THE ALCHEMY OF COMPETITIVE SUCCESS: AN ANALYSIS OF DIVISION I WOMEN'S ROWING RESOURCES

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ABSTRACT

Katherine L. Burger: The Alchemy of Competitive Success: An Analysis of Division I Women's Rowing Resources
(Under the direction of Barbara Osborne)

Using the Resource Based View of competitive advantage, the present research identified and analyzed potential resources associated with competitive success in Division I women's rowing, with the goal of empowering these programs to make data-driven decisions to improve their likelihood of competitive success. Employing a voluntary survey of Division I women's rowing head coaches and a collection of secondary data, thirty-nine variables were explored to determine their significance based on three institutional and program characteristic groups. The research suggests that many variables cannot be sources of sustained competitive advantage, as all programs have the potential to develop them; however, the limitations that exist for programs to develop those resources can result in the creation of temporary competitive advantage for others. Variables within the Financial and Human Resources categories were particularly significant, which furthers the findings of current research. In discussing these results, recommendations for future research were also offered.

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CHAPTER I: INTRODUCTION

INTRODUCTION

In National Collegiate Athletic Association (NCAA) Division I, only 88 of the 346 member institutions sponsor the sport of women's rowing (NCAA, 2016). Of those 88 institutions, only 22 teams will advance each year to the NCAA Women's Rowing Championships. From the 2013 season to the 2016 season, the 22 selected teams have come from a pool of 32, with 19 of those teams returning to compete three or four times in the NCAA Championships ("Division I College Rowing", 2016; "Rowing Regatta Results", 2013-16). This pattern of concentrated dominance prompts the questions: what makes those top programs so successful? And what barriers are keeping the other 56 programs from breaking into that upper echelon of success? Thus, the purpose of this research was to analyze the resources that are associated with competitive success in Division I women's rowing, with the goal of empowering all collegiate women's rowing programs to make data-driven decisions to improve their likelihood of competitive success.

PURPOSE

The purpose of this study was to identify and analyze the resources that are associated with competitive success in NCAA Division I women's rowing. In examining these resources, the goal was two-part: (1) to identify the variables that are associated with creating competitive success in women's rowing, and (2) to prioritize these variables in order to improve the competitive success of all Division I women's rowing programs.

To develop the list of variables to analyze, this study employed the Resource Based View (RBV) which "is an efficiency-based explanation of performance differences" (Bridoux, 2004, p. 1). The RBV suggests that organizations achieve and sustain competitive advantage in an industry through the identification and efficient utilization of the resources under their control (Won & Chelladurai, 2016). This framework groups resources into four categories— financial, human, organizational, and physical

(Barney, 1995). Variables specific to the sport of women's rowing were grouped by resource category and refined by an informal review panel of former rowers and/or former women's rowing coaches.

In order to identify the importance and contribution of various resources on competitive success in women's rowing, the population of 88 Division I women's rowing program head coaches were asked to voluntarily complete an online questionnaire regarding program-specific resource information, as well as respond to a few qualitative questions.

RESEARCH QUESTIONS

In an effort to analyze Division I women's rowing programs, the following research questions were posed:

1. What are the relationships between competitive success and each of the following resource categories:
    a. Financial
    b. Human;
    c. Organizational; and
    d. Physical.
2. Based on institutional and program characteristics, what resources should be emphasized for programs looking to improve their likelihood of competitive success?

DEFINITION OF TERMS

For the purpose of this study, the following terms will be defined as listed:

1. Resource Categories: Per the RBV framework (discussed in Chapter II), this study grouped variables into four resource categories: Financial, Human, Organizational and Physical. Chapter III and Appendix 1 provide a listing of the variables considered within each category in this study.
2. cMax Rankings: In this study, programs were ranked from 1 to 88 based on their two-year average final cMax ranking using the 2015-16 and 2016-17 data. A detailed explanation for this can be found in Chapter III.
3. Competitive Success: This is one of three metrics used for comparisons in Chapter IV. Three categories of success were defined, as listed below, and each rowing program was assigned to

one of the three categories based on their performance in the final cMax ranking in the 2015-16 and 2016-17 seasons.

a. Gold Program – A program fit this category if they fell in the top 15 of the final cMax ranking in each of the last two years. This showed consistent success within the top tier of programs nationally.

b. Silver Program – A program fit this category if they fell in the top 30 of the final cMax ranking in either of the last two years. This showed recent success within the top third of programs nationally.

c. Bronze Program – A program fit this category if they did not fall in the top 30 of the final cMax ranking in either of the last two years. This encompassed all other programs. Although there are disparities in terms of competitive success within the bronze category, the analytical intentions of this study did not require further parsing of the group.

4. Enrollment Size: This is one of three metrics used for comparisons in Chapter IV. Four categories of undergraduate enrollment size were defined, as listed below, based on the most up-to-date information available on The Collegeboard website ("The Collegeboard").

   a. Small – Less than 5,000 undergraduate students enrolled.

   b. Medium – Between 5,001 and 15,000 undergraduate students enrolled.

   c. Large – Between 15,001 and 30,000 undergraduate students enrolled.

   d. Extra-Large – More than 30,001 undergraduate students enrolled.

5. Institutional Type: This is one of three metrics used for comparisons in Chapter IV. Two categories of enrollment size were defined, as listed below, based on the most up-to-date information available on The College Board website ("The Collegeboard").

   a. Public – A public institution is "operated by or controlled by the Federal government, a State, or a political subdivision of a State such as a city or country" (§ 416.201, 1982).

   b. Private – A private institution is "controlled and managed by a non-governmental organization or if its Governing Board consists mostly of members not selected by a public agency" ("Glossary of Statistical Terms", 2003).

6. Coaching Staff: The current individuals in coaching positions on staff (including volunteers and graduate assistants) for a women's rowing team as identified on each institutional athletics website.
7. Former Coaching Staff: The former individuals in coaching positions on staff (including volunteers and graduate assistants) for a women's rowing team as identified by previously published institutional news releases.
8. NCAA Division I Women's Rowing Programs: The 88 varsity-level programs that are sponsored by NCAA Division I member institutions and compete in the sport of rowing as either an Independent or as a member of an athletic conference.
9. Conference Championship: The 11 Division I athletic conferences who sponsor the sport of women's rowing and have an end-of-regular-season regatta to determine the conference's automatic qualifier to the NCAA Division I Women's Rowing Championship. (This includes the American Athletic Conference, Atlantic-10 Conference, Atlantic Coast Conference, Big 12 Conference, Big Ten Conference, Colonial Athletic Conference, Ivy League, Metro Atlantic Athletic Conference, Pac-12 Conference, Patriot League, West Coast Conference, and two Independents.)
10. NCAA Championship Selections: An annual process completed by the NCAA Division I Women's Rowing Committee to choose the 22 teams to compete in the NCAA Division I Women's Rowing Championship; 11 teams are selected via Automatic Qualifying Bids as determined by each of the 11 athletic conferences who sponsor rowing and the final 11 teams are selected by the offer of an At-Large Bid from the Division I Women's Rowing Committee.
11. NCAA Division I Women's Rowing Championships: An annual, post-season regatta sponsored by the NCAA that crowns the Division I National Champion; the regatta is formatted as three rounds of racing (Heats, Semifinals/Repechages, and Finals) for each of the three boat categories (Varsity 8+, 2nd Varsity 8+, Varsity 4+); the point system associated with placement for each boat is used to determine the National Championship team.
12. USRowing: The national governing body for the sport of rowing in the United States; the organization does not interfere with the collegiate administration of the sport and leaves that

responsibility to the NCAA membership; USRowing and the CRCA release a co-authored weekly coaches' poll.

13. Collegiate Rowing Coaches' Association (CRCA): The national coaches' association for rowing in the US; the organization operates separately from the NCAA. The CRCA and USRowing release a co-authored weekly coaches' poll.
14. CRCA Coaches' Poll: A weekly coaches' poll conducted by CRCA and USRowing in which the top 20 women's rowing programs in the country are identified through a voting tally/points system based on responses from Division I Women's Rowing head coaches.
15. cMax Rankings: A mathematical model that ranks rowing teams using a statistical technique called ordinary least squares which provides a relative estimate of how fast a team is as predicted in a "standardized race, based solely on the current season Varsity 8+ results; this ranking system was used in this study to analyze a factor's association with competitive success; see Chapter III for greater detail ("cMax Rankings: Women's Varsity Eight," 2013-16).

LIMITATIONS

The following limitations were present in this study:

1. The participants who completed the online questionnaire may not have been the head coach, as was requested.
2. The head coach may have changed institutions immediately prior to or during the online questionnaire period and was not able to provide accurate information for both the 2015-16 and 2016-17 seasons, as was requested.
3. The cMax rankings may not have been the most accurate measure of a program's competitive standing or predictor of success.
4. Resource-related variables selected for analysis may not have included all possible factors contributing to every program's competitive success.
5. For the survey question regarding the year the rowing program was established, it was not clarified whether that meant the year a women's rowing program was established on campus (i.e. club team) or the year the women's rowing program was established as a Varsity program (i.e. no earlier than 1997-1998). This lack of clarity may have resulted in inconsistent reporting.

6. Due to the breakdown of the sample subgroups, significant findings may have be indicated within variables simply because of the small *n* of the subgroup, when the variable is not actually significant in the population.

DELIMITATIONS

The following delimitations were present in this study:

1. The number of programs that participated did not include the entire population of 88 NCAA Division I women's rowing programs.
2. The respondents had an online questionnaire submission deadline of five weeks which may have been a deterring factor. Many coaches use the summer weeks as time to recruit nationally and internationally and may not have had enough time to begin or complete the survey.
3. The competitive success rankings were developed from the two-year average final cMax rankings from the 2015-16 and 2016-17 seasons.

ASSUMPTIONS

The following assumptions were present in this study:

1. There are common resource-related factors that impact most programs' likelihoods of competitive success.
2. The RBV framework assumes that "managers are rational and that a firm's ultimate goal is to increase its performance" (Bridoux, 2004, p. 6).
3. Online questionnaire respondents answered honestly and accurately.

SIGNIFICANCE OF STUDY

As will be discussed in the following review of literature, there have been virtually no investigations done into success-related matters in women's collegiate rowing. Although much research has been done on sports like football and men's basketball—tying resources to topics like recruiting and private giving—this will be the first comprehensive study done to identify and analyze resource-based factors that impact competitive success in a specific sport. Thus, this study will be significant for the following reasons:

First, the results from the online questionnaire will provide a snapshot of the competitive landscape in women's rowing based on the respondent sample. Second, the results will provide a similar

snapshot of the landscape of resources available to and utilized by women's rowing programs. The descriptive statistics developed from these snapshots will provide an unprecedented, comprehensive look into the profiles of women's rowing programs. Programs will have the ability to use this information as a point of general comparison, as well as a point of leverage in conversations with administrators to provide data to substantiate their resource-related requests.

Third, if this study finds that specific resources and/or variables significantly increase a program's likelihood of competitive success, programs will have data to justify focusing their efforts on maximizing those specific variables, if they are not already maximized. Furthermore, this study will provide programs with benchmarks for each variable based on the three metrics of comparison (Institutional Type, Enrollment Size, and Competitive Success) that could help programs set incremental goals for developing those resources.

Fourth, this study will not only provide data that coaches can use as leverage in conversations with administrators, but it also provides administrators with a unique look into the needs and demands of the sport of rowing. While it could be assumed that a successful athletic program—no matter the sport—relies on a combination of funding, recruiting, and good coaching, every sport is slightly different. For example, a women's soccer program is not identical to a men's soccer program and may need a different combination of resources to success against their competitors. This study has the potential to act as an educational piece for administrators unfamiliar with the sport of rowing, as well as to provide a comprehensive breakdown of rowing's specific resource needs.

Finally, this study will provide a model or framework from which further research could be done on specific resources within women's rowing. Alternatively, this model could be used to identify and analyze variables impacting competitive success in other sports.

CHAPTER II: REVIEW OF LITERATURE

HISTORY OF WOMEN'S COLLEGIATE ROWING

SPORT OF ROWING

Despite its origins as a method of transportation, rowing developed into the modern version of the sport in the late 18th century. By the 1900s a boom in international participation and audience interest had occurred, with historians estimating over 5,000 rowing matches taking place from 1835-1851 in England alone (Wigglesworth, 1987). In 1839, the city of Henley, England founded the Henley Royal Regatta—now, the best-known annual regatta in the world (*"Henley Royal Regatta,* 2017).

Although races had been taking place in the United States since in 1762, it wasn't until 1852 that the first men's collegiate race occurred—between Harvard University and Yale University ("Rowing History Timeline," 2005; Smith, 2011). This race was not only historic for the sport itself, but also makes rowing the oldest collegiate sport in the United States ("Rowing History Timeline," 2005). Internationally, rowing also has the designation as the only team sport to have been in every Olympic Games—excluding the first Games in Athens in 1896 in which all rowing races were cancelled due to bad weather ("Rowing History Timeline," 2005).

Immediately following the first Harvard-Yale race, issues began to arise in regards to the amateur status of participants and coaches in American collegiate rowing programs. These issues eventually spurned the formation of the National Association of Amateur Oarsmen (NAAO) in 1872—the first national amateur team sport organization in the United States ("Rowing History Timeline," 2005).

Similar issues, related to amateurism and financial aid, in football and basketball quickly resulted in the creation of the Intercollegiate Athletic Association of the United States (IAAUS) in 1905, which by 1910 had become the National Collegiate Athletic Association (NCAA). Under this membership model, support for men's athletics continued to grow (Smith, 2011).

WOMEN'S PARTICIPATION IN ATHLETICS

Due to ties between athletics and education, and the fallacious dogma about women's diminished capacity to engage in physical and mental activities because of menstruation, women's participation in intercollegiate athletics did not frequently occur until 1892 when a women's basketball program was introduced at Smith College (Bell, 2008). Participation continued to be hindered until the women's suffrage movement in the 1920s; unfortunately, the gains made during the women's suffrage movement were negated due to the Great Depression in the 1930s (Bell, 2008). Although women's empowerment increased during World War II, it wasn't until the 1950s and 1960s, during the American civil rights movement, when the official position of the Division for Girls and Women in Sport (DGWS) was changed to not only allow intercollegiate athletic programs for women, but to encourage their existence (Bell, 2008).

The DGWS created a competition oversight commission in 1966—the Commission on Intercollegiate Athletics for Women (CIAW)—but by 1971, the commission had been replaced by the membership-driven organization, the Association for Intercollegiate Athletics for Women (AIAW), a national organization similar to the NCAA, but specific to the development of women's intercollegiate athletics (Bell, 2008). With the passage of Title IX of the Education Amendments of 1972 and the AIAW membership numbers reaching over 800 by 1981, a struggle for power and control over the governance of women's intercollegiate athletics programs began between the AIAW and the NCAA (Bell, 2008).

Initially, the NCAA took small steps to avoid charges of sex discrimination and complications with the AIAW by waiving their legislative regulations barring women from men's events and setting up meetings to discuss an affiliation between the two organizations (Bell, 2008). But ultimately, the AIAW was discontinued once the NCAA introduced sponsorship of women's varsity athletic programs and women's championships in 1982 (Bell, 2008).

During that same time span of changes in the national intercollegiate athletics landscape, the rowing landscape was also changing. The National Women's Rowing Association was established in 1962, and by 1982 had merged with the National Association of Amateur Oarsmen to create the modern-day governing body for the sport in the United States—USRowing ("Rowing History Timeline," 2005).

Furthermore, on the intercollegiate scene, the NCAA developed the Emerging Sports Program for Women in 1993 with the intention of providing additional flexibility for institutions to provide opportunities for women in athletics ("*NCAA Emerging Sport for Women*," 2017). Notably women's rowing was in the first group of programs identified as an emerging sport and by the 1997-98 season, rowing had received full varsity sport sponsorship by the NCAA ("*NCAA Emerging Sport for Women*," 2017). At that time, 54 programs existed and over the course of the following three seasons, nearly 30 more programs had been started, the sponsorship number settling at 88 for the 2013-2017 seasons ("*NCAA Sport Sponsorship Report,"* 2016).

TITLE IX

Title IX of the Education Amendments of 1972 was a turning point for women's participation in athletics, as the intent was to eliminate sexual discrimination in educational environments. The statute affirms that "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance" (20 U.S.C. §1681). Athletics, though not directly named, falls under Title IX's domain as it fits the "program or activity receiving Federal financial assistance" aspect of the legislation (20 U.S.C. §1681).

Due to confusion about proper implementation and compliance in higher education with Title IX in the following years, the Office of Civil Rights (OCR) produced a set of clarifying regulations; the 1975 OCR Regulations, specifically section 106, addressed athletic financial aid and intercollegiate athletics. The 1975 OCR Regulations not only provided clarification on compliance in regards to athletic scholarship aid distribution and equal opportunity, but also mandated that institutions achieve compliance by 1978 (34 C.F.R. §106.37(c), 106.41(c&d)).

In that time of confusion and non-compliance in intercollegiate athletics, women's rowing became a catalyst for change. The now, infamous Yale Title IX protest of 1976, sparked national solidarity across women's collegiate teams who while legally entitled to equal treatment, were not receiving such support or respect (Wulf, 2012). The Yale women's rowing team stripped in front of Yale's director of women's athletics and physical education to protest the inadequate shower facilities at the boathouse which had caused sickness and even a bout of pneumonia among the team (Wulf, 2012). Stories of the protest

spread nationwide and circled the globe via the Associated Press thanks to a front-page article in the *New York Times*; almost immediately, “letters poured in from alumni beseeching the administration to rectify the problem” and within days, the team’s showers were restored to working order (Gilder, 2015; Wulf, 2012). The protest also resulted in the onboarding of Louise O’Neal to guide widespread changes for women’s athletics at Yale. Ultimately, “the publicity would shame the university into a commitment to expand the boathouse to accommodate women the following year” (Gilder, 2015). The ripple effect of this incident and its resolution was significant as it expanded across the nation and across all sports.

The 1979 OCR Policy Interpretations set forth three main regulation areas for athletics—financial assistance, equal treatment, and equal accommodation (34 C.F.R. § 106). In terms of Financial Assistance, athletic departments “must provide reasonable opportunities for such award (of financial assistance) for members of each sex in proportion to the number of students of each sex participating in intercollegiate athletics*”* (45 C.F.R. Part 26, § 86.37 (c)). Equal Treatment requires that schools receiving federal financial aid and sponsoring interscholastic, intercollegiate, club or intramural athletics must "provide equal athletic opportunities for members of both sexes" (45 C.F.R Part 26 § B (1)). The Regulations detailed a laundry list of items from which athletic departments could demonstrate their compliance with equal treatment (45 C.F.R Part 26 § B (1)). Equal Opportunity requires institutions to “accommodate effectively the interests and abilities of students to the extent necessary to provide equal opportunity in the selection of sports and levels of competition available to members of both sexes” (45 C.F.R Part 26 § C (1)).

MODERN FUNCTIONS OF WOMEN’S COLLEGIATE ROWING

The importance of Title IX in regards to women’s rowing frequently centers around the issue of football, in terms counterbalancing the large number of participants and funding for the male sport. Football is a men’s sport that 72% of Division I member institutions sponsor (“*NCAA Sport Sponsorship Report,”* 2016). Football, unlike many other men’s sports, does not have an equivalent sponsored women’s sport in comparison to scholarship limits and roster sizes (e.g. men’s soccer to women’s soccer, baseball to softball). The NCAA mandated scholarship maximum is 85 in the Football Bowl Subdivision and 63 in the Football Championship Subdivision (NCAA Division I Manual, 2017, p. 190). Women’s rowing has an NCAA scholarship limit of 20, with the next closest limit at 18 between cross country,

indoor and outdoor track and field teams (NCAA Division I Manual, 2017, p. 190; *NCAA Sport Sponsorship Report,* 2016). Additionally, women's rowing roster sizes average 64 over the past four years, with the next largest average roster size of 40 for women's indoor track and field ("*NCAA Sport Sponsorship Report,"* 2016). Due to the large roster size, large scholarship opportunities, as well as large investment dollars needed for equipment and facilities, women's rowing could – and does on occasion – function to counterbalance some gender and Title IX disparities for universities.

Intercollegiate women's rowing is also the best source for developing Olympic team members for USRowing and the United States Olympic Committee (USOC). For the 2016 Rio Olympic Games, nearly 100% of the Women's National Team members participated in rowing at their undergraduate institution (*"2016 Olympic Team Bios*," 2017). Intercollegiate women's rowing teams are not just a source for participants for the National Team, but also a source that breeds winning potential. Following the Women's Varsity 8+ performance in the 2016 Rio Games, the boat had won its "third-consecutive U.S. Olympic championship and the 11-straight women's eight world title" ("*Women's Eight USOC Best of Olympics Team Award Finalists*," 2017). SB Nation called it "one of the greatest sports team dynasties in the history of the world" and explained "that level of team dominance is nearly unprecedented at the international level…In essence, the American women's 8+ is better at being a team than any women's 8+ in the world, and really, than just about any team, in any sport ever" (Bien, 2016). Although the NCAA governs and administers women's rowing, USRowing and the USOC should have a vested interest in its development and success, as the increased competitive success at the collegiate level directly impacts the sport's and team's national and international success.

