://www.virginia.edu/resourcingthemission/faq.html