Women's rowing is one of the most unique intercollegiate athletic sports in that a large portion of participants walked-on to their collegiate team. There is no other Division I Varsity sport that provides such a large number of participation opportunities to individuals who may not have prior experience with the sport. Three-time Olympian, Megan Kalmoe recounts her introduction to women's rowing on her blog saying, "After spending my freshman year being decidedly 'inactive' and 'unathletic' and partying myself and my waistline into oblivion, I was looking to make a change. The program at Washington has a strong tradition of developing walk-on talent, and so I thought maybe rowing could be the positive change I

needed in my life" (*"Bio,"* 2007). She, like so many other women, picked up the sport in college and eventually became not only an elite athlete, but an Olympic medalist (*"Bio,"* 2007).

COMPETITIVE SUCCESS

Success in intercollegiate athletics is achieved in a number of different areas—academics, athletics, leadership, etc. ("NCAA Core Values," 2017). For the purpose of this study, success will be defined in terms of athletics.

A substantial amount of research has been done in the area of defining athletic success, often times in exploring its effects on other areas. For example, when investigating athletic performance and its impact on private giving in Division I, Stinson and Howard (2008) described athletic success in football and men's basketball using "won-loss records, post-seasons appearances, end-of-season rankings, athletic tradition, and year-to-year winning." This study was constructed similarly to that of Rhoads and Gerking (2000), who also used "indicators of post-season play and measure of athletic tradition" in defining athletic success.

Grant and Zygmont (2013) investigated the factors that influence football coaching salaries and bonuses in the Division I football bowl subdivision. Their measures of coaching success related to recruiting ability, post-season appearances, lifetime winning percentage, bowl game appearances, BCS rank, and institutional characteristics like enrollment, tuition, and academic selectivity.

While there are similar measures that could be calculated in rowing, there are numerous components to the sport that make defining competitive success slightly more complex. Rowing is a team sport comprised of three boats (Varsity 8+, 2nd Varsity 8+, and Varsity 4+) competing against their opponent's counterparts—ex. Team A's V8+ typically races Team B's V8+ and Team A's 2V8+ typically races Team B's 2V8+ ("Rules of Rowing," 2017). In a simple, two-team race, there are three pairs of boat times to consider in developing a statistic like a winning percentage. This percentage would be even more complex in a 20+ team regatta, with each of the three boats racing in one of a number of Heats, and then again in one of a number of Semifinals, and again in one of a number of Finals. Even if those percentages were calculated for each boat and averaged for a program total, the number would likely be ineffective in identifying and differentiating between successful and unsuccessful teams.

Additionally, there are other uncontrollable variables—wind speed and direction, temperature of the water, current, differences in course patterns—which all impact a boat's time. This makes it difficult to even compare times between the same boats from one day to the next, let alone calculate and compare traditional indicators of athletic success across an entire season.

Thus, for the purpose of this research, athletic or competitive success was defined by a program's two year average cMax ranking from the 2015-16 and 2016-17 seasons. These rankings also determined a program's Competitive Success as detailed in Chapter I.

THE RESOURCE BASED VIEW

In 1991, Barney published his seminal study that built a foundation for the development of the resource based view (RBV) framework in the field of strategic management. "The RBV has since become one of the dominant contemporary approaches to the analysis of sustained competitive advantage" (Bridoux, 2004, p. 1). The central tenant of RBV is that firms compete on the basis of their resources and capabilities (Peteraf & Bergen, 2003) and that "sustainable competitive advantage of the organization comes from resources under its control and how those resources are used" (Won & Chelladurai, 2016, p. 2). As a result, organizations are encouraged "to obtain critical resources, utilize those resources productively, and develop proactive strategies based on the analysis of resources" (Won & Chelladurai, 2016, p. 2).

Based on this framework, an examination of the connection "between a firm's internal characteristics and performance" begins with two underlying assumptions: first, different resources may be available to different organizations within a single industry and second, those resources are imperfectly mobile (Barney, 1991; Won & Chelladurai, 2016). Furthermore, the heterogeneity and immobility of an organization's resources alone are not sufficient conditions for sustained competitive advantage (Bridoux, 2004). Barney (1991) proposes that firm resources must also be characterized as valuable, rare, imperfectly imitable, and hardly substitutable.

These qualities are indicators of how useful or influential certain resources may be in creating sustained competitive advantage for an organization in a given industry. Resources are valuable "when they enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness" (Barney, 1991, p. 3). However, a valuable resource possessed and utilized by many competitors in an

industry does not contribute to a firm's competitive advantage due to the lack of rarity of that resource. Furthermore, the extent to which a valuable and rare resource can be imitated or copied directly impacts a firm's potential for achieving a sustained competitive advantage. Finally, however valuable, rare, and imperfectly imitable a resource may be, if a competitor firm can generate a strategically equivalent resource by "implementing the same strategies, but in a different way, using different resources" then that resource becomes substitutable and therefore, unable to be a source of sustained competitive advantage (Barney, 1991, p. 13). While the four resource conditions are required to develop a sustained competitive advantage, the application of the model "only ensures that each firm optimizes the use of its own specialized resources" (Peteraf, 1993, p. 185-187).

Aside from characterizing resources, the RBV also provides a categorical framework for grouping types of resources—financial, physical, human, and organizational (Barney, 1995). Further research on the RBV over time has resulted in "general agreement as to the basic insights of the model, with small disagreements over minor points" (Peteraf, 1993, p. 180). More recent research has expanded the categories to include the role of intangible resources—factors like reputation, information, and knowledge—which had not previously fit into the framework (Bridoux, 2004, p. 3).

CRITIQUES OF THE RBV

The underlying assumptions and phrasing used in the RBV model became sources for critique and scholarly disagreements following Barney's 1991 study. Foss (2003) argued that the relation between Barney's two underlying assumptions—heterogeneity and immobility—and his four resource characteristics—valuable, rare, imperfectly imitable, and hardly substitutable—were not clear. There was confusion in selecting the proper unit of analysis which while "most contributions within the RBV take the individual resources as the relevant unit of analysis…," Foss (1998) pointed out that this choice may only be legitimated if the relevant resources are sufficiently well-defined and free-standing" (Bridoux, 2004, p. 4).

Priem and Butler (2001a, 2001b) critiqued the tautological nature of the model in reference to defining value and competitive advantage. They argued that "the underlying problem in the statement 'that valuable and rare organizational resources can be sources of competitive advantage' (Barney, 1991) is that competitive advantage is defined in terms of value and rarity, and the resource characteristics

argued to lead to competitive advantage are value and rarity" (p. 28). Peteraf and Barney (2003) eventually addressed this issue by proposing a narrower definition of competitive advantage which linked competitive advantage "to value creation" and provided "an economically meaningful definition of value and more precise definitions of critical resources and economic rent." On a similar point, Priem and Butler (2001a&b) also argued that "resource value is determined from a source exogenous to the RBV" (p. 30), to which Barney (2001) recognized as a necessary clarification to his initial theoretical framework.

For the purposes of this study, the critiques and concerns presented are largely tangential; the RBV provides a solid categorization model for the resources at play in an industry, like Division I women's rowing, as well as insights into why and/or how certain resources have contributed to a sustained competitive advantage for some programs and not others.

RBV APPLICATION TO ATHLETICS

As previously stated, the RBV provides a categorization model that lends itself to application in other industries; and substantial research has already been done with this framework in analyzing professional and intercollege athletics.

Smart and Wolfe (2000) utilized the RBV to identify the sources of competitive advantage that made the Penn State football team successful in the 1990s. Their findings indicated that in the sport of football, and in the Big Ten in particular, physical and human resources—like a stadium or coaches—could be characterized as valuable, but not rare, and thus, could not be the sources of the program's sustained competitive advantage. However, their organizational resources, like the coaching staff stability within the program and "the individuality of each coach's skill and experience, can be viewed as the basis of an enduring competitive advantage" (p. 143).

A deeper investigation by Smart and Wolfe (2003) explored human resources—management (leadership) and players—to analyze which sub source had the greatest effect on team performance in Major League Baseball. In considering various managerial statistics in relation to team winning percentage, they found that player resources accounted for 67% of the variance in performance while leadership contributed slightly more than 1% (p. 178).

Cunningham (2003) studied the "relationships between the expenditures on human resources and competitive advantage as reflected in the athletic performance of intercollegiate athletic departments"

(p. 39). Using the Sears' Directors Cup as the measurement of performance, he found that "expenditures used to recruit student-athletes served as the most potent predictor" of athletic department success (p. 56).

Won and Chelladurai (2016) explored the role of intangible resources in generating more tangible resources and that impact on competitive advantage for intercollegiate athletic departments. Their findings indicated that "intangible resources consisting of academic and athletic reputation explained more than 83% of the generation of tangible resources in the collegiate sports context" (p. 10).

The breadth of the research applying RBV to athletics, specifically intercollegiate athletics, provides a strong rationale for this study's categorization of resources within the Division I women's rowing industry.

CHAPTER III: METHODOLOGY

SUBJECTS

The target population for this study was the 88 NCAA Division I Women's Rowing program head coaches in the summer of 2017. An email list of the entire population of head coaches was developed from institutional athletic websites and the most recently updated roster provided by the CRCA. The online questionnaire was emailed to head coaching staff members and closed five weeks later. Of the 88 questionnaires that were distributed, 35 subjects completed the questionnaire, for a response rate of 40%.

INSTRUMENTATION

Due to the rowing-specific and investigative nature of this study, it was necessary to develop a new instrument specific to the research purpose and questions posed. The Rowing Resource Survey Instrument (RRSI) (Appendix 6) was created based on an in-depth review of literature relating to the Resource Based View framework, (Barney, 1991; Won and Chelladurai, 2016), competitive success in rowing ("cMax Rankings: Women's Varsity Eight," 2013-16) and informal review by a panel of collegiate rowing experts.

In an effort to provide evidence of instrument face validity, a three-person panel of experts—including current and former Division I women's rowers, assistant coaches, and administrators from various institutions—reviewed the independent variables of interest and grouped each into one of the four resource categories: Financial, Human, Organizational, and Physical. Due to the quantitative nature of some of the independent variables, triangulation of data sources and/or secondary data sources were used whenever possible to confirm various answers provided by the respondents or replace the need to include the question in the questionnaire.

In an effort to develop face-validity, the same three-person panel of experts reviewed the questionnaire prior to its distribution to confirm that the questions were clear and easily understood. In

many cases, the questionnaire asked for specific, factual data which also increases this study's construct validity.

Participants were given the option to skip any question in the questionnaire, which included 35 items. Each subject received a link to the questionnaire via email and completed the questionnaire online using Qualtrics. Each question on the questionnaire relates to one of the two research questions. The questionnaire featured sliding bars, Likert scales, and open-ended questions.

DATA ANALYSIS

The data analysis conducted in this study included descriptive statistics, correlations, regressions, and ANOVAs. The questionnaire's instructions are shown in Appendix 6. After entering the quantitative data collected from the completed questionnaires into Statistical Package for the Social Sciences (SPSS 24) software, various statistical tests were run to analyze the results. Responses to the open-ended, qualitative questions were analyzed and coded.

The dependent variable in question was the level of competitive success in women's rowing programs. In order to utilize the aforementioned statistical techniques in understanding the impact of selected independent variables on competitive success, this study required a full ranking of women's rowing programs. Categorically, rowing is a team sport with contributions from all three competing boats; however, there is no verified or accepted ranking system in the sport listing all programs 1 to 88. The closest ranking system that exists are the cMax Rankings. Developed in 2002 by Dr. Chris Maxwell, a professor of Sport Economics and Game Theory at Boston College, the cMax rankings provide a statistically standardized comparison of all women's Varsity 8+ boats at different points throughout the season ("cMax rankings: Women's Varsity Eight," 2013-2016).

Despite the fact that the cMax Rankings are based on only the results of an institution's Varsity 8+ boat, the final cMax Rankings are very highly correlated with the final CRCA/USRowing Coaches' Poll rankings, which account for entire team speed, see Table 1. The r-squared values show that at least 75% of the variance in the cMax rankings could be explained by the CRCA/USRowing Coaches' Poll in each of the last five years; therefore, this study will operationalize the level of competitive success using the two-year average final cMax Rankings for the 2016 and 2017 seasons.

Table 1

Historical cMax Ranking and Coaches' Poll Ranking Correlations

Year	r^2
2013	0.78
2014	0.75
2015	0.79
2016	0.85
2017	0.77

Thirty-nine total independent variables were included in this study and each fell into one of twelve variable groups as shown below and in Appendix 1:

Financial resources: total budget, financial aid, salaries;

Human resources: admission slots, coaches, student-athletes;

Organizational/Intangible Resources: program reputation, institutional reputation; and

Physical resources: water equipment, land equipment, boat storage facility, indoor facility.

RQ 1) what are the relationships between competitive success and each of the following resource categories: financial, human, organizational and physical? sought to distinguish which of those resource categories and independent variables were the most influential factors on competitive success. Descriptive statistics were used to characterize each variable and correlation and regression techniques were used identify the relationships between those variables and competitive success, as well as the relationships based on the three metrics of comparison as detailed in Chapter I: Institutional Type, Enrollment Size, and Competitive Success.

RQ 2) based on institutional and program characteristics, what resources should be emphasized for programs looking to improve their likelihood of competitive success? was intended to help programs understand which of the resources would be most impactful considering their institutional and program specific characteristics. One-way between-subjects ANOVAs were run on each of the same three metrics of comparison: Institutional Type, Enrollment Size, and Competitive Success.

CHAPTER IV: RESULTS

The purpose of this study was to identify and analyze the resources that are associated with competitive success in NCAA Division I women's rowing for the academic years of 2015-16 and 2016-17 (referred to as “2015” and “2016” respectively throughout the study). The following chapter provides the results for each of the aforementioned research questions. Respondents self-reported data through an online Qualtrics questionnaire which was distributed via email (Appendix 6). Additional data was collected from secondary data sources (i.e. institutional websites, Learfield Director’s Cup Rankings, NCAA reports, etc.).

In considering the following analyses related to cMax ranking, it is important to note that smaller two-year average cMax rankings are associated with more successful programs and larger two-year average cMax rankings are associated with less successful programs.

DEMOGRAPHICS

Of the questionnaires distributed to the target population (N = 88), a total of 35 responses were collected for a response rate of 40%. The sample was very similar to the population in a number of ways. First, the competitive success categorical breakdown for the population was nearly identical to that of the sample, as shown in Table 2. Furthermore, the balance in the percent sample-to-population participation across the three Competitive Success categories showed that no category of program had considerably more representation in the study than any other. Second, all 10 Division I conferences that sponsor women’s rowing were represented in this sample—with an impressive 100% participation from one conference. Third, the sample was relatively similar to the population in terms of institutional Enrollment Size, as is shown in Table 3.

Table 2

Competitive Success Comparison of Population and Sample

Categories	Population (*N*)	Population Breakdown	Sample (*n*)	Sample Breakdown	Sample-to-Population Participation
Gold	14	15.91%	6	17.14%	42.86%
Silver	19	21.59%	8	22.86%	42.11%
Bronze	55	62.50%	21	60.00%	38.18%
Total	88	100.00%	35	100.00%	39.77%

Table 3

Enrollment Size Comparison of Population and Sample

Categories	Population (*N*)	Population Breakdown	Sample (*n*)	Sample Breakdown	Sample-to-Population Participation
Small (≤ 5,000)	20	22.73%	6	17.14%	30.00%
Medium (5,001-15,000)	30	34.09%	11	31.43%	36.67%
Large (15,001-30,000)	24	27.27%	9	25.71%	37.50%
Extra-Large (≥ 30,001)	14	15.91%	9	25.71%	64.29%
Total	88	100.00%	35	100.00%	39.77%

The only demographic category, which was not truly representative of the population, was the breakdown of the Institution Type (public or private). The sample was 57% public and 43% private, although the population is nearly the opposite distribution—approximately 40% public and 60% private institutions. This lone category should not impact the validity of the sample; that 15 private institutions volunteered proprietary information enhances the validity. The excellent response rate and number of similarities between the population and sample yield a high level of confidence that this is a representative sample.

RESEARCH QUESTION 1

What are the relationships between competitive success and each of the following resources and categories?

In order to answer the first research question in regards to each resource categories, a number of statistical test were utilized. Correlations were run between each set of categorical variables, as well as with cMax rankings. Then simple regressions were run between the variables and cMax rankings with the entire sample. Finally, the relationships between the variables and cMax rankings were compared using simple regressions based on three sample subgroups—Institution Type, Enrollment Size, and Competitive Success. For a snapshot of the variables and categories in which significant relationships were found, please refer to Appendix 2.

FINANCIAL RESOURCES

A total of five variables were identified as representative of the Financial Resources category, as listed below in Table 4. Each variable is discussed in greater depth following the table.

Table 4

Financial Resource Variables Descriptive Statistics

Variables	*n*	Mean	Standard Deviation	Range (minimum)	Range (maximum)
Total Budget *	32	$309,928.75	$253,594.90	$3,876.00	$1,029,987.00
Number of Student-Athletes on Athletic Aid *	30	26.15	15.27	0	60
Number of Student-Athletes on Full Athletic Scholarship *	18	4.59	3.93	0	12
Head Coach Base Salary *	29	$84,259.45	$43,952.24	$14,729.00	$242,894.00
Assistant Coach Base Salary Pool *	29	$90,436.83	$52,899.91	$3,876.00	$194,394.00

* Significant at $p \leq .05$

The Total Budget was developed by summing an institution's reported operating and recruiting budgets responses from the questionnaire. This was done for a few reasons; first, some respondents chose to provide both amounts, one of the two, or neither which made comparing the individual numbers difficult and rather ineffective. Second, some athletic departments and/or programs may budget one total amount to be used at the discussion of the coach; therefore, some respondents might not be able to provide separate numbers at the outset. Those considerations aside, a significant relationship was found between the Total Budget and cMax rankings for the entire sample ($r(30) = 0.55$, $p = 0.001$). Total Budget explained approximately one third of the variance in the cMax rankings, $r^2 = 0.30$.

Additionally, relationships between the Total Budget and cMax rankings were analyzed based the three sample subgroups—Institution Type, Enrollment Size, and Competitive Success. In terms of Institution Type, a significant relationship was found between Total Budget and cMax ranking for private institutions ($r(15) = 0.50$, $p = 0.043$, $r^2 = 0.25$), but not at the 0.05 level for public institutions ($p = 0.09$). No significant relationships were found between any of the four Enrollment Sizes and cMax rankings. When the sample was split based on Competitive Success, there were no significant relationships between Total Budget and cMax rankings.

There was a significant relationship between the Number of Student-Athletes on Athletic Aid and cMax rankings for the entire sample ($r(28) = 0.55$, $p = 0.002$). There was a moderate amount of variance in cMax rankings that was explained by the Number of Student-Athletes on Athletic Aid, $r^2 = 0.30$.

The relationships between Number of Student-Athletes on Athletic Aid and cMax rankings were analyzed based on the same three sample subgroups. Based on Institution Type, there was no significant relationship found for public institutions between the two variables ($p = 0.31$) and a nearly significant relationship was found for private institutions ($p = 0.056$). When compared based on Enrollment Size, programs from small institutions were found to have a significant relationship between the two variables ($r(9) = 0.67$, $p = 0.02$). The number of student-athletes on Athletic Aid explained nearly half of the variance in cMax rankings, $r^2 = 0.45$. The final comparison was made based on Competitive Success; only the bronze category indicated a significant relationship between the variables ($r(16) = 0.67$, $p = 0.003$, $r^2 = 0.44$).

A significant relationship was identified between the Number of Student-Athletes on Full Athletic Scholarships and the cMax rankings for the entire sample ($r(16) = 0.82$, $p = 0.000$). Furthermore, over two-thirds of the variance in cMax rankings was explained by the Number of Student-Athletes on Full Scholarships, $r^2 = 0.67$. It is important to mention that the NCAA maximum number of full scholarships allotted to the sport of women's rowing is 20, but the maximum reported in the survey was 12 and only 18 of 35 respondents chose to provide this information.

The relationships between Number of Student-Athletes on Full Scholarship and cMax rankings were analyzed based on the same sample subgroups. It is worth noting that due to the low number of responses to this variable in particular, the subgroups of these comparisons were also rather small.

When comparing the variables based on Institution Type, significant relationships were found for both public institutions (p = 0.02) and private institutions (p = 0.000). Almost half of the variance in cMax ranking was explained by the Number of Student-Athletes on Full Scholarship variable for public institutions, r^2 = 0.46; but it explained 96% of the variance in cMax ranking for private institutions. In terms of Enrollment Size, only the small institutions were found to have a significant relationship between the variables, with over 60% of the variance in cMax rankings explained by the variance in enrollment size (r(5) = 0.79, p = 0.04, r^2 = 0.62). In terms of the comparison based on Competitive Success, the bronze category was the only group in which a significant relationship was found between the two variables (r(7) = 0.73, p = 0.04, r^2 = 0.48).

The Head Coach Base Salary was highly related to the cMax rankings for the entire sample (r(27) = 0.80, p = 0.000). Additionally, this variable explained a nearly two-thirds of the variance in the cMax rankings, r^2 = 0.64.

The relationships between Head Coach Base Salary and cMax rankings were analyzed based on the sample subgroups. Based on the Institution Type, public institutions showed a significant relationship between the variables (r(11) = 0.70), p = 0.008, r^2 = 0.49), as well as private institutions with nearly 80% of the variance in cMax rankings explained by the Head Coach Base Salary (r(14) = 0.89, p = 0.000, r^2 = 0.79). In the comparison of Enrollment Size, all four enrollment sizes were found to have significant relationships between the variables. The amount of variance in cMax rankings explained by the Head Coach Base Salary was over 70% for small institutions (r(6) = 0.85, p = 0.008, r^2 = 0.72) and 86% for medium institutions (r(4) = 0.93), p = 0.008, r^2 = 0.86). It explained nearly 70% for large institutions (r(6) = 0.83, p = 0.01, r^2 = 0.69) and 84% for extra-large institutions (r(5) = 0.92, p = 0.004, r^2 = 0.84). When the sample was split by Competitive Success, the bronze category was the only group in which a significant relationship was found (r(16) = 0.80, p = 0.000, r^2 = 0.63); nearly two-thirds of the variance in cMax rankings could be explained by the Head Coach Base Salary.

The Assistant Coach Base Salary Pool summed all reported assistant coach base salary amounts and the number of salaries listed provided an initial overview of staffing sizes. Respondents may have listed salaries for all of their assistant coaches, just one or two, or none at all, making a total Assistant Coach Base Salary Pool the best method of comparison considering voluntary nature of the

survey. There was a strong relationship between the Assistant Coach Base Salary Pool and cMax rankings for the entire sample ($r(26) = 0.84$, $p = 0.00$) with 72% of the variance in cMax rankings explained by the Assistant Coach Base Salary Pool, $r^2 = 0.72$.

The relationships between Assistant Coach Base Salary Pool and cMax rankings were analyzed based on the sample subgroups. In regards to the Type of Institution, the private institutions showed a strong relationship with nearly 70% of the variance in cMax rankings explained by the Assistant Coach Base Salary Pool ($r(14) = 0.83$, $p = 0.000$, $r^2 = 0.69$). While also significant, just under half of the variance could be explained for public institutions ($r(11) = 0.68$, $p = 0.01$, $r^2 = 0.47$). Based on Enrollment Size, three of the four groups were found to have significant relationships between the two variables. Over three-quarters of the variance in cMax rankings explained by the Assistant Coach Base Salary Pool for small institutions ($p = 0.002$, $r^2 = 0.77$) and large institutions ($p = 0.003$, $r^2 = 0.79$). Over 90% of the variance in cMax rankings explained by the Assistant Coach Base Salary Pool for medium institutions ($p = 0.003$, $r^2 = 0.91$). Based on Competitive Success, the bronze category was the only group in which a significant relationship was found between the two variables ($r(15) = 0.69$, $p = 0.002$); and nearly half of the variance in cMax ranking could be explained by the Assistant Coach Base Salary Pool, $r^2 = 0.47$.

HUMAN RESOURCES

A total of twelve variables were identified as representative of the Human Resources category, as listed below in Table 5. Each variable is discussed in greater depth following the table.

Table 5

Human Resource Variables Descriptive Statistics

Variables	*n*	Mean	Standard Deviation	Range (minimum)	Range (maximum)
Average Number Admissions Slots in the last 2 years *	15	8.13	6.75	0	20
Number of Program Head Coaches in the last 5 years	32	1.44	0.56	1	3
Combined Total Years of National Team Experience on Coaching Staff	18	9.56	10.76	0	40
Number of Coaches with or Working towards a Master's Degree or Higher	31	1.90	1.04	0	4
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	32	24.52	21.97	1	100
Number of Inexperienced Walk-Ons or Inexperienced Recruits Who Transitioned to the Varsity Team the Following Year ^	32	2.78	1.10	1	5
Average number of Experienced Recruits Who Signed on to the Team in the last 2 years *	30	6.85	4.54	0	16
Total number of International Experienced Walk-Ons or International Experienced Recruits in the last 2 years *	24	3.46	3.44	0	12
Average number of Experienced Recruits who Competed Most Often in the Varsity 8+ in the last 2 years *	30	4.83	2.80	0	9
Average Program Roster Size in the last 2 years *	32	55.97	26.89	13	150
Total number of Student-Athletes on Team Receiving any kind of Academic or Athletic Award in the last 2 years	31	41.1	25.74	2	111
Average Team GPA in the last 2 years	32	3.33	0.13	3.02	3.51

* Significant at $p \leq .05$; ^ Responses were codified (1 to 5).

Although fewer than half of the respondents provided an answer regarding Admission Slots, there was still a strong relationship between the variable and cMax rankings for the entire sample ($r(13) = 0.71$, $p = 0.003$). Additionally, approximately half of the variance in cMax ranking was explained by the number of Admission Slots, $r^2 = 0.51$.

Additionally, relationships between Admission Slots and cMax rankings were analyzed based the sample subgroups. When the sample was analyzed based on the Type of Institution, the variables were significant within the private institutions group ($r(6) = 0.89$, $p = 0.003$) with nearly 80% of the variance in cMax ranking explained by the number of Admission Slots, $r^2 = 0.79$. In terms of Enrollment Size, although no subgroup showed a significant relationship between the two variables, at least three-quarters of the variance in cMax ranking could be explained by the number of Admission Slots for medium

institutions (r^2 = 0.90) and large institutions (r^2 = 0.77). Based on Competitive Success, the two variables were significantly related within the bronze group (r(6) = 0.86, p = 0.007, r^2 = 0.73).

This study did not find any significant relationships for the primary coaching-related variables for the entire sample: the Number of Head Coaches (r(30) = 0.19, p = 0.30), the coaching staff's combined Years of Experience on or with the National Team (r(16) = -0.41, p = 0.90), and the Number of Coaches with or Working towards a Master's Degree or Higher (r(29) = -0.23, p = 0.21).

Analyses based on the three sample subgroups found no significant relationships between the Number of Head Coaches or Number of Coaches with or Working towards a Master's Degree or Higher and cMax rankings. When examining the Years of Experience on or with the National Team and cMax rankings, the only significant relationship was indicated in the Competitive Success comparison for the bronze group (r(8) = 0.78, p = 0.007, r^2 = 0.61).

Two variables focused on the impact of inexperienced walk-ons and inexperienced recruits on the competitive success of a program. No significant relationship was found between the average Number of Inexperienced Walk-ons or Inexperienced Recruits and cMax rankings for the entire sample (r(30) = 0.22, p = 0.221). Similarly, there was no relationship between the number of Inexperienced Walk-ons or Inexperienced Recruits that Transitioned to the Varsity program the following year and cMax rankings for the entire sample (r(30) = 0.17, p = 0.344).

Based on the sample subgroups, no significant relationships were found between the average Number of Inexperienced Walk-ons or Inexperienced Recruits and cMax rankings. When analyzing the Number of Inexperienced Walk-ons or Recruits that Transitioned to the Varsity program the following year, a significant relationship was indicated in the Competitive Success comparison for the gold group (r(4) = 0.82, p = 0.045, r^2 = 0.68).

Approximately one-third of the variance in cMax rankings was explained by each of the following variables relating to experience-level of a student-athlete. Significant relationships were found for the entire sample between cMax rankings and the average Number of Experienced Recruits Signed to a team (r(28) = 0.58, p = 0.001, r^2 = .33), the average Number of Experienced International Recruits who Signed to a team (r(22) = 0.61, p = 0.002, r^2 = 0.37), and the average Number of Experienced Recruits who Rowed most often in the Varsity 8+ boat (r(28) = 0.58, p = 0.001, r^2 = 0.34).

The relationships relating to experience-level of a student-athlete and cMax rankings were analyzed based on the sample subgroups. In terms of Institution Type, there were significant relationships indicated between the Number of Experienced Recruits Signed and cMax rankings within both the public and private institutions. Over 30% of the variance in cMax ranking was explained by the Number of Experienced Recruits Signed for the private institutions ($r(13) = 0.60$, $p = 0.03$, $r^2 = 0.31$) and over 36% for the public institutions ($r(13) = 0.60$, $p = 0.017$, $r^2 = 0.37$). No significant findings were indicated when the variables were compared based on Enrollment Size. Based on the Competitive Success comparisons, over half the variance in cMax ranking was explained by the Number of Experienced Recruits Signed in the bronze group ($r(15) = 0.72$, $p = 0.001$, $r^2 = 0.52$).

When comparing the Number of Experienced International Recruits who Signed with cMax rankings based on the Institution Type, a significant relationship was indicated in the public institution group ($r(11) = 0.85$, $p = 0.000$, $r^2 = 0.72$). In terms of the Enrollment Size, a significant relationship was found for small institutions ($r(6) = 0.74$, $p = 0.04$, $r^2 = 0.54$). No relationships were found within the Competitive Success groups between the two variables.

Based on Institution Type, the Number of Experienced Recruits who Competed Most Often in the Varsity 8+ was highly related to cMax rankings in the public institution group ($r(13) = 0.77$, $p = 0.001$, $r^2 = 0.59$). When the sample was compared by Enrollment Size, only the large group indicated a significant relationship between the two variables. The Number of Experienced Recruits who Competed Most Often in the Varsity 8+ explained 70% of the variance in the cMax Rankings ($r(6) = 0.84$, $p = 0.009$, $r^2 = 0.70$). In terms of the Competitive Success, significant relationships were indicated within the gold and bronze groups. Nearly 75% of the variance in cMax ranking was explained by the variable in the gold group ($r(4) = 0.86$, $p = 0.027$, $r^2 = 0.74$) and almost 50% in the bronze group ($r(15) = 0.70$, $p = 0.002$, $r^2 = 0.49$).

Program Roster Size was not significantly related to the cMax rankings for the entire sample. When the sample was compared based on the three sample subgroups, neither the Institution Type nor the Competitive Success groups indicated significant relationships between the two variables; however, within the Enrollment Size group, a significant relationship was found for medium institutions ($r(5) = 0.87$, $p = 0.010$, $r^2 = 0.76$).

There was no relationship between the Total Number of Student-Athletes Receiving Athletic or Academic Awards and cMax rankings for the entire sample (r(29) = 0.07, p = 0.71).

The relationships relating to Total Number of Student-Athletes Receiving Athletic or Academic Awards and cMax rankings were analyzed based on the three sample subgroups. No significant relationships were found between the two variables when compared by Institution Type or Competitive Success. Based on Enrollment Size, however, a significant relationship was found for institutions in the extra-large group (r(4) = 0.83, p = 0.04); nearly 70% of the variance in cMax rankings was explained by the Total Number of Student-Athletes Receiving Athletic or Academic Awards, r^2 = 0.68.

There were no relationships found between the average Team GPA and cMax rankings for the entire sample (r(32) = 0.21, p = 0.24), nor between any of the sample subgroups.

ORGANIZATIONAL RESOURCES

A total of four variables were identified as representative of the Organizational Resources category, as listed below in Table 6. Each variable is discussed in greater depth following the table.

Table 6
Organizational Resource Variables Descriptive Statistics

Variables	*n*	Mean	Standard Deviation	Range (minimum)	Range (maximum)
Year Program Established	35	1990	27.58	1950	2014
Year Institution Established	35	1863	48.04	1701	1963
Average Director's Cup Ranking *	33	100.80	83.14	2	294
US News & World Report Ranking 2016-17 *	24	79.38	61.63	3	188

* Significant at $p \leq .05$

There was no significant relationship between the Year a Program was Established and cMax rankings for the entire sample (r(33) = 0.12, p = 0.485). There was also no significant relationship between the Year an Institution was Established and cMax rankings (r(33) = 0.26, p = 0.135).

Relationships between the Year a Program was Established and cMax rankings were analyzed based the three sample subgroups and when the sample was analyzed based on the Institution Type, a significant relationship was found between the two variables for private institutions (r(16) = 0.48, p = 0.045, r^2 = 0.23). In terms of Enrollment Size, there was a significant relationship between the two

variables for medium institutions (r(6) = 0.83, p = 0.011, r^2 = 0.69). There were no significant relationships within the comparison of Competitive Success.

The relationships between the Year an Institution was Established and cMax rankings were analyzed based on the sample subgroups. When compared based on Institution Type, the sample showed a significant relationship for private institutions (r(17) = 0.49, p = 0.033). Nearly 25% of the variance in cMax rankings was explained by the Year an Institution was Established, r^2 = 0.24. No significant relationships were found between the two variables for the Enrollment Size or Competitive Success comparisons.

Director's Cup Ranking provides a quantitative rank to the competitive success of an institution's athletic department; this study compared an institution's Director's Cup Ranking and their cMax ranking. A significant relationship was found between these two variables for the entire sample (r(31) = 0.79, p = 0.000); and the Director's Cup Rankings explained a significant amount of variance in cMax ranking, r^2 = 0.62.

The relationships between Director's Cup Ranking and cMax rankings were analyzed based on the sample subgroups. Based on the Institution Type, the variables were very strongly related in the private institution group, with three-quarters of the variance in cMax ranking explained by Director's Cup Ranking (r(16) = 0.87, p = 0.000, r^2 = 0.75). There was also a significant relationship between the variables when the sample was compared by Enrollment Size. The small institutions indicated a significant relationship between the variables, with 67% of the variance in cMax ranking explained by the Director's Cup Ranking (r(9) = 0.82, p = 0.002, r^2 = 0.67). When compared by Competitive Success, the bronze group also indicated a significant relationship between the variables (r(17) = 0.65, p = 0.002, r^2 = 0.43).

The US News & World Report (USNWR) Rankings from 2015-16 was used as a measure of institutional academic success; regional rankings were not included, only institutions ranking on the National Universities list. There was a significant relationship between the USNWR Ranking and an institution's cMax rankings for the entire sample (r(22) = 0.39, p = 0.001) and the USNWR Ranking explained nearly 40% of the variance in cMax ranking, r^2 = 0.39.

The relationship between USNWR Ranking and cMax rankings were analyzed based on the sample subgroups. Strong relationships were found between the two variables for both the public and private institutions when the sample was compared by Type of Institution. Over one-third of the variance in cMax ranking was explained by the USNWR Ranking for the public institutions ($r(13) = 0.59$, $p = 0.021$, $r^2 = 0.35$) and 75% of the variance was explained for the private institutions ($r(7) = 0.87$, $p = 0.003$, $r^2 = 0.75$). No significant relationships were indicated based on Enrollment Size or Competitive Success comparisons.

PHYSICAL RESOURCES

A total of eighteen variables were identified as representative of the Physical Resources category, as listed below in Tables 7-10. Each variable is discussed in greater depth following the tables.

Table 7
Physical Resource Variables Descriptive Statistics

Variables	*n*	Mean	Standard Deviation	Range (minimum)	Range (maximum)
Total Number of Competitions in the last 2 years	32	9.56	3.30	2	18
Number of Miles from Campus to Boat Storage Facility	30	7.43	4.52	1	15
Number of Functional Ergs *	32	42.31	17.40	8	80

* Significant at $p \leq .05$

The total Number of Competitions in the last two years had no statistically significant relationship to cMax rankings for the entire sample ($r(30) = 0.08$, $p = 0.660$). Additionally, when the two variables were compared based on Institution Type, Enrollment Size, and Competitive Success, no significant relationships were indicated in any group.

There was no relationship between the Miles from Campus to the boat storage facility and cMax rankings ($r(28) = 0.08$, $p = 0.70$). Further, no significant relationship was indicated between the two variables within any of the sample subgroups.

A significant relationship was found between the Number of Functional Ergometers and cMax rankings for the entire sample ($r(30) = 0.61$, $p = 0.000$). The Number of Functional Ergometers explained approximately 37% of the variance in cMax rankings, $r^2 = 0.37$.

The relationships between Number of Functional Ergometers and cMax rankings were analyzed based on the sample subgroups. In terms of Institution Type, both the public and private institutions had significant relationships. Roughly one-third of the variance in cMax ranking was explained by the Number of Functional Ergometers for both public institutions ($r(13) = 0.61$, $p = 0.015$, $r^2 = 0.38$) and private institutions ($r(15) = 0.60$, $p = 0.011$, $r^2 = 0.36$). Based on Enrollment Size, two of the four categories indicated significant relationships—small and large. The small group had over half of the variance in cMax ranking explained by the Number of Functional Ergometers ($r(8) = 0.76$, $p = 0.01$, $r^2 = 0.58$); however, the large group had 80% of the variance explained ($r(6) = 0.89$, $p = 0.003$, $r^2 = 0.80$). Based on Competitive Success, only the bronze group indicated a significant relationship between the two variables ($r(16) = 0.70$, $p = 0.001$, $r^2 = 0.49$).

Table 8

Physical Resource Variables Descriptive Statistics: Other

Variables	*n*	Yes	No
Is the entire team able to practice together on the water? *	32	84.40%	15.60%
Does the women's rowing program have a dedicated indoor facility? *	32	78.10%	21.90%
Does the program have a tank or access to a tank? *	32	34.40%	65.60%

* Significant at $p \leq .05$

The ability for an Entire Team to Practice Together on the Water was significantly related to cMax rankings for the entire sample ($r(30) = 0.36$, $p = 0.045$); however, not very much of the variance in cMax ranking could be explained by this variable, $r^2 = 0.13$. The relationship between the two variables was analyzed based on sample subgroups, but no significant relationships were found.

A significant relationship was found between programs with a Dedicated Indoor Facility and cMax rankings for the entire sample ($r(30) = 0.46$, $p = 0.008$), but only 21% of the variance in cMax ranking could be explained by having that facility.

The relationship between the programs with a Dedicated Indoor Facility and cMax rankings were compared based on the three sample subgroups. In terms of Institution Type, a statistically significant relationship was found between the variables for private institutions ($r(13) = 0.54$, $p = 0.025$, $r^2 = 0.29$). Based on the Enrollment Size, the only group with a significant relationship was the small institution group

(r(10) = 0.65, p = 0.021, r^2 = 0.43). Additionally, the comparison of Competitive Success indicated a significant relationship between the variables within the bronze group (r(49, p = 0.037), but less than one-quarter of the variance in cMax ranking was explained by whether or not a program had a Dedicated Indoor Facility, r^2 = 0.24.

Although a majority of the respondents said their program did not have Access to a Tank, this variable was found to be significantly related to cMax rankings, despite the fact that this did not explain much of the variance in the rankings for the entire sample (r(30) = 0.37, p = 0.036, r^2 = 0.14). Additionally, when the sample was compared based on the sample subgroups, there were no statistically significant relationships indicated between the two variables within any group.

Table 9

Physical Resource Variables Descriptive Statistics: Boat Storage Facility ^

Variables	*n*	Not at all (1)	Slightly (2)	Somewhat (3)	Mostly (4)	Completely (5)
Body of Water	32	6.50%	3.20%	19.35%	41.94%	32.26%
Size	32	6.30%	12.50%	28.70%	21.90%	31.30%
Quality/Condition *	32	3.10%	18.80%	21.90%	31.30%	25.00%
Equipment Storage *	32	9.40%	15.60%	21.90%	28.10%	25.00%
Proximity to Water	32	0.00%	3.10%	3.10%	15.60%	78.10%
Dock Access	32	0.00%	0.00%	9.40%	15.60%	75.00%
Ability to Host Competitions	32	28.10%	9.40%	25.00%	12.50%	25.00%

* Significant at $p \leq .05$; ^ Responses were codified (1 to 5).

Due to the outdoor nature of the sport, all rowing programs require space for the storage of boats and equipment. This often is seen in the form of a boat storage facility, like a boathouse. There are many facets to a boat storage facility and the body of water on which a team rows, but this study focused on a few key variables above.

No significant relationships were found in the entire sample between the cMax rankings and any of the Boat Storage Facility variables.

Based on the three sample subgroups, no significant relationships were found between cMax rankings and the Size of the Facility, Quality/Condition of the Facility, Equipment Storage, Proximity to Water, and Dock Access. A significant relationship was indicated in the Institution Type category for public institutions in regards to the sufficiency of the Body of Water; this variable explained approximately 31% of the variance in the public institutions' cMax rankings ($r(12) = 0.553$, $p = 0.040$, $r^2 = 0.31$). Additionally, a significant relationship was found between the cMax rankings and the Ability to Host Home Competitions within the Competitive Success subgroup. Nearly 60% of the variance between the variables was explained within the silver group ($r(5) = 0.76$, $p = 0.046$, $r^2 = 0.58$).

Table 10

Physical Resource Variables Descriptive Statistics: Indoor Facility ^

Variables	*n*	Not at all (1)	Slightly (2)	Somewhat (3)	Mostly (4)	Completely (5)
Location on Campus	29	10.30%	0.00%	3.40%	24.10%	62.10%
Size	29	6.90%	3.40%	44.80%	20.70%	24.10%
Storage	29	6.90%	24.10%	24.10%	20.70%	24.10%
Ventilation	29	6.90%	24.10%	24.10%	20.70%	24.10%
Scheduling Availability	29	0.00%	13.80%	6.90%	10.30%	69.00%

* Significant at $p \leq .05$; ^ Results were codified (1 to 5).

As shown in Table 8, a majority of programs have a Dedicated Indoor Facility. There was a significant relationship between the Location of the indoor facility on campus and cMax rankings for the entire sample ($r(27) = 0.39$, $p = 0.038$, $r^2 = 0.15$). There were no significant relationships between the other four variables and the cMax rankings for the entire sample.

When the three sample subgroups were compared based on each of the indoor facility variables and cMax ranking, the Location and the Ventilation were the only two variables with significant relationships. Based on Institution Type, over one-quarter of the variance in cMax ranking was explained by the Location of the indoor facility ($r(16) = 0.52$, $p = 0.028$, $r^2 = 0.27$). Another relationship was indicated with the Location variable in the extra-large institution group when the comparison split the sample by Enrollment Size ($r(4) = 0.87$, $p = 0.025$, $r^2 = 0.75$). In terms of Competitive Success, the bronze group also saw a significant relationship between Location and cMax ranking ($r15) = 0.49$, $p =$

0.047, r^2 = 0.24). The Ventilation variable was only significantly related the cMax ranking when the sample was compared by Enrollment Size (r(5) = 0.83, p = 0.022, r^2 = 0.68).

FUNDAMENAL RESOURCE NEEDS

A subjective question was posed to the respondents regarding the athletic department support they feel is provided to their program's fundamental needs in the three "controllable" resource groups. In this question coaches indicated their sentiments using a five-point scale (Not at all – 1, Slightly – 2, Somewhat – 3, Mostly – 4, Completely – 5). Each variable is discussed in greater depth following Table 11.

Table 11

Program Perceptions of Athletic Department's Support of Fundamental Resource Needs ^

Variables	*n*	Mean	Standard Deviation	Range (minimum)	Range (maximum)
Financial Resource Needs *	31	3.26	1.26	1	5
Human Resource Needs *	31	3.19	1.22	1	5
Physical Resource Needs *	31	3.19	1.17	1	5

* Significant at $p \leq .05$; ^ Responses were codified (1 to 5).

Strong relationships were indicated between cMax rankings and Athletic Department Support of Program's Fundamental Needs in each of the three resources groups based on simple regression analyses: Financial (r(29) = 0.72, p = 0.000, r^2 = 0.52), Human (r(29) = 0.70, p = 0.000, r^2 = 0.48), and Physical (r(29) = -0.65, p = 0.000, r^2 = 0.42).

The relationships between Athletic Department Support of Fundamental Financial Resource Needs and cMax rankings were analyzed based on the sample subgroups. Based on the Institution Type grouping, the private institutions had a strong relationship between the two variables (r(16) = 0.54, p = 0.001) with half of the variance in cMax ranking explained by the feeling of support for fundamental financial resource needs. When analyzing the two variables based on Enrollment Size, significant relationships were found for the small institutions (r(7) = 0.74, p = 0.02, r^2 = 0.55) and Large institutions (r(7) = 0.84, p = 0.005). The most variance in cMax ranking could be explained by the feelings of support for fundamental Financial Resource Needs at large institutions, r^2 = 0.70. Relationships were indicated in all three of the Competitive Success categories, with significant relationships emerging for the gold

programs (p = 0.04) and bronze programs (p = 0.02). The level of support felt by the programs in the gold category explained nearly 80% of the variance in their cMax rankings (r^2 = 0.79), but just over a quarter of the variance within the bronze category, r^2 = 0.27.

The relationships between Athletic Department Support of Fundamental Human Resource Needs and cMax rankings were analyzed based on the sample subgroups. In terms of Institution Type, there were strong relationships indicated by both public and private institutions. The feelings of support explained nearly 40% of the variance in cMax ranking within the public institutions (r(11) = 0.61, p = 0.03, r^2 = 0.38); however, even more variance was explained within the private institutions (r(16) = 0.67, p = 0.002, r^2 = 0.45). Based on the Enrollment Size, the two variables were significantly related within the large institution group (r(7) = 0.70, p = 0.04, r^2 = 0.49). The relationship was even more significant for the extra-large institution group (r(5) = 0.83, p = 0.022, r^2 = 0.69). When the sample was compared by Competitive Success, the variables were only significant within the bronze category (r(17) = 0.47, p = 0.04), although just over 20% of the variance in cMax rankings could be explained, r^2 = 0.22.

The relationships between Athletic Department Support of Fundamental Physical Resource Needs and cMax rankings were analyzed based on the sample subgroups. In terms of Institution Type, although relationships were indicated for both groups, a significant relationships was found between the two variables for the private institution group (r(16) = 0.74, p = 0.001). The feelings of support for this group explained over half of the variance in their cMax rankings, r^2 = 0.54. Based on the Enrollment Size, significant relationships were indicated for three of the four categories – small, medium, and large. For small institutions, nearly half of the variance in cMax ranking could be explained by the feelings of support (r(7) = 0.70, p = 0.037, r^2 = 0.49). Medium institutions displayed an even stronger relationship, however the sample size in this category was rather small (r(4) = 0.93, p = 0.007, r^2 = 0.87). The feelings of support for large institutions explained 55% of the variance in cMax rankings (r(7) = 0.75, p = 0.021, r^2 = 0.55). Based on Competitive Success, only the bronze group showed a significant relationship between the two variables (r(17) = 0.49, p = 0.031), but only a small amount of the variance could be explained within that category, r^2 = 0.24.

The following tables (Tables 12-14) provide further analysis in the form of response averages based on the three sample subgroups.

Table 12

Program Perceptions of Athletic Department Support of Fundamental Resource Needs Averages Based on Institution Type ^

Variables	*Financial*	*Human*	*Physical*	*Combined*
Public	3.92	3.62	3.38	3.64
Private	2.78	2.89	3.06	2.91

^ Responses were codified (1 to 5).

Programs at public institutions consistently indicated their athletic department supported their fundamental Financial Resource Needs, while the programs at private institutions differed in feelings by 1.14 points. The Combined resource averages differed by nearly a full point (0.73).

Table 13

Program Perceptions of Athletic Department Support of Fundamental Resource Needs Averages Based on Institution Enrollment Size ^

Variables	*Financial*	*Human*	*Physical*	*Combined*
Small	2.27	2.64	2.82	2.58
Medium	3.38	3.13	3.25	3.25
Large	3.67	3.33	2.83	3.28
Extra-Large	4.50	4.17	4.17	4.28

^ Responses were codified (1 to 5).

Programs at smaller institutions consistently indicated their athletic department supported their fundamental resource needs the least, with a combined resource average of just 2.58 points. The programs at extra-large institutions however, experienced quite the opposite, with a combined resource average of 4.28—a difference of 1.70 points. The medium and large institutions showed relatively similar responses across all three resource categories.

Table 14

Program Perceptions of Athletic Department Support of Fundamental Resource Needs Averages Based on Level of Competitive Success ^

Variables	*Financial*	*Human*	*Physical*	*Combined*
Gold	4.40	4.20	4.40	4.33
Silver	4.00	4.00	3.57	3.86
Bronze	2.68	2.63	2.74	2.68

^ Responses were codified (1 to 5).

The bronze programs provided tremendously different responses for each of the resource groups than those of the silver and gold programs. A minimum 1.5-point difference appears between average bronze and gold programs in relation to all resources. Although much more similar, the silver and gold programs even differ by nearly a half point in Combined resource average.

RESEARCH QUESTION 2

Based on institutional and program characteristics, what resources should be emphasized for programs looking to improve their likelihood of competitive success?

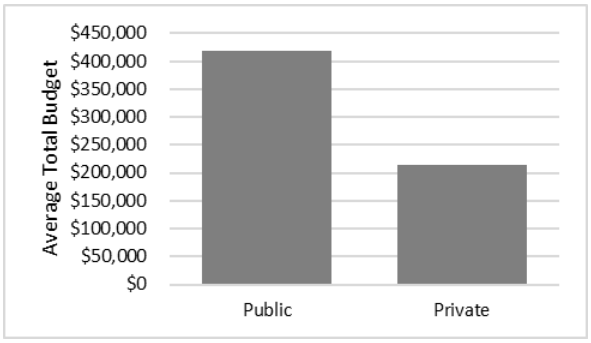
In order to answer the second research question, numerous one-way between-subjects ANOVAs were conducted to determine if the amount of each resource reported was significantly different between the three aforementioned subgroups: Institution Type, Enrollment Size, and Competitive Success. The Levene's Test of Homogeneity of Variances was used to determine whether or not Equal Variances could be assumed. The Tukey post hoc test was utilized if Equal Variances were assumed and the Games-Howell post hoc test was utilized if Equal Variances were not assumed. For a snapshot of the variables and categories in which significant relationships were found, please refer to Appendices 3-5.

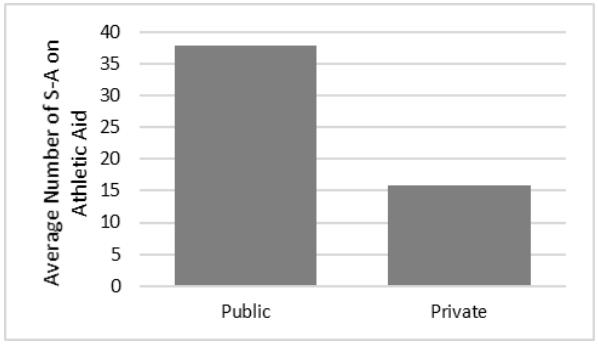
FINANCIAL RESOURCES

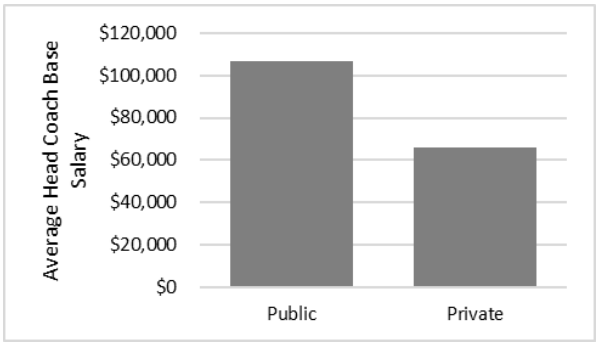
The same variables representing the Financial Resources category used in the prior analysis were used for the three ANOVA comparisons and only the variables with significant results are listed below in Tables 15-17. Each variable is discussed in greater depth following the table.

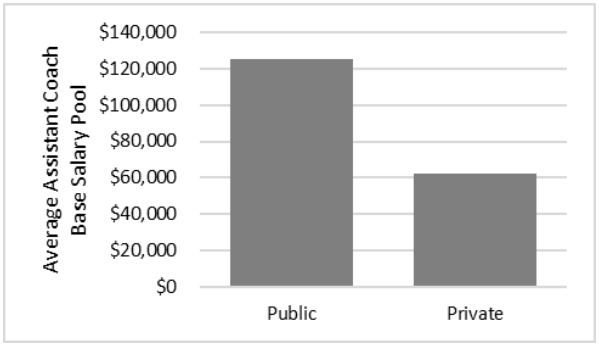
Table 15
Significant Variables from Financial Resource and Competitive Success ANOVAs Based on Institution Type Subgroups ($p \leq 0.05$)

Variables	*Overall* *Mean* *(SD)*	*Public* *Mean* *(SD)*	*Private* *Mean* *(SD)*	*F*	*p*
Total Budget	$309,928.75 ($253,594.90)	$418,534.80 ($280,644.12)	$214,099.88 ($186,735.57)	6.017	0.020
Number of Student-Athletes on Athletic Aid	26.15 (15.27)	37.88 (8.50)	15.88 (12.15)	32.092	0.000
Head Coach Base Salary	$84,259.45 ($43,952.24)	$106,587.69 ($48,568.79)	$66,117.75 ($30,589.93)	7.490	0.011
Assistant Coach Base Salary Pool	$90,436.83 ($52,899.91)	$125,413.00 ($40,114.07)	$62,018.69 ($44,885.61)	15.713	0.000









The mean Total Budget for the public institutions (n = 15) was 95% larger than that of the private institutions (n = 17), $F(1, 30) = 6.017$, $p = 0.020$.

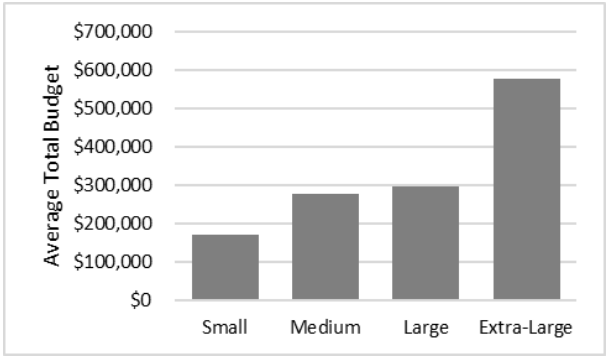
The mean Number of Student-Athletes on Athletic Aid for the public institutions (n = 14) was 136% higher than that of the private institutions (n = 16), $F(1, 28) = 32.092$, $p = 0.000$.

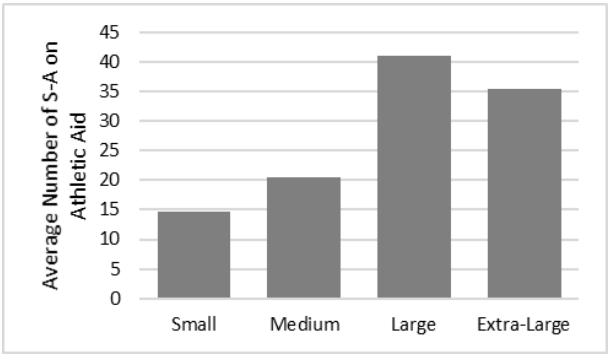
The mean Head Coach Base Salary for the public institutions (n = 13) was over 60% higher than that of the private institutions (n = 16), $F(1, 27) = 7.490$, $p = 0.011$.

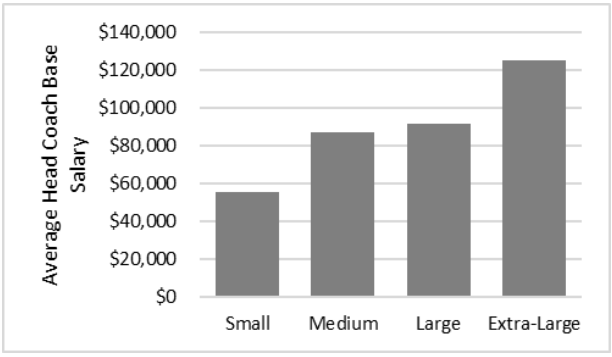
The mean Assistant Coach Base Salary Pool for the public institutions (*n* = 13) was over 100% larger than that of the private institutions (*n* = 16), *F*(1, 27) = 15.713, *p* = 0.000.

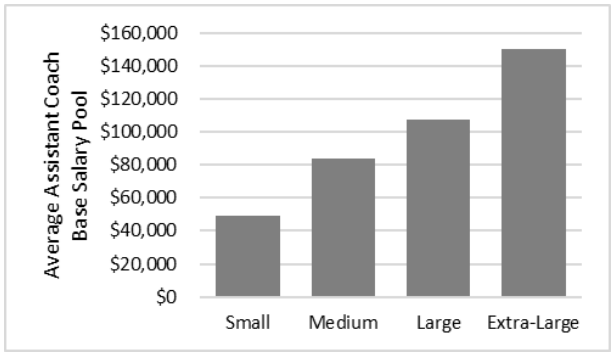
Table 16
Significant Variables from Financial Resource and Competitive Success ANOVAs Based on Enrollment Size Subgroups (p ≤ 0.05)

Variables	*Overall* *Mean (SD)*	*Small* *Mean (SD)*	*Medium* *Mean (SD)*	*Large* *Mean (SD)*	*Extra-Large* *Mean (SD)*	*F*	*p*
Total Budget	$309,928.75 ($253,594.90)	$169,359.73 ($166,612.33)	$276,080 ($197,826.86)	$296,148.00 ($183,957.52)	$578,452.00 ($301,863.98)	5.409	0.005
Number of Student-Athletes on Athletic Aid	26.15 (15.27)	14.72 (10.07)	20.50 (16.00)	41.01 (10.96)	35.40 (3.53)	10.393	0.000
Head Coach Base Salary	$84,259.45 ($43,952.24)	$55,852.18 ($24,331.50)	$87,274.50 ($29,891.92)	$92,062.50 ($23,366.68)	$125,521.33 ($65,514.42)	4.702	0.010
Assistant Coach Base Salary Pool	$90,436.83 ($52,899.91)	$49,097.00 ($33,537.98)	$83,507.00 ($51,063.65)	$107,543.50 ($37,363.84)	$150,314.67 ($32,345.35)	9.004	0.000









The mean Total Budget for the extra-large institutions (*n* = 7) was 242% more than the mean of the small institutions (*n* = 11), 110% more than the mean of the medium institutions (*n* = 7), and 95% more than the mean of the large institutions based on the omnibus ANOVA (*n* = 7), *F*(3, 28) = 5.409, *p* = 0.005. The small institutions' mean Total Budget was also 63% less than the medium institutions and 75% less than the large institutions. Although there were a number of large differences in means, the

only statistically significant difference indicated by post hoc testing was between the extra-large and small institutions, $p = 0.002$.

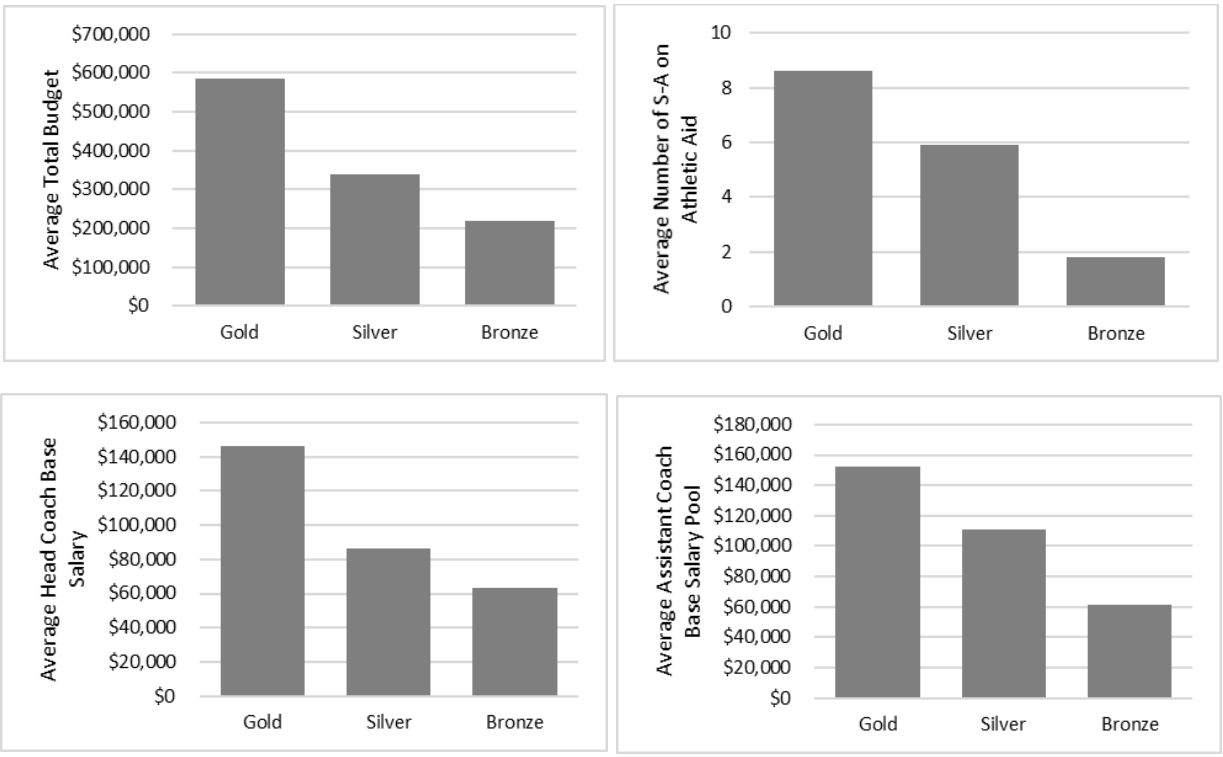
The mean Number of Student-Athletes on Athletic Aid for large institutions ($n = 7$) was 179% more than the mean of the small institutions ($n = 11$) and 100% more than the mean of the medium institutions ($n = 6$). The small institutions' mean was also nearly one and a half times less than that of the extra-large institutions ($n = 6$). The omnibus ANOVA was significant for this variable, $F(2, 26) = 10.393$, $p = 0.000$. Additionally, in post hoc testing two significant differences were indicated between the small and large institutions ($p = 0.001$) and the small and extra-large institutions ($p = 0.000$).

Although the omnibus ANOVA for Head Coach Base Salary was significant, ($F(3, 25) = 4.702$, $p = 0.010$), none of the pairwise comparisons in the post hoc testing indicated significant differences.

The mean Assistant Coach Base Salary Pool for extra-large institutions ($n = 6$) was 80% more than that of the medium institutions ($n = 7$) and 206% more than that of the small institutions ($n = 10$). The large institutions' ($n = 6$) mean Assistant Coach Base Salary Pool was also 119% more than that of the small institutions. The omnibus ANOVA was significant for this variable, $F(3, 25) = 9.004$, $p = 0.000$. Three significant differences were indicated by post hoc testing in these comparisons: small and large institutions ($p = 0.035$), small and extra-large institutions ($p = 0.000$), and medium to extra-large institutions ($p = 0.023$).

Table 17
Significant Variables from Financial Resource and Competitive Success ANOVAs Based on Competitive Success Subgroups ($p \leq 0.05$)

Variables	*Overall* *Mean (SD)*	*Gold* *Mean (SD)*	*Silver* *Mean (SD)*	*Bronze* *Mean (SD)*	*F*	*p*
Total Budget	$309,928.75 ($253,594.90)	$585,201.17 ($313,182.86)	$339,918.83 ($255,615.44)	$218,350.00 ($169,942.49)	6.665	0.004
Number of Student-Athletes on Full Athletic Scholarship	4.59 (3.93)	8.60 (2.70)	5.90 (3.02)	1.78 (2.44)	11.407	0.001
Head Coach Base Salary	$84,259.45 ($43,952.24)	$146,073.67 ($51,164.23)	$86,119.60 ($11,049.02)	$63,138.00 ($23,688.92)	17.418	0.000
Assistant Coach Base Salary Pool	$90,436.83 ($52,899.91)	$152,515.83 ($28,947.80)	$110,804.00 ($32,215.90)	$61,338.18 ($42,783.60)	13.562	0.000



The omnibus ANOVA indicated that the mean Total Budget was significant, $F(2, 29) = 6.665$, $p = 0.004$. Furthermore, the mean of the gold programs ($n = 6$) was 72% larger than that of the silver programs ($n = 6$); the silver programs' mean was 56% larger than that of the bronze programs ($n = 20$). The gold programs' mean Total Budget was 168% larger than that of the bronze programs. That gold to bronze comparison was where a significant difference was found in post hoc analysis ($p = 0.003$).

Again, the omnibus ANOVA was significant for the mean Number of Student-Athletes on Full Athletic Scholarship, $F(2, 15) = 11.407$, $p = 0.001$. Additionally, the mean of this variable was nearly five times larger for the gold programs (n = 5) than the bronze programs ($n = 9$). A significant difference was found in post hoc testing for that comparison ($p = 0.001$). Additionally, the silver programs' ($n = 4$) mean was more than three times larger than that of the bronze programs, which was also significantly different ($p = 0.049$).

The mean Head Coach Base Salary was significant in the omnibus ANOVA analysis, $F(2, 26) = 17.418$, $p = 0.000$. The mean of this variable for the gold programs ($n = 6$) was 70% larger than that of the silver programs ($n = 5$); the silver programs' mean was 36% larger than that of the bronze programs ($n = 18$). The gold programs' mean Head Coach Base Salary was 131% larger than that of the bronze

programs. In post hoc testing, statistically significant differences were indicated between the silver and bronze programs (p = 0.020) and the gold to bronze programs (p = 0.022).

The mean Assistant Coach Base Salary Pool for the gold programs (n = 6) was 38% larger than that of the silver programs (n = 6); the silver programs' mean was 81% larger than that of the bronze programs (n = 17). The gold programs' mean Assistant Coach Base Salary Pool was 149% larger than that of the bronze programs. The omnibus ANOVA showed this variable was statistically significant, F(2, 26) = 13.562, p = 0.000. In post hoc analysis, statistically significant differences were indicated between the silver and bronze programs (p = 0.030) and the gold to bronze programs (p = 0.000).

HUMAN RESOURCES

The same variables representing the Human Resources category used in the prior analysis were used for the three ANOVA comparisons and only the variables with significant results are listed below in Tables 18-20. Each variable is discussed in greater depth following the table.

Table 18
Significant Variables from Human Resource and Competitive Success ANOVAs Based on Institution Type Subgroups (p ≤ 0.05)

Variables	*Overall Mean (SD)*	*Public Mean (SD)*	*Private Mean (SD)*	*F*	*p*
Number of Program Head Coaches in the last 5 years	1.44 (1.21)	1.21 (0.43)	1.61 (0.61)	4.308	0.047
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	24.16 (22.09)	36.88 (23.73)	14.23 (14.93)	10.86	0.003
Average Program Roster Size in the last 2 years	55.97 (26.89)	74.93 (27.38)	41.22 (14.79)	19.940	0.000

The mean Number of Head Coaches in the last 5 years for the private institutions (n = 18) was 33% higher than that of the public institutions (n = 14), F(1, 30) = 4.308, p = 0.047.

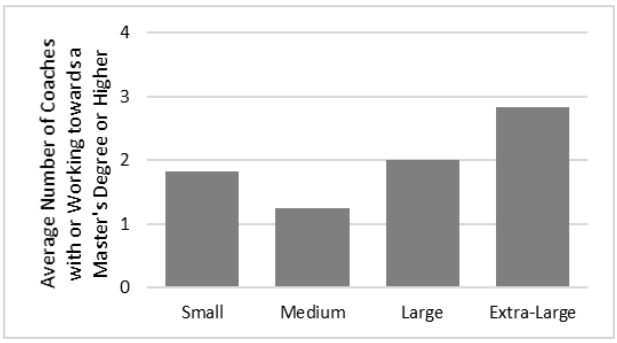
The public institutions (n = 11) had 159% higher mean average Number of Inexperienced Walk-Ons or Inexperienced Recruits than that of the private institutions (n = 13), F(1, 22) = 10.86, p = 0.003.

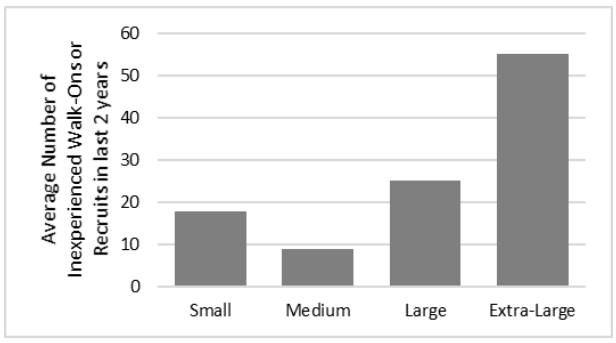
The mean Program Roster Size for the Public institutions (n = 14) was over 80% larger than that of the private institutions (n = 18), F(1, 30) = 19.940, p = 0.000.

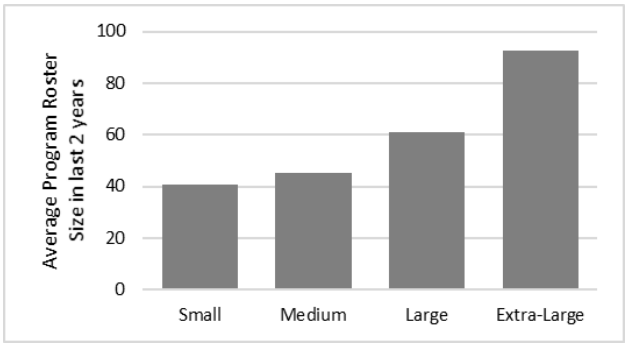
Table 19

Significant Variables from Human Resource and Competitive Success ANOVAs Based on Enrollment Size Subgroups ($p \leq 0.05$)

Variables	*Overall* *Mean (SD)*	*Small* *Mean (SD)*	*Medium* *Mean (SD)*	*Large* *Mean (SD)*	*Extra-Large* *Mean (SD)*	*F*	*p*
Number of Coaches with or Working Towards a Master's Degree or Higher	1.90 (1.04)	1.82 (1.08)	1.25 (0.71)	2.00 (0.89)	2.83 (0.98)	3.282	0.036
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	24.61 (22.09)	17.80 (18.11)	8.91 (4.77)	25.07 (13.41)	55.13 (22.57)	10.657	0.000
Average Program Roster Size in the last 2 years	55.97 (26.89)	40.59 (16.72)	45.06 (13.97)	61.21 (17.32)	92.58 (30.52)	10.362	0.000







The mean Number of Coaches with or Working towards a Master's Degree or Higher for extra-large institutions (n = 6) was 42% more than that of the large institutions (n = 6), 55% more than that of the small institutions (n = 11), and 126% more than that of the medium institutions (n = 8). The omnibus ANOVA found this variable to be statistically significant, $F(3, 27) = 3.282$, $p = 0.036$. In post hoc testing, the extra-large to medium was the only comparison with a statistically significant difference ($p = 0.021$).

Three significantly different means were identified based on the mean average Number of Inexperienced Walk-Ons or Inexperienced Recruits based on the omnibus ANOVA, $F(3, 28) = 10.657$, $p = 0.000$. The extra-large institutions' (n = 6) mean was over 500% greater than that of the medium

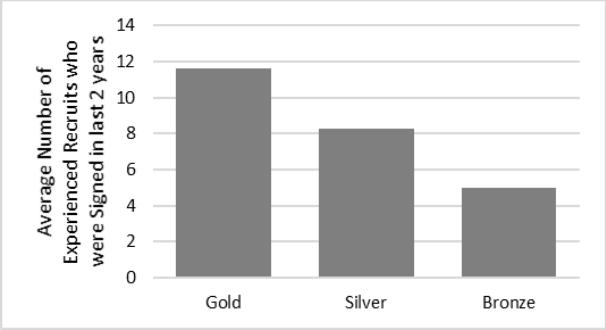
institutions (n = 8, p = 0.000), 120% greater than that of the large institutions (n = 7, p = 0.010), and over 200% greater than that of the small institutions (n = 11, p = 0.000).

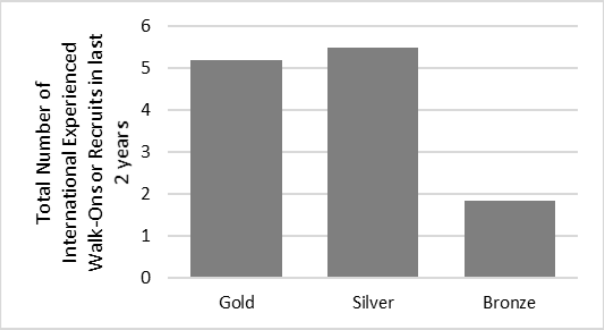
The mean average Program Roster Size was found to be significant in the omnibus ANOVA analysis, $F(3, 28) = 10.362$, p = 0.000. The mean of this variable for extra-large institutions (n = 6) was significantly different from the other three groups. Based on post hoc analysis, the small institutions' (n = 11) mean was 128% smaller than that of the extra-large institutions, p = 0.000. The large institutions (n = 7) mean was 51% smaller than that of the extra-large institutions, p = 0.035. The medium institutions (n = 8) mean was over 100% smaller than that of the extra-large institutions (p = 0.001).

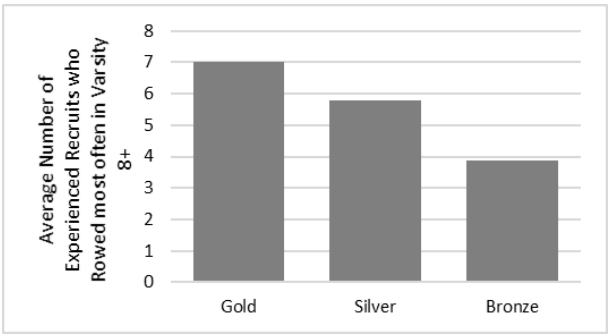
Table 20

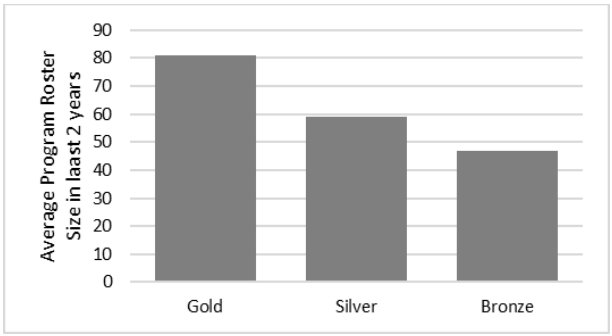
Significant Variables from Human Resource and Competitive Success ANOVAs Based on Competitive Success Subgroups ($p \leq 0.05$)

Variables	*Overall* *Mean (SD)*	*Gold* *Mean (SD)*	*Silver* *Mean (SD)*	*Bronze* *Mean (SD)*	*F*	*p*
Average number of Experienced Recruits who Signed on to the Team in the last 2 years	6.85 (4.54)	11.60 (2.86)	8.29 (4.29)	4.98 (3.94)	6.336	0.006
Total number of International Experienced Walk-Ons or International Experienced Recruits in the last 2 years	3.46 (3.44)	5.20 (1.79	5.50 (3.21)	1.85 (3.34)	3.923	0.036
Average number of Experienced Recruits that Rowed Most Often in the Varsity 8+ in the last 2 years	4.83 (2.80)	7.00 (2.62)	5.79 (2.43)	3.86 (2.63)	3.496	0.045
Average Program Roster Size in the last 2 years	55.97 (26.89)	81.00 (40.58)	59.07 (17.08)	46.92 (19.78)	4.584	0.019









The omnibus ANOVA analysis indicated that the average Number of Experienced Recruits Signed was statistically significant, $F(2, 27) = 6.336$, $p = 0.006$. The gold programs' ($n = 5$) mean for this variable was 40% larger than that of the silver programs ($n = 7$); the silver programs' mean was 66% larger than that of the bronze programs ($n = 18$). The gold programs' mean was 133% larger than that of the bronze programs, which was where the statistically significant difference was indicated by post hoc analysis ($p = 0.006$).

Although the omnibus ANOVAs for the Number of International Experienced Walk-Ons or International Experienced Recruits Signed ($F(2, 21) = 3.923$, $p = 0.036$) and the Average Number of Experienced Recruits who Competed Most Often in the Varsity 8+ ($F(2, 27) = 3.496$, $p = 0.045$) were both significant, no post hoc tests indicated that the means of the subgroups were significant different from one another.

The mean Program Roster Size was significant based on the omnibus ANOVA, $F(2, 29) = 4.584$, $p = 0.019$. The mean of this variable for the gold programs ($n = 6$) was 37% larger than that of the silver programs ($n = 7$); the silver programs' average was 26% larger than that of the bronze programs ($n = 19$). The gold programs' mean Program Roster Size was 73% larger than that of the bronze programs. Significant differences were found between the gold to bronze programs in post hoc analysis ($p = 0.015$).

ORGANIZATIONAL RESOURCES

The same variables representing the Organizational Resources category used in the prior analysis were used for the ANOVA comparisons and only the variables with significant results are listed below in Tables 21-23. Each variable is discussed in greater depth following the table. Note: Smaller numbers represent higher rankings which are more desirable for both of the following variables.

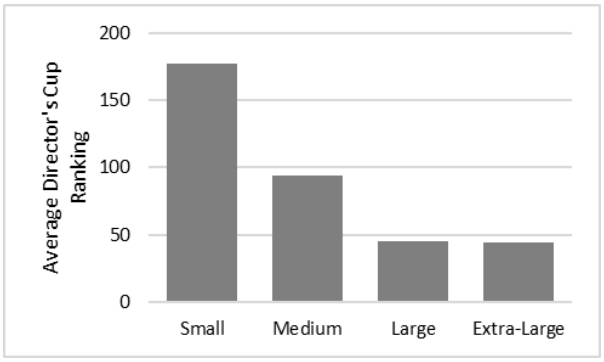
Table 21
Significant Variables from Organizational Resource and Competitive Success ANOVAs Based on Institution Type Subgroups (p ≤ 0.05)

Variables	*Overall* *Mean (SD)*	*Public* *Mean (SD)*	*Private* *Mean (SD)*	*F*	*p*
Average Director's Cup Ranking	100.80 (83.14)	55.87 54.94)	138.25 (85.20)	10.391	0.003

The mean Director's Cup Ranking for public institutions (*n* = 15) was 60% smaller than the mean of the private institutions (*n* = 18), *F*(1, 31) = 10.391, *p* = 0.003.

Table 22
Significant Variables from Organizational Resource and Competitive Success ANOVAs Based on Enrollment Size Subgroups (p ≤ 0.05)

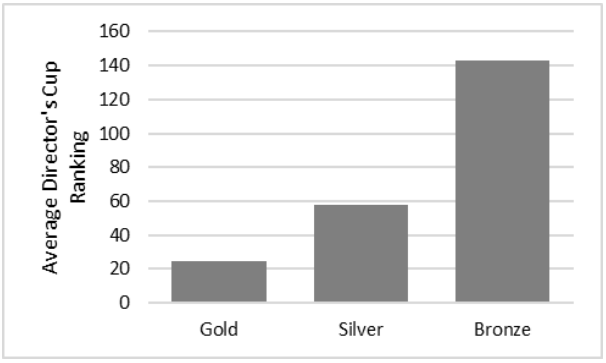
Variables	*Overall* *Mean (SD)*	*Small* *Mean (SD)*	*Medium* *Mean (SD)*	*Large* *Mean (SD)*	*Extra-Large* *Mean (SD)*	*F*	*p*
Average Director's Cup Ranking	100.80 (83.14)	177.32 (78.42)	93.75 (70.43)	45.36 (26.60)	44.07 (44.51)	9.365	0.000

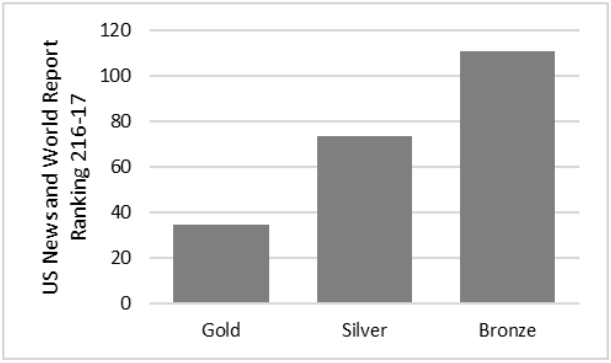


Three significant differences were indicated for the Director's Cup Ranking variable between the small institutions (*n* = 11) and each of the other three groups. The medium institutions' (*n* = 8) mean was 47% lower than that of the small institutions, *p* = 0.034. The large institutions' (*n* = 7) and extra-large institutions' (*n* = 7) means were both roughly 75% lower than that of the small institutions, both had the same p value at 0.001.

Table 23
Significant Variables from Organizational Resource and Competitive Success ANOVAs Based on Competitive Success Subgroups ($p \leq 0.05$)

Variables	*Overall* *Mean (SD)*	*Gold* *Mean (SD)*	*Silver* *Mean (SD)*	*Bronze* *Mean (SD)*	*F*	*p*
Average Director's Cup Ranking	100.80 (83.14)	24.92 (27.66)	57.50 (35.91)	143.00 (83.32)	9.076	0.001
US News & World Report Ranking 2016-17	79.38 (61.63)	34.67 (21.81)	73.50 (62.23)	110.90 (62.95)	3.579	0.046





The gold programs' (n = 6) average for Director's Cup Ranking was 57% smaller than that of the silver programs (n = 8); the silver programs' average was 60% smaller than that of the bronze programs (n = 19). The gold programs' average was 83% smaller than that of the bronze programs. Significant differences between the means was found in the omnibus ANOVA analysis, $F(2, 30) = 9.076$, $p = 0.001$. Additionally, significant differences were indicated between the silver and bronze programs ($p = 0.003$) and the gold and bronze programs in post hoc analyses ($p = 0.000$).

The mean Institutional USNWR Ranking for 2016-17 was significant in the omnibus ANOVA analysis, $F(2, 21) = 3.579$, $p = 0.046$. The mean of this variable for gold programs (n = 6) was 53% smaller than that of the silver programs (n = 8); the silver programs' mean was 34% smaller than that of the bronze programs (n = 10). The gold programs' mean USNWR Ranking was 69% smaller than that of the bronze programs. The comparison that showed a significant difference was between the gold and bronze programs ($p = 0.038$).

PHYSICAL RESOURCES

The same variables representing the Physical Resources category used in the prior analysis were used for the ANOVA comparisons and only the variables with significant results are listed below in Tables 24-25. Each variable is discussed in greater depth following the table.

Table 24
Significant Variables from Physical Resource and Competitive Success ANOVAs Based on Institution Type Subgroups (p ≤ 0.05)

Variables	*Overall Mean (SD)*	*Public Mean (SD)*	*Private Mean (SD)*	*F*	*p*
Indoor Facility: Ventilation ^	3.31 (1.29)	3.91 (1.22)	2.94 (1.21)	4.304	0.048

^ Responses were codified (1 to 5).

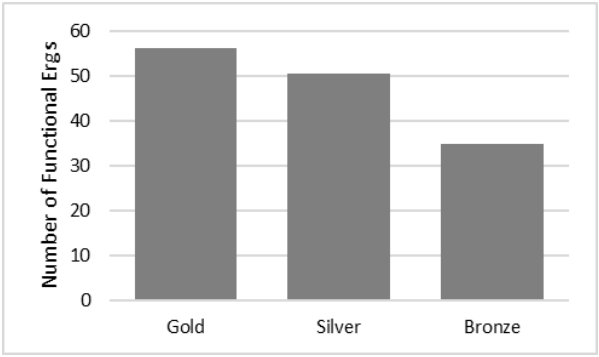
The public institutions' (n = 11) mean adequacy ranking for Indoor Facility Ventilation was roughly one-third higher than that of the private institutions (n = 18), $F(1, 27) = 4.304$, $p = 0.048$.

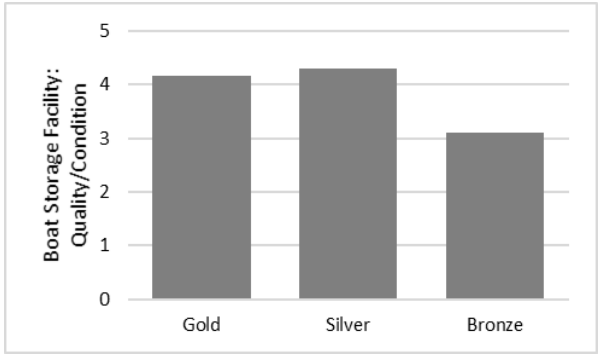
No Physical Resources were significant when comparisons were based on Enrollment Size.

Table 25
Significant Variables from Physical Resource and Competitive Success ANOVAs Based on Competitive Success Subgroups (p ≤ 0.05)

Variables	*Overall Mean (SD)*	*Gold Mean (SD)*	*Silver Mean (SD)*	*Bronze Mean (SD)*	*F*	*p*
Number of Functional Ergs	42.31 (17.40)	56.33 (18.71)	50.71 (15.76)	34.79 (13.74)	6.007	0.007
Boat Storage Facility: Quality/Condition ^	3.56 (1.16)	4.17 (0.75)	4.29 (1.11)	3.11 (1.10)	4.444	0.021

^ Responses were codified (1 to 5).





The mean Number of Functional Ergomters was statistically significant in omnibus ANOVA analysis, $F(2, 29) = 6.007$, $p = 0.007$. The mean of this variable was only slightly larger for the gold programs (n = 6) than the silver programs (n = 7); the silver programs' mean was nearly 50% larger than

that of the bronze programs (*n* = 19). However, the gold programs' mean was significantly larger than that of the bronze programs based on post hoc testing (*p* = 0.013).

The mean adequacy ranking of Boat Storage Facility: Quality/Condition for the gold programs (*n* = 6) was slightly lower than that of the silver programs (*n* = 7); both the gold and silver programs' means were slightly more than 34% higher than that of the bronze programs (*n* = 19). Statistically significant differences were indicated by the omnibus ANOVA analysis, $F(2, 29) = 4.444$, $p = 0.021$. Additionally, significant differences were found in post hoc analysis between the silver and bronze programs (*p* = 0.043).

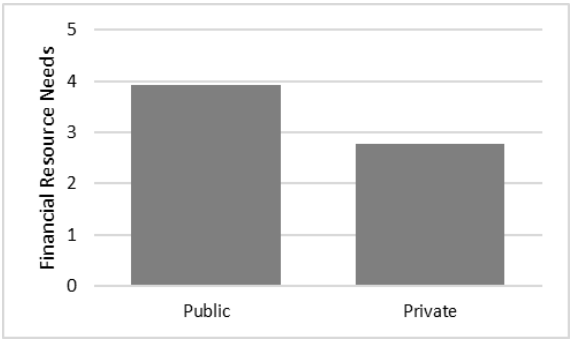
FUNDAMENTAL RESOURCE NEEDS

The coaches' subjective indications of the level of support they feel is provided to their program's fundamental needs in each of the resource groups was analyzed using ANOVAs based on the three sample subgroups and the significant variables are listed in the following tables.

Table 26
Significant Variables from Fundamental Needs and Competitive Success ANOVAs Based on Institution Type Subgroups (p ≤ 0.05) ^

Variables	*Overall Mean (SD)*	*Public Mean (SD)*	*Private Mean (SD)*	*F*	*p*
Financial Resource Needs	3.26 (1.26)	3.92 (1.04)	2.78 (1.22)	7.549	0.010

^ Responses were codified (1 to 5).

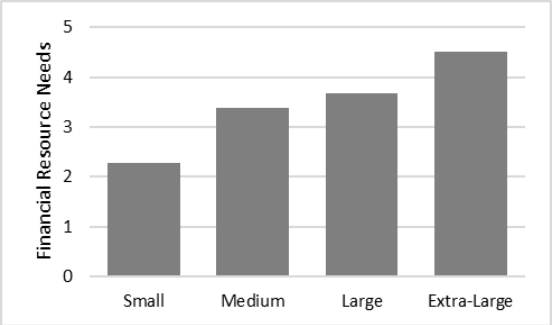


Only the Financial Resource Needs indicated a significant different between the means of the public and private institutions $F(1, 29) = 7.549$, $p = 0.010$. The private institutions felt over a full point less support than public institutions. In terms of the five-point scale, the private institutions felt their fundamental needs were "Somewhat" met, whereas the public institutions felt their needs were "Mostly" met.

Table 27
Significant Variables from Fundamental Needs and Competitive Success ANOVAs Based on Enrollment Size Subgroups (p ≤ 0.05) ^

Variables	*Overall* *Mean (SD)*	*Small* *Mean (SD)*	*Medium* *Mean (SD)*	*Large* *Mean (SD)*	*Extra-Large* *Mean (SD)*	*F*	*p*
Financial Resource Needs	3.26 (1.26)	2.27 (1.10)	3.38 (1.06)	3.67 (1.03)	4.50 (0.55)	7.044	0.001

^ Responses were codified (1 to 5).

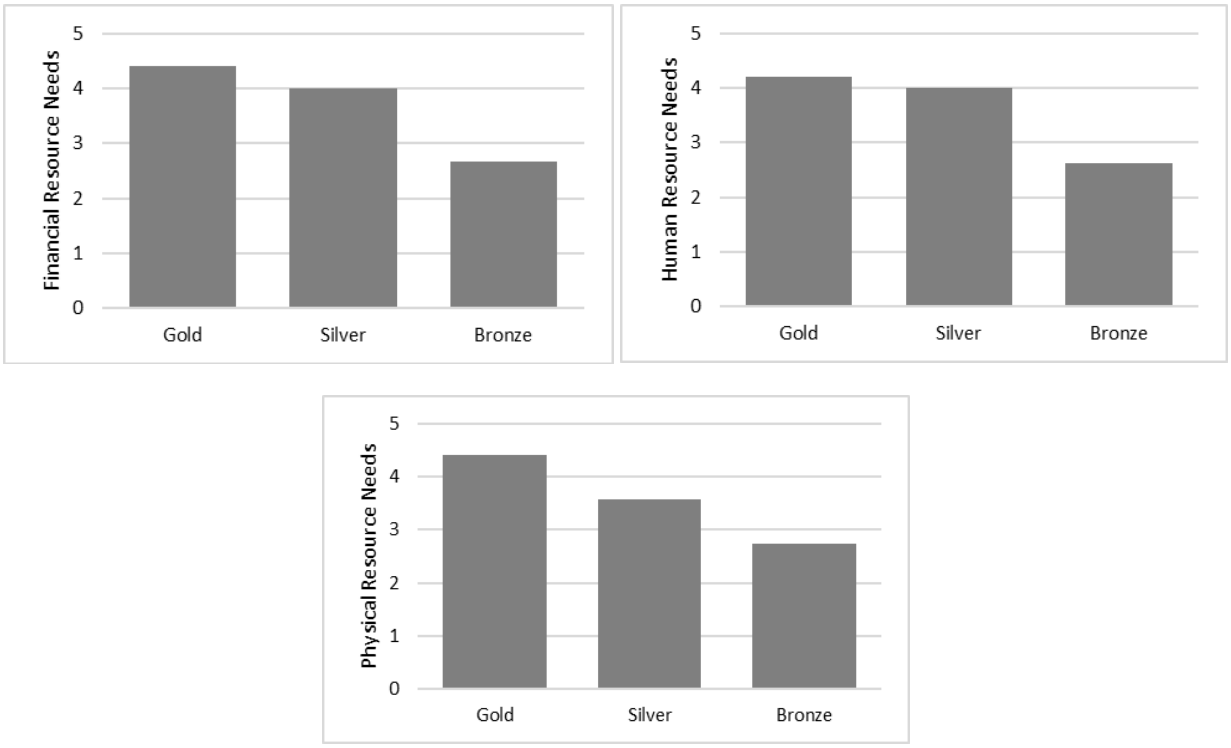


Again, only the Financial Resource Needs indicated a significant difference between the means of the groups based on enrollment size in the omnibus ANOVA analysis, $F(3, 27) = 7.044$, $p = 0.001$. The extra-large institutions reported sentiments of support that were roughly double that of the small institutions—a statistically significant finding in post hoc analysis ($p = 0.001$). Furthermore, post hoc testing indicated that the small and large institutions were also significantly different with 1.4 points in variation ($p = 0.048$).

Table 28
Significant Variables from Fundamental Needs and Competitive Success ANOVAs Based on Competitive Success Subgroups (p ≤ 0.05) ^

Variables	*Overall* *Mean (SD)*	*Gold* *Mean (SD)*	*Silver* *Mean (SD)*	*Bronze* *Mean (SD)*	*F*	*p*
Financial Resource Needs	3.26 (1.26)	4.40 (0.55)	4.00 (1.00)	2.68 (1.16)	7.437	0.003
Human Resource Needs	3.19 (1.22)	4.20 (0.45)	4.00 (0.58)	2.63 (1.21)	7.483	0.002
Physical Resource Needs	3.19 (1.17)	4.40 (0.55)	3.57 (1.27)	2.74 (0.99)	5.992	0.007

^ Responses were codified (1 to 5).



The omnibus ANOVA analyzing the Financial Resource Needs indicated significant relationships for the entire group $F(2, 28) = 7.437$, $p = 0.003$. In post hoc analysis, the bronze and silver groups' means were significantly different ($p = 0.023$), as were the bronze to gold groups' means ($p = 0.0009$).

The omnibus ANVOA analyzing the Human Resource Needs showed significant relationships existed $F(2, 28) = 7483$, $p = 0.002$). Again, in post hoc testing, the bronze and silver groups' means were significantly different ($p = 0.002$), as were the bronze and gold groups' means ($p = 0.001$).

Finally, the omnibus ANOVA analyzing the Physical Resource Needs indicated a significant relationship for the entire group $F(2, 28) = 5.992$, $p = 0.007$. The bronze and gold groups' means were significant different from one another based on post hoc analysis ($p = 0.008$).

In all three cases, the bronze programs felt their fundamental needs were close to being "Somewhat" met, whereas the other two groups felt that their needs were at least "Mostly" met.

QUALITATIVE RESEARCH QUESTIONS

The survey instrument included three qualitative questions asking for each program's biggest advantage, biggest disadvantage, and a list of three terms to describe team culture. The responses from the questions were coded and reduced to approximately five main themes as shown in the table below.

Table 29

Qualitative Advantages and Disadvantages Response Breakdown by Theme

Variables	*n*	Frequency
Advantages	25	
Human Resources		8
Weather and Location		6
Academic Excellence		4
Financial Support		4
Team Culture		4
Disadvantages	25	
Lack of Financial Support and Scholarships		15
Weather and Location		10
Lack of Human Resources		7
Facilities		5
Terms Describing Team Culture	25	
Tenacity and Dedication		27
Family and Community		18
Positivity and Kindness		10
Willingness and Trust		5

The two most frequently cited Advantages related to Human Resources and Weather and Location. The kinds of Human Resources were the quality and/or number of staff, coaches, and student-athletes available to the program. The Weather and Location comments ranged from benefits of the geographic location of the university on recruiting to the ability to row year-round on the body of water. A few programs felt that the academic rigor or reputation of their institution was an advantage, while others saw team culture as their advantage.

The two most frequently cited Disadvantages were undoubtedly Lack of Financial Support and Weather and Location. The Lack of Financial Support was most commonly described as a lack of scholarships; however, some programs also mentioned their financial issues were more budget related. The Weather and Location disadvantages were primarily the inability for programs to row year-round due

to freezing water or just weather issues in general. Other programs felt that their lack of sufficient staffing or ability to recruit student-athletes were their biggest disadvantages.

Over one third of all the terms listed to describe Team Culture fell into the theme of Tenacity and Dedication; some of the more popular terms in this theme were “gritty,” “dedicated,” and “committed.” Another quarter of the responses were captured in the theme of Family and Community; these terms ranged from “friendship” and “family” to “inclusive” and “supportive.” Additionally, of the 73 terms and phrases listed, only one had a negative connotation.

CHAPTER V: DISCUSSION

As described in Chapter I, the purpose of this study was to identify and analyze the resources that are associated with competitive success in NCAA Division I women's rowing.

It is worth noting that the relationships found and not found between the various programs and variables suggest that the cMax rankings were a reasonable source for defining athletic success in this study, considering traditional indicators – such as won-loss record – are not meaningful in the sport.

RESEARCH QUESTION 1

FINANCIAL RESOURCES

From the data detailed in Chapter IV, it is clear that financial resources are very important for programs to be successful in Division I women's rowing. Not only were each of the five financial variables significant in simple regressions, but also nearly 90% of the variance in the cMax rankings could be accounted for by the Number of Student-Athletes on Full Scholarship and Assistant Coach Base Salary Pool.

All programs, regardless of sport, need some level of funding in order to function and thus, a way that an athletic department can show its dedication to and support of a program is through that level of funding—whether to the budget or its personnel. A rowing program with a smaller budget will likely be able to purchase only "need" items and/or be restricted to more localized competitions; whereas, rowing programs with larger budgets will likely be able to purchase both "need" and "want" items, in addition to having more liberty with travel for competitions. The responses collected indicate that a larger Total Budget increases the likelihood of competitive success, particularly for private institutions. When the budget amounts were compared by size, all institutions in the smaller budget group were in the bronze category and 64% of those were also private institutions. Furthermore, the average difference between private institutions in the two groups was over $120,000 in total budget and 54-points in cMax ranking.

In terms of personnel, a larger Assistant Coach Base Salary Pool is an indicator of the size of the coaching staff, as well as a department's desire and ability to attract and retain quality coaches. A

program with three assistant coaches will likely have a larger total pool than that of a program with only one assistant coach. Just like a smaller ratio of students to teachers is ideal in the education realm, a smaller ratio of student-athletes to coaches is ideal in rowing. This provides a team with more collective coaching and the student-athletes with more individual coaching, and the program with a greater potential for competitive success overall. But having a large staff is not enough; of the respondents that listed salaries for all three available assistant coaching positions, the Salary Pool totals varied by nearly $100,000 and the average cMax rankings varied by over 60 points.

To that end, the ability of a department to attract and retain a staff of high quality coaches—as indicated by their compensation—is highly associated with the competitive success of a program. An athletic department that is unable to provide a rowing staff with adequate compensation will likely lose their best talent to a competing institution that chooses to invest financially in their rowing staff. This is apparent, in that the average difference in cMax rankings between the respondent groups listing one, two, and three assistant coaches' salaries was over 20 points each. By increasing both the number of and compensation for assistant coaches a program's likelihood of competitive success is increased.

This same philosophy is applicable to the Head Coach Base Salary variable. The association with competitive success is clearly demonstrated by the average $53,000 and 47-point cMax ranking difference when comparing the higher and lower ranked halves of the responses. While some of the discrepancy could be attributed to athletic departments rewarding athletic success with increased compensation, there is still a deep connection between higher Head Coach Base Salaries and higher levels of competitive success. Research supports this claim; in a study focused on head football coaches at FBS institutions "showed that the maximum total compensation of these coaches increases with their past performance (Inoue, Plehn-Dujowich, Kent, & Swanson, 2013). Another study focused on the assumption "that paying top salaries to coaches assures or improves success on the field and in the rankings" (Tsitsos & Nixon, 2012).

Six and seven of the nine subgroups of comparison indicated significant relationships for the Assistant Coach Base Salary Pool and Head Coach Base Salary variables, respectively. For categories in which a significant relationship was not indicated, it is likely that the small *n*'s of those subgroups were a contributing factor to their insignificance. However, almost regardless of the institutional or program-

related characteristics, any program's likelihood of competitive success can be improved by the development of these two personnel-related resources.

Similar to positions and compensation for coaching personnel, many programs use scholarships and athletic aid to entice the best student-athletes to compete for them; and research has proven that "recruiting significantly affects team performance" (Langelett, 2003) and that in football "higher rated recruiting classes are related to greater success on the field" (Bergman & Logan, 2014). With a maximum number of 20 full scholarships, rowing programs have the potential to fill almost a third of the average roster size with their desired student-athletes. However, a disconnect exists between the number permitted by the NCAA and the number provided by most institutions; 12 full scholarships was the highest number reported in this study, with the average at a mere 4.5. It is clear that many programs do not operate off of the scholarship maximum like many other sports do. Although it is unknown whether the schools in this study fully fund all other sports at maximum NCAA scholarship levels, it appears to be the norm in rowing. As only 18 of the 35 respondents provided scholarship numbers, it cannot be known how many rowing programs are able to provide their entire allotment of scholarships and how that would impact the relationship found to competitive success. However, this was particularly significant for private institutions with nearly 100% of the variance in competitive success explained by the variable. In addition to private institutions, public institutions, small institutions, and bronze programs also could see improvements in competitive success by increasing the allotment of and Number of Student-Athletes on Full Scholarships.

Furthermore, based on the high average ($\bar{x}$ = 26) Number of Student-Athletes on Athletic Aid reported by nearly the entire sample, it seems that many coaches take the approach that rather than spend their handful of full scholarships on a handful of student-athletes, they prefer to spread that funding out over a larger number of student-athletes. Based on these figures, if the average program has the average scholarship funding and the average number of student-athletes on athletic aid, that means that the average rower on aid is only receiving 17% of a scholarship. Just as salary is an incentive to recruit talented coaches, the same concept is applicable in recruiting talented student-athletes. With such low financial aid support, this average program is handicapped in their ability to bring in the more desirable recruits.

The Number of Student-Athletes on Athletic Aid variable was significant for small institutions and bronze programs, which is likely in part due to the demographics of the respondents. Many of the programs that indicated similar numbers of student-athletes on athletic aid fell into both the small institution and bronze categories. As a rowing program cannot exist without student-athletes, the extent to which a program can support those student-athlete personnel-expenses can have a positive impact on a program's likelihood of competitive success.

In terms of the RBV, none of these financial resources alone is enough to create sustained competitive advantage in the industry. For example, every program has a budget and despite the varying sizes, any program's budget could be increased from one year to the next making it neither rare, nor unique. The same can be said about the Head Coach Base Salary and the Assistant Coach Salary Pool. Again, student-athletes are necessary for a program to exist and although the Athletic Aid and Scholarship funding available to programs is varied, those resources are easily imitated and/or substituted. An immediate and substantial increase in any of these resources or the implementation of a different strategy for utilizing these resources could become a source of temporary competitive advantage. For example, a bump in compensation for assistant coaches could help a program attract and/or retain the best coaching personnel which could lead to in an increase in the program's ranking compared to those previously ranked around them. But because other programs could imitate that change in the same way, the advantage would not be sustainable in the long term. Additionally, the first coach who chose to spread limited scholarship and aid dollars over a larger number of student-athletes probably had temporary competitive advantage from employing that new strategy; however, as soon as other coaches began to use the same strategy with their own resources, it could no longer serve as a source of competitive advantage.

From a wider perspective, none of these financial factors are necessarily exclusive to the sport of rowing; it could be argued that these are consistent across many sports in intercollegiate athletics. However, this provides statistical evidence that dedication to finances—personnel-related resources in particular—can help nearly any program foster better opportunities for temporary competitive advantage and improved competitive success. These findings support the research done by Cunningham (2003)

who found that “expenditures used to recruit student-athletes served as the most potent predictor” of athletic department success (p. 56).

HUMAN RESOURCES

The Human Resources variables fit into roughly two groups – variables associated with coaches and variables associated with student-athletes; all four significant variables fell into the latter group.

One might assume that the consistency, experience, and education of coaches would all have an impact on a program’s level of competitive success. This study found that is not the case in women’s rowing. Part of this insignificance can likely be tied to the lengthy tenure afforded to many head coaches in the sport; head coaches can often last multiple decades in their positions. This is not always true across other sports; in fact, over 20 FBS football coaches were let go in both the 2016 and 2017 seasons alone (Fornelli, 2017; Kirk & Kirshner, 2017). Although FBS football might be an extreme comparison, the sentiment remains—rowing, and perhaps other Olympic sport, head coaches might have more flexibility in the length of their reign than other programs, regardless of their success. As was discussed in Chapter III, even simply defining competitive success in the sport is particularly difficult. From a rather pessimistic perspective, if an athletic department does not value a rowing program or its success, then the expenses of firing and hiring a new coach might just be too much hassle. However, it could also be that competitive success in rowing is associated with head coaching stability but over a length of time beyond the five years chosen for this study. Furthermore, consistency in assistant coach staffing was not investigated which could also be associated with competitive success.

As there are limited professional opportunities in rowing, the idea that coaching staffs with greater professional experiences might have a competitive leg-up on other programs was not found to be substantiated by the data in most cases. The only occurrence of significance was within the bronze sample category. While some of this could be attributed to the small *n* of those sample subgroups and/or an overall smaller total *n* of the respondents to this survey question, another possibility is that the bronze programs with more coaches who have greater professional experiences with rowing are benefitting competitively to some degree.

In the same vein, further education of coaches—in terms of degrees beyond a bachelors—was not found to be associated with success. This paints a counterintuitive picture: a more “traditionally”

qualified coach does not necessarily result in a more competitively successful program. The ability of a coach to motivate and inspire greatness in his or her student-athletes likely has a much stronger impact on the team than does the items on a coaches' resume. This finding can allow an athletic department the confidence to select the best fitting coach for their institution and program, rather than going after only the highest educated and/or most experienced coaches.

Shifting to the student-athlete-related variables, many were not significantly associated with competitive success in simple regression analyses. The average Number of Inexperienced Walk-Ons or Recruits and the number of those individuals who Transitioned to the Varsity Team the Following Year were almost entirely insignificant. This is surprising due to the heavy walk-on nature of the sport and the necessity of those pools to many programs. The one sample subgroup which indicated a significant relationship between competitive success and the Number of Inexperienced student-athletes who Transitioned to Varsity was the gold category. This could be a result of a combination of factors that make gold programs successful; these programs can typically afford and retain the best coaching talent, bring in the best student-athletes, and maintain competitive standards and expectations. These factors would likely improve the learning potential and success of novice rowers. There was a small *n* in this subgroup, so it cannot be known how a change in the number of responses could impact the variable's connection to competitive success.

The academic success of student-athletes is a point of pride for many rowing programs, as it should be. However, the average Team GPAs and average Number of Student-Athletes Receiving Athletic or Academic Awards are not statistically associated with competitive success. This may be that the strength of academics for these student-athletes is high regardless of institutional or program characteristics.

At some institutions, athletic departments and athletic programs are permitted a number of admission slots for recruits who might require the special consideration of their athletic abilities by Admissions departments to gain admittance. Although the number and approval process can vary dramatically from one institution to the next or might not exist at an institution, the idea that some programs could ensure their most desirable recruits are accepted into an institution would seemingly have a positive impact on the competitive success of the program. This claim was substantiated by the data in

this study. Beyond the existence of the relationship, this was particularly significant for private institutions and bronze programs. A substantial portion of these findings can be explained by the high number of private institution respondents who also fell into the bronze category. It is unclear how a different and/or larger sample of responses would change this results as there was a small *n* for this variable.

The impact of these recruits is significant; the data indicated that an increase in average Number of Experienced Recruits Signed is associated with an increase in competitive success. If a program is able to attract many desirable recruits and sign them to the team, it makes sense that it would result in an increase in the level of competitive success. This is true for both public and private institutions, in addition to bronze programs. Coaches of well-funded rowing programs likely have the ability to recruit wherever and whoever they desire. In terms of the bronze category, because that group encompasses programs just outside the silver tier all the way to the least successful programs, this emphasizes that those differences in number of experienced recruits does matter. A larger number of experienced recruits means a larger immediate impact on team speed and greater depth in case of unexpected student-athlete injuries.

A model developed in 2017 by Sparks Consulting found in heavyweight men's rowing at the Intercollegiate Rowing Association (IRA) Championships that each additional international athlete can be associated with a 1.88-point increase which means "a boat of international athletes could theoretically nearly bridge the gulf between third and first place in the Varsity 8+" (Connor, 2017). A similar model was developed for Division I women's rowing at the NCAA Championships; unfortunately, it was not statistically significant ($p = 0.11$). However, there is an underlying sentiment that international rowers might be unique in their impact on competitive success; this study substantiates that claim. International Walk-Ons or Recruits Signed to a team are not only significant in simple regression analyses, but also for the public institution and small institution sample subgroups.

This is likely for a variety of reasons. First, many private institutions could be disadvantaged at the outset as public institutions typically have a wider and stronger international brand. It might be more difficult to attract international talent to a lesser-known school than to a more well-known school. Second, rowing programs at public institutions generally have larger total budgets, and thus, would be more likely to be able to fund international recruiting. Third, tuition costs at private schools are typically much greater

than those at public institutions, and if a program or university is unable to provide substantial athletic or academic aid, an international student might not be able to attend. However, small institutions might be able to provide greater athletic or academic aid to particular students as they have fewer students and often fewer sports to support.

As has been established, the more experienced and international recruits a program can attract, the more likely a program is to be competitively successful. However, it is important to also consider whether or not those experienced recruits are directly impacting the speed of the Varsity 8+. This study found that more experienced recruits in the Varsity 8+ results in a greater likelihood of competitive success. Across many sports, veteran statuses are associated with greater poise and often greater mental and physical strength or ability. Poise and strength/endurance are particularly important in rowing and those qualities can be improved upon over time; an experienced recruit might already be more poised in a stressful situation and have more mental and physical strength than an inexperienced individual. These qualities would be beneficial in all boats, but especially the Varsity 8+ where boat speed is the fastest and the most team points can be earned.

Furthermore, the impact on competitive success of recruits in the Varsity 8+ can be seen in a number of other sample subgroups – public institutions, large institutions, and gold and bronze programs. As for the public institutions, that was the institution type for a majority of the programs categorized as gold. Additionally, those institutions were often also categorized as large in enrollment size.

These walk-on and recruit variables all impact a program's roster size. It makes sense that the greater roster depth a program has, the more likely it is to be competitive successful. Simple regression analyses substantiate this idea and support the claim that there is a significant relationship between a program's roster size and competitive success. Not only does depth have the potential to increase internal competitiveness, as more people are vying for a small number of seats in the boats, but also in the case of injuries, as there might be less of a disparity in terms of speed of a replacement if there are more student-athletes at the outset. This relationship could also true because of the walk-on nature of the sport and the reality than student-athletes do not always choose to continue competing with the team. As shown by the data, on average 25 inexperienced walk-ons or recruits join a team, but just under half of those transition to the Varsity team the following year. But the greater number of student-athletes who

transition onto the Varsity team help to maintain and/or grow the size and depth of the program roster. This was particularly true for programs at medium sized institutions; it is possible that occurs because these institutions have neither an enormous nor finite pool of student-athletes to pull from and so programs who can maximize their roster size have more successful results than those of the same group who cannot.

In terms of the RBV, very few of the human resources identified in this study could be sources of sustained competitive advantage. Many of these variables are things that a program could theoretically increase from one year to the next like Admissions Slots, Number of Coaches with or Working towards a Master's Degree or Higher, Number of Experienced Recruits Signed, Number of Experienced Recruits who Competed Most Often in the Varsity 8+, Program Roster Size, and Number of Inexperienced Walk-Ons or Recruits. A program might be able to develop a temporary competitive advantage over other programs ranked around them by increasing these factors; however, they are not rare in terms of being acquired or imitated.

There are programs in which there is little to no potential for the development of some of those resources. Maybe a university does not and will not provide Admissions Slots to athletics or the program's budget makes it impossible to recruit internationally or provide substantial aid to international students. Those programs would experience a lengthier disadvantage to the programs whose limitations are less static. Although a few resources are rarer in nature like the Total Years of Experience on or with the National Team and Number of International Walk-Ons or Recruits Signed, those variables can be sought out and intentionally developed. The ability for the variables to be substituted or imitated makes them only potential sources of temporary advantage. Although statistically insignificant, the average Team GPA and Number of Student-Athletes Receiving Athletic or Academic Awards are resources that can be encouraged but are not under the direct control of a program. These could be sources of competitive advantage since inconsistencies exist in academic rigor from institution to institution and how a student performs athletically or academically is not always easily imitated and/or substituted.

Once again, this data provides statistical evidence that dedication to specific human resources—related to student-athletes—can help a number of programs with particular characteristics foster better opportunities for temporary competitive advantage and improved competitive success. This student-

athlete focus furthers the research of Smart and Wolfe (2003) who found that player resources in the MLB accounted for 67% of the variance in performance while leadership contributed slightly more than 1% (p. 178).

ORGANIZATIONAL RESOURCES

The Organizational Resource group was used to quantify and understand the institutional environment in which programs function and the influence that uncontrollable characteristics have on the competitive success of a rowing program. As detailed in Chapter IV, the two most significant organizational resources in simple regression analyses were Director's Cup Ranking and the USNWR Ranking.

Before discussing the two significant variables, it is interesting to understand the implications of the insignificant variables. One might believe that program or institutional history with a sport has influence on the competitive success of that program; for example, since the first collegiate rowing event was a men's race between Harvard and Yale, theoretically, those programs would have had the most time to develop their training and resources to be competitively successful ("Rowing History Timeline," 2005; Smith, 2011). However, this study shows that this is rarely the case in women's rowing. The overall lack of significant relationships indicated between cMax ranking and the Year an Institution was Established, as well as the Year the Program was Established, show that programs are not disadvantaged by being newer to the intercollegiate rowing scene than those with a lengthy history. However, significant relationships did appear for both variables if the institution was private. This is likely due to the demographics of respondents skewing more private than public. Ultimately, although most programs are not competitively disadvantaged by their institutional or program inception, it is likely that these variables have underlying influences on other factors like recruiting or academic allure.

The Director's Cup Ranking is used nationally to quantify the overall competitive success of Division I athletic departments. This study finds that the Average Director's Cup Ranking variable was significantly associated with competitive success for women's rowing. In simple regression analyses, private institutions, small institutions, and bronze programs were particularly connected to the variable. Due to the demographics of respondents, over half of the programs fell into all three categories; however, that should not dismiss the significances entirely. Although typically public institutions fare better in the

Director's Cup—due to larger sport sponsorship, larger budgets, larger alumni bases, etc.—an increase in a private institution's Director's Cup Ranking could indirectly improve the rowing program's likelihood of competitive success. If an athletic department improves their Director's Cup Ranking even small amounts, that competitive success and improvement becomes something of a standard and/or expectation across more sports. That "climbing-the-charts" mentality could result in athletic departments being more receptive and/or willing to invest resources into programs that have room to improve and impact the department's overall success. In another way, improved Director's Cup Ranking increases the athletic reputation of an institution making it potentially more appealing to recruits.

The USNWR Ranking indicates the national academic reputation of institutions. This variable was significant for both the public and private institutions, in addition to appearing as the most significant predictor of competitive success in this resource group. Nearly one-third of the programs that participated in this study were at institutions which did not appear on the Best National Universities list, but rather a Regional Universities list; and those programs almost exclusively fell in the private institution, small institution, and bronze categories. This study finds that the academic reputation of the institution can have an impact on the competitive success of a rowing program—whether because of the student-athlete interest in academically rigorous institutions or because some of the qualities that characterize successful rowers are also qualities that characterize successful students (i.e. driven, competitive, smart). Furthermore, academic success is frequently a point of pride for Division I programs as the professional career opportunities are limited in rowing and as the sport is heavy with walk-ons who may have chosen an institution based solely on academics.

In terms of the RBV, the Director's Cup and USNWR Rankings fit many of the criteria necessary for sustained competitive advantage. First, these rankings are rare in that typically only one institution can achieve each available ranking. Second, they are valuable because they can be used from a grander university perspective to market themselves. Third, they cannot just be copied, as external factors and organizations determine these rankings. Fourth, they cannot be substituted very well, as these are the most widely-respected methods of making these national comparisons. This claim is substantiated by the survey responses, as 86% of the top half of the Director's Cup Rankings were filled by gold and silver programs; and 75% of the gold and silver programs filled the top half of the USNWR Ranking slots.

While on the surface these two variables are not under the direct control of a rowing program, all coaches and programs can help improve these variables through their actions and team cultures. The extent to which an athletic department and any program can bring in academically prepared students and develop and support them in their academic goals, can assist in the overall academic standing of the institution. The same concept is true on the athletic side, in turn impacting the athletic standing of the institution.

PHYSICAL RESOURCES

Rowing is an equipment-heavy sport; there are basic needs for water practice like a body of water, boats, and oars, and then ergometers and a space for land practice. In this study the Physical Resource variables fit into roughly four groups: general variables, practice-related variables, boat storage facility variables, and indoor facility variables. Based on simple regression analyses, the practice-related variables appeared as the most significantly impactful group to competitive success.

The ability for coaches and programs to schedule competitions can be impacted by their budget and/or institutional policies about missed class time. If a program has a larger budget and laxer missed class time policies, they may be able to travel further or more frequently for competitions. While this may be true, no relationship was found between the number of competitions a program has and competitive success. A program is not necessarily disadvantaged by those limitations. However, there may be underlying effects that do impact competitive success, in that programs able to compete more frequently or who have a wider geographic travel plan could be competing against programs of higher success. The top tiered programs span all corners of the country and so in order to compete against each other, those programs would likely need to travel further.

In shifting to more internal variables, it would seem possible that the convenience of a closer boat storage facility might be connected to competitive success; for example, that student-athletes and coaches with less travel time to and from the water would be more likely to compete at a higher level. This was not found to be substantiated by the data. Some programs do have a much shorter commute than others, but overall, this variable was not found to have a direct impact on competitive success.

The Number of Functional Ergometers was found to be significantly related to competitive success particularly for public and private institutions, large institutions, and bronze programs; although

there might be a direct cause and effect relationship, it is more likely this was a confounding variable, as a larger number of functional ergs is an indication of the size and support of the program. For example, a larger roster size means the need for a larger number of ergs. A larger roster size and larger number of ergs means having a larger budget to support the student-athletes and afford necessary equipment. A larger number of ergs also means needing a larger space to practice. A larger budget and larger space to practice means the athletic department values ensuring the program has what it needs. Moreover, with a larger number of ergs, a program can have more student-athletes practicing at the same time, making the environment more competitive and effective. While having good, functioning equipment is definitely connected to a program's ability to develop competitive athletes, it is also possible that this variable is an indicator of other underlying factors—like budget and roster size—which have also been connected to competitive success.

The practice-related variables all indicated significant relationships to competitive success. If a team does not have a sufficient body of water, amount of equipment, or number of coaches, they might not be able to all practice together on the water at any given time, and the ability for a team to practice together is imperative in developing speed and ultimately competitive success. None of the sample subgroups indicated significant relationships for ability to practice together on the water.

Furthermore, if a program does not have a Dedicated Indoor Facility sufficient to store their equipment and/or practice, then less time and energy is likely spent getting faster as a team and more time and energy is spent transitioning from space to space. Here, private institutions, small institutions, and bronze programs all showed a significant relationship to competitive success; this means that the few programs that fit these characteristics and have a Dedicated Indoor Facility will likely have a higher level of competitive success than those that do not. This makes sense in that if a program at a private and/or small institution has this dedicated indoor space, they are able to train in a less interrupted way than those that must share space.

Lastly it is important to remember that rowing is an outdoor sport which is frequently impacted by weather; some institutions are in areas where the water freezes or is too cold or windy to row year-round. While any program can spend time indoors working out using ergs, some programs have access to a tank, which is an indoor facility that simulates rowing on a body of water. This study found there to be a

significant relationship with this variable and competitive success. Although there could be an inherent advantage in using a tank year-round, it is again more likely that this is an indicator of an underlying factor. Tanks are very expensive to build and maintain. Most of the programs which responded indicated that they did not have access to a tank, however, 64% of the respondents who said they do have access to a tank fell into the top two tiers of competitive success. This is not to say that tanks are necessary for competitive success, as 42% of the top two tiers of competitive success said they do not have access to a tank. The programs with tanks likely have larger budgets and more support from their athletic department to get what they need to continue their competitive success.

The third variable group focused on qualities of the boat storage facility, like the Size, Condition, amount of Storage, Proximity to Water, Dock Access, and Ability to Host Competitions. A disparity exists between rowing programs in terms of their boat storage facilities (Georgetown Athletics, n.d.; ODU Athletics, 2011; Princeton Athletics, n.d.; UNC Athletics, 2012; Washington Rowing, n.d.). Some programs have a rented bay in a shared public facility, others have a shack in the woods, and others have private, multi-million-dollar, multi-storied, air-conditioned facilities. It might seem logical that programs with better boat storage facilities would be more competitively successful; however, that was not substantiated by the data. Approximately half of the respondents felt that their boat storage facility at least Mostly fit their needs in terms of Size, Condition, and Storage, with the other half indicating a level of dissatisfaction. Proximity to Water and Dock Access were sufficient for over 90% of respondents; however, a very different pattern appeared in relation to the Ability to Host Competitions. While nearly two-thirds of respondents felt they were at least Somewhat able to host competitions, the other third virtually Never felt their boat storage facility was sufficient to host. Although none of these variables were significant in simple regression analyses, silver programs indicated a statistically significant relationship with the Ability to Host Competitions; however, this variable is almost not significant, so it cannot be known how a change in respondents and sample size would affect the significance. These overall insignificant findings indicate that the boat storage facility is just that—a storage facility; while the state of the facility might limit other factors like recruiting and the quality of it does indicate the level of program support by the athletic department, it's connection to competitive success is not substantial, nor direct.

The final group of physical variables focused on the Indoor Facility and its Location, Size, Storage, Ventilation, and Scheduling Availability. Only the Location on Campus was found to be significant in simple regression analyses, with subgroup comparisons indicating significances for private institutions, extra-large institutions, and bronze programs. Similar to the distance of the boat storage facility to campus, the more convenient the indoor facility location on campus is for student-athletes and coaches, the more streamlined the training process can be. Additionally, there was a relationship indicated for medium institutions with Ventilation of the indoor facilities. This reinforces the idea that the quality of the facilities has the potential to directly impact the competitive success of a program, as a hot, stuffy room with poor ventilation could reduce the effectiveness of the training environment.

In terms of the RBV, most of the physical resources identified in this study could only be sources of temporary competitive advantage. Many of these variables are things that a program could theoretically increase or improve from one year to the next, like Number of Competitions, Number of Functional Ergometers, the Boat Storage Facility, and the Indoor Facility. A program might be able to develop a temporary competitive advantage over other programs ranked around them by increasing or improving these factors; however, they are not rare in terms of being acquired or imitated.

However, some programs might have little to no potential for the development or improvement of these resources. Maybe an athletic department does not have the interest, ability, or funding available to build a dedicated indoor facility for the rowing program. Or an athletic department cannot increase the program's budget to purchase more ergometers if there is no place to store them. Those programs would experience a lengthier disadvantage to the programs whose limitations are less static. On the other hand, there are variables that might simply never be improved upon. One example could be the actual body of water used for practice. If an institution has only one body of water within a reasonable distance to campus, that is the only option for the team to use. In this way, it could be a source of sustained competitive advantage or disadvantage because the resource is not easily imitated and/or substituted.

This data provides statistical evidence that support of physical resources relating to practice can help programs with particular characteristics foster better opportunities for temporary competitive advantage and improved competitive success. Furthermore, this idea that many physical resources are not sources of sustained competitive advantage support the findings of Smart and Wolfe (2000) who

found that physical resources like stadiums were valuable but not rare and could not be the sources of Penn State football's sustained competitive advantage in the 1990s.

FUNDAMENTAL RESOURCE NEEDS

A subjective question was posed to the respondents regarding the athletic department support they feel is provided for their program's fundamental needs in each of the three resource groups. This was a way to capture whether or not the data, reported was adequate for the program to be conducted and theoretically succeed. It seems logical that an athletic department should strive to meet, if not succeed, the fundamental needs of all their programs, but not all programs achieve these goals. Most athletic departments already operate at a deficit, (Berkowitz, Schnaars, & Hannan, 2017) so the idea that they should spend money on rowing – a non-revenue generating and expensive sport with a very large roster – may not be as appealing or feasible as supporting other sports.

By the data, it would appear that few rowing programs are supported in all ways to the degree that they feel is necessary to function, let alone succeed. The Financial Resource Needs responses indicated that on average, coaches feel their fundamental needs are only "Somewhat" met. Although this category had the highest average, it also had the highest standard deviation. There are definitely institutions that feel very supported in their needs, but those appear in stark contrast to the group of institutions who feel their fundament needs are virtually "Never" met. The Human and Physical Resource Needs reflected a similar sentiment. Comparisons from all three resource groups across all three sample subgroups indicate that the larger the public institution and the more competitive the program, the more likely it is for the program's fundamental needs to be met. This makes sense because athletic departments often reward athletic success with support to program needs and those that are public typically have greater funds to distribute.

Moreover, these sentiments of support in each of the three resource groups were significant in five of the nine categories of comparison based on regression analyses. Based on certain characteristics, there are programs which would likely see and feel the competitive success impact of improvements on these different types of resources. There are so many categories that are associated with competitive success, and the sentiments of support could virtually all be improved upon, which

leaves athletic departments with a number of opportunities in which they can develop and show their commitment to nearly any kind of rowing program.

Furthermore, the ANOVA analyses indicated that many of the significant differences that appear between these various subgroups are based in the financial resources category. What is important to understand though is that most of the significant differences that exist are in comparisons made based on competitive success. Bronze programs feel significantly different about their level of athletic department support than do the silver and gold programs. This makes sense as a competitively successful program would have more leverage to ask for their needs to be met. However, if athletic departments are not supporting these Fundamental Resource Needs of bronze programs, they are adding handicaps to the already tough job of improving the programs' success.

In reality, some coaches might never be satisfied with the support from their athletic department; the landscape of recruiting, competing, equipment, and technology changes so quickly that there is almost always more that can be done for a program. Overall, women's rowing on a national scale has plenty of room for improvement before most programs have the kind of support from their athletic department they feel is fundamental to their success.

RESEARCH QUESTION 2

The regression analyses help to determine the kind of relationship the variables have with competitive success, but that information only paints part of the picture. It is also crucial to understand if the variables are distributed across the sample subgroups in significantly different ways that could be creating competitive advantages for some programs.

In discussing the ANOVA analyses, it is important to note that each of the three subgroups of external characteristics (type of institution, enrollment size, and competitive success) can be sources of competitive advantage based on the RBV. The size and type of an institution is completely outside the control of any program and although the categories of sizes and types are limited, they are also static in nature. They cannot easily be changed—let alone manipulated by the athletic department or rowing program to become a new source of competitive advantage. This makes the separate categories of institutions valuable, rare, imperfectly imitable, and hardly substitutable, and thus likely sources of competitive advantage. However, these categories are not sources of competitive advantage within each

group; for example, if public institutions are advantaged in a variable over private institutions, the public institutions have a competitive advantage, but that advantage does not exist within the group of public institutions. Furthermore, these characteristics have underlying influence on the availability of these variables and each other; many institutions with one characteristic also had the same characteristic of another category.

FINANCIAL RESOURCES

The ANOVA analyses indicated significant differences between means of the Institution Type subgroups in four of the five financial variables – Total Budget, Number of Student-Athletes on Athletic Aid, Head Coach Base Salary, and Assistant Coach Base Salary Pool. The only insignificant variable was the Number of Student-Athletes on Full Scholarship. This is in part due to the small *n* in comparison to the other variables in the resource category, and in part due to the overall low number of full scholarships reported by the respondents. Although there is a 20-full scholarship maximum, no program reported having nearly that full scholarships at their discretion.

Some of the significant differences for the other four variables was likely because of influence by underlying factors; for example, many of the respondents who fell into the public institution group also fell into a larger enrollment size and the more successful groups. As has been discussed, larger institutions and public institutions receive state and federal funding and often sponsor a greater number of sports which results in the need and/or ability to have a larger budget. Additionally, many successful programs are rewarded with greater financial support in order to continue their success.

As for the Enrollment Size groups, the same four variables were significant. However, because there were four groups, the differences could be identified more specially. In most comparisons, the significant differences appeared between the institutions on the ends of the size spectrum; for example, the Total Budgets were significantly different when comparing the extra-large institutions to the small institutions. Many of the same explanations, in terms of underlying factors, apply to the significant differences between the means in this group, but they are especially true when comparing one institution to another that is at least six-times larger in size. A particularly interesting difference is indicated between the medium and extra-large institutions for the Assistant Coach Base Salary variable. In this comparison, the average Assistant Coach Base Salary Pool for a program at an extra-large institution is already

significantly larger than that of a medium institution, let alone a small institution. One of the reasons for this is that virtually all of the programs at extra-large institutions reported three assistant coach salaries, whereas only two programs at medium institutions were able to do the same.

The Competitive Success subgroups indicated significant differences between most of the same variables; however, the Number of Student-Athletes on Athletic Aid was insignificant, rather than those with Full Scholarships. In nearly every comparison, the bronze group average was significantly different from both the silver and gold groups. The effects of the Institution Type and Enrollment Size have a direct impact on the level of funding afforded to a program, and ultimately to the level of success that a program is able to achieve. In a more circular explanation, the more a program struggles to be competitively successful, the harder it might be to improve the status of these resources, as often times increased financial resources are given based on competitive success. But this data is showing that these bronze programs are frequently being initially disadvantaged by external characteristics and then further handicapped from competing successfully by a lack of financial resources.

HUMAN RESOURCES

Of the variables identified as Human Resources, only two indicated significant differences exist between means of the Institution Type subgroup – Number of Head Coaches and average Number of Inexperienced Walk-Ons or Inexperienced Recruits. This is particularly interesting as both were insignificant in the regression analyses. The Number of Head Coaches was significant, but only slightly, so if the sample size had been larger it would be interesting to see if and how that might have changed. As has been mentioned already, the tenure of many head coaches in rowing is longer than those of other sports. These findings support the research of Smart and Wolfe (2000) who found that the coach staff stability within the Penn State football team was a source of "enduring competitive advantage" for the program through the 1990s (p. 143). Research by Cunningham (2003) was also supported by this study through the significance of the Average Number of Inexperienced Walk-Ons or Inexperienced Recruits variable, as Cunningham found that "expenditures used to recruit student-athletes served as the most potent predictor" of athletic department success (p. 56).

Significant differences between the means of the medium and extra-large institutions and the Number of Coaches with or Working towards a Master's Degree or Higher variable appeared in analyses

based on Enrollment Size. There are simply fewer rowing coaches at medium sized institutions who have or are working towards a master's degree or higher, than every other group, but especially the extra-large institutions. Although this variable is insignificant in terms of directly impacting competitive success, this finding once again furthers the research of Smart and Wolfe (2003) who found that leadership in the MLB contributed slightly more than 1% of the variance in performance while player resources accounted for 67% (p. 178).

Furthermore, the average Number of Inexperienced Walk-Ons or Inexperienced Recruits also showed significant differences between the means of the extra-large institutions and all other institution sizes. The extra-large institutions by nature have the largest population of undergraduates from which to develop their roster. As rowing technique can be taught fairly quickly, not only can walk-ons be inexperienced, but so can recruits. A great athlete has the potential to be molded into a great rower. In addition to the undergraduate population, the reach and funding of a program at an extra-large institution directly impacts their ability to bring in larger numbers to their roster.

Three Human Resources variables were significant when comparisons were done based on Competitive Success. However, two of the three variables only indicated significant relationships in the omnibus ANOVAs and not between any of the success groups; these variables were the Number of Experienced International Walk-Ons or Recruits Signed and the average Number of Experienced Recruits who Competed Most Often in the Varsity 8+. As was discussed with RQ1, this study finds that by increasing the number of experienced and international recruits a program brings in, the more likely that program is to be competitively successful. That the underlying effects of having experienced recruits in the Varsity 8+ is likely to result in boat speed and team success.

The third variable, average Number of Experienced Recruits Signed, showed significant differences between the bronze and gold groups. This is likely due to many of the aforementioned reasons: the more successful programs typically are at public institutions with larger budgets and larger undergraduate populations, all of which might be attractive to more potential student-athletes resulting in a larger roster and more recruits committing to a program.

ORGANIZATIONAL RESOURCES

Across all three sample subgroups, Director's Cup Ranking appeared as a variable with significant difference among various means. In terms of Institution Type, this makes sense because public institutions often sponsor more sports and have larger budgets to support those sports than private institutions. Additionally, public institutions were also categorized as competitively successful in this study more often than were private institutions and these higher levels of competitive success would have a direct impact on the institution's overall Director's Cup Ranking.

The Enrollment Size comparison indicated significant differences existed in this variable between the means of the small institutions and the means of every other group. Again, because smaller schools likely sponsor fewer sports they have fewer opportunities to participate in and finish well in NCAA championships which is how the Director's Cup Rankings are calculated. Typically, the smaller the school, the smaller the financial resources available to invest into athletic programs.

In terms of Competitive Success, the bronze to both gold and silver comparisons were significantly different for this variable. Once again, the influence of the other two sample subgroups is apparent on the success of programs at the bronze level. Small and private institutions have a much harder time developing competitive success due to the innate disadvantages of those characteristics. Whereas the other programs are slightly more advantaged because of their characteristics. Furthermore, this finding supports the research, like that of Cunningham (2003) who found that the use of Director's Cup Ranking was a successful measurement of an athletic department's performance. Additionally, the USNWR Ranking was also significantly different between the bronze and gold programs. Research suggests that "position in the US News and World Report 'Best Colleges' ranking is one of the strongest predictor variables" in determining a program's "value to intercollegiate athletic conferences in rights fees" (Jensen, Turner, & McEvoy, 2015).

PHYSICAL RESOURCES

Based on Institution Type, the only variable that indicated a significant difference between the public and private institutions was the ventilation of the indoor facility. This seems to be a rather unimportant finding in reality of Division I women's rowing. Furthermore, there were no significant differences indicated between any of the enrollment size subgroups. These findings show that public or

private, and regardless of size, physical resources are not sources of competitive advantage. For example, simply because a program does not have a great boat storage facility does not mean that they are unable to be competitively successful. However, it is important to remember that while there might not be a direct relationship to competitive success, these resources may have underlying influences on other factors like student-athletes and recruiting, that are in fact significant resources.

Two variables were significant in terms of competitive success – the number of functional ergs and the quality/condition of the boat storage facility. The significant differences for number of ergs existed between the bronze and gold groups which is more likely to be an indication of the influences of other variables like roster size, budget, student-athlete aid, and recruiting.

A similar explanation seems logical for differences between the silver and bronze groups shown by the quality/condition of the boat storage facility. Silver programs are likely able to leverage their success to have a boat storage facility renovated or maintained in a better way than the bronze programs. But because the significance was just under the standard, it is unclear how that value might change if the sample size was larger or different.

In terms of the RBV, many of the physical resources in this study did not meet the characteristics that define a source of competitive advantage – rare, hardly substitutable, imperfectly imitable, and valuable. Physical resources, though valuable, are infrequently rare, hard to substitute, and imperfectly copied; any type of equipment can be purchased by any program at any time. Even though something like a boat storage facility might be built to serve a unique set of purposes for a program, the same purposes could be served in different ways in another program's boat storage facility. Similar to the Human resources, while many of these variables cannot be sources of sustained competitive advantage, the impact of other limitation—like financial resources—can result in physical resources as a source of temporary advantage. Program A might gain temporary advantage over its ranked peers from a bump in number of functional ergs until its peers are able to make those improvements. On the other hand, if the Program A was initial at a disadvantage based on number of ergs than its ranked peers, it might not see any kind of temporary advantage because Program A is only reducing the advantage its peers had on it.

The idea that many physical resources are not sources of sustained competitive advantage support the findings of Smart and Wolfe (2000) who found that physical resources like stadiums were

valuable but not rare and could not be the sources of Penn State football's sustained competitive advantage in the 1990s. But the extent to which these variables impact human resources supports first., the findings of Smart and Wolfe (2003) who found that player resources accounted for 67% of the variance in team performance in the MLB and second, mirrors the ideas of Won and Chelladurai (2016) who found that the development of one kind of resource explained much of the generation of another resource.

FUNDAMENTAL RESEARCH NEEDS

The ANOVA analyses indicated that many of the significant differences that appear are based in the financial resources category. The other layer to this is that many of these differences are most prevalent in competitive success comparisons. Bronze programs feel significantly different about their level of athletic department support than do the silver and gold programs. It makes sense in that a competitively successful program would have more leverage to ask for their needs to be met and an athletic department might have more confidence in the return on investment. However, if athletic departments are not supporting these Fundamental Resource Needs of bronze programs, they are adding handicaps to the already tough job of improving the programs' level of success.

Once again, some coaches might never be satisfied with the level of support from their athletic department because more can almost always be done for a program. The point is that Division I women's rowing has plenty of room for improvement.

Another piece to this puzzle is the theory of holism. Holism is the idea that effectiveness of group actions is greater than the separate actions of the individuals. In this train of thought, the improvement of all programs has a direct and positive impact on the state and competitive success of the sport. Just like depth on a roster makes everyone work harder to earn their spot, it is in the best interest of Division I women's rowing to encourage the development of speed and resources for all levels of programs.

QUALITATIVE RESEARCH QUESTIONS

No distinct patterns appear when analyzing the responses provided relating to program advantages, disadvantages, and culture terms. Programs with high and low success, at public or private institutions, and at institutions of all sizes noted advantages like coaching, culture, and location.

Programs of all kinds also noted disadvantages like budget, weather, and facilities. Most of the programs used a variety of the same terms to describe their team culture like family, hardworking, and willing.

In comparing the results in terms of the RBV to the perceived advantages and disadvantages of the qualitative data, there are a few similarities. Resources like budget and coaching compensation are statistically significant factors that can be an advantage or disadvantage. Although the data contradicts perceived importance in terms of scholarships, the influence of those scholarships on other variables is important, as student-athlete recruiting variables are particularly significant.

This study did not include many variables relating to geographic location and weather; and although programs can both benefit from and struggle with these variables and its impact on other factors, it is worth nothing that national championship team have come from every corner of the country. There are programs with tough weather and less than ideal locations who compete just as highly as those with great weather and perfect locations. While the effects of these factors can be big, they should not be viewed as insurmountable obstacles.

Interestingly, many of the advantages and disadvantages could apply to all different sports; and these are realities that all types of programs experience, from Pee Wee to collegiate teams. There may be slight differences in priority or impact of these factors at the different levels, but the advantages and disadvantages boil down to just a few common themes.

There is something to be said, however, in relation to the culture terms and their manifestation into a tangible culture. The language is relatively similar across most programs, but how a high success program interprets and internalizes a term like “dedication” could be very different than that of a low success program. So although both teams may describe their culture in the same way, the manifestation of the culture could have very different competitive results. Furthermore, as the responses were subjective, it is hard to know which, if any, of the terms were describing an idealized version of a team’s culture versus what the reality of the culture may be.

CONCLUSION

This was the first comprehensive study of its kind, as there have been virtually no investigations done to identify and analyze resource-based factors that impact competitive success in Division I women’s rowing. This study provided an unprecedented opportunity for programs to see a broad-based

picture of the distribution of resources, as well as the ability to develop incremental goals for improving resources over time. All of the findings and comparisons can be used by coaches as points of leverage in conversations with administrators by offering data-driven recommendations.

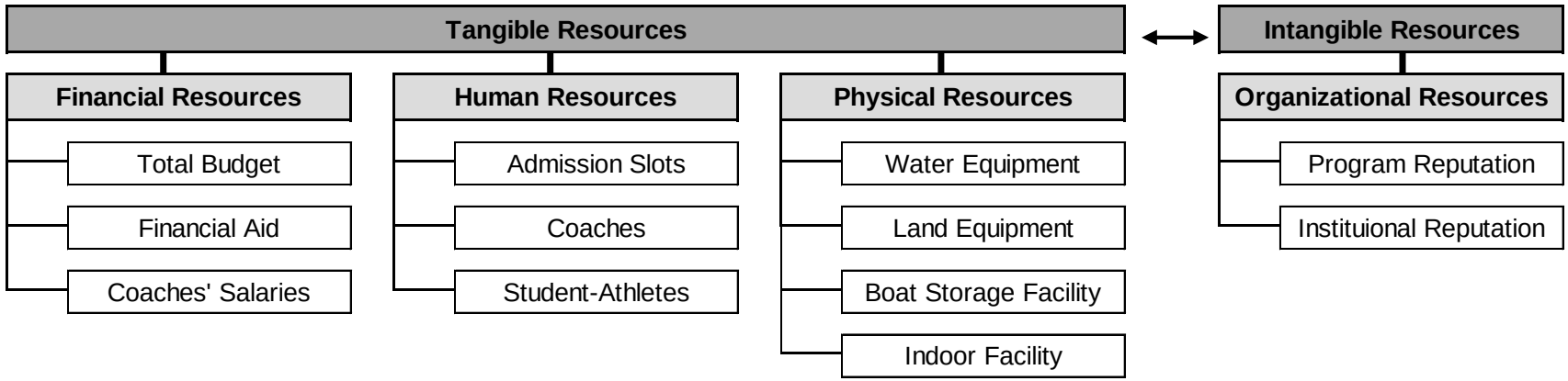
The RBV framework was a highly successful tool to develop not only a categorical structure to compare types of resources, but more importantly, a logical set of criteria to evaluate the competitive advantage potential of each variable. The downside to this framework is that it does not accompany any kind of verified, general survey instrument; however, because of the flexibility of its application, researchers might want the ability to develop an instrument specific to their investigation, such as the case of this study. Furthermore, the implications of the study reinforce the potential for the application of the RBV to any other sport. Although a new instrument would need to be developed for each sport, the real-world benefits of programs using data to maximize their likelihood of competitive advantage are substantial.

FURTHER RESEARCH

This initial investigation of identifying resources associated with competitive success in Division I women's rowing provides a framework from which further research can be conducted. The data in this study will soon be outdated as the information collected was from the 2015-16 and 2016-17 seasons, so it could be repeated to build consistent support for certain resources as each institution's cMax rankings develop over time. There are deeper analyses that can be done with the current dataset in this study like developing a predictive model for each type of program (based on the institutional and program characteristics) and identifying if plateaus in competitive success exist at certain levels within the individual resource variables. There are also other factors to consider in relation to competitive success like the impact of team culture and other intangible resources like leadership style.

Furthermore, this study acts as a model for applying the RBV analysis to virtually any other sport in intercollegiate athletics. Athletic departments and programs could identify and analyze the variables that most impact competitive success particular sports and with that data could make more informed decisions to increase their likelihood of competitive success.

APPENDIX 1: RBV CHART: ROWING RESOURCE CATEGORIES AND VARIABLE GROUPS



APPENDIX 2: SIGNIFICANCE CHART: REGRESSION ANALYSES

Variables	Entire Sample	Sample Subgroup Analyses								
	Simple Regression	*Institution Type*		*Enrollment Size*				*Categorical Success*		
	(p)	*Public (p)*	*Private (p)*	*Small (p)*	*Medium (p)*	*Large (p)*	*Extra-Large (p)*	*Gold (p)*	*Silver (p)*	*Bronze (p)*
FINANCIAL RESOURCES										
Total Budget	0.001	-	0.043	-	-	-	-	-	-	-
Number of Student-Athletes on Athletic Aid	0.002	-	-	0.024	-	-	-	-	-	0.003
Number of Student-Athletes on Full Athletic Scholarship	0.000	0.022	0.000	0.035	-	-	-	-	-	0.039
Head Coach Base Salary	0.000	0.008	0.000	0.008	0.008	0.011	0.004	-	-	0.000
Assistant Coach Base Salary Pool	0.000	0.010	0.000	0.002	0.003	0.003	-	-	-	0.002
HUMAN RESOURCES										
Average Number Admissions Slots in the last 2 years	0.003	-	0.003	-	-	-	-	-	-	0.007
Number of Program Head Coaches in the last 5 years	-	-	-	-	-	-	-	-	-	-
Combined Total Years of National Team Experience on Coaching Staff	-	-	-	-	-	-	-	-	-	0.007
Number of Coaches With or Working Towards a Master's Degree or Higher	-	-	-	-	-	-	-	-	-	-
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	-	-	-	-	-	-	-	-	-	-
Number of Inexperienced Walk-Ons or Inexperienced Recruits Who Transitioned to the Varsity Team the Following Year	-	-	-	-	-	-	-	0.045	-	-
Average number of Experienced Recruits who Signed on to the Team in the last 2 years	0.001	0.017	0.030	-	-	-	-	-	-	0.001
Total number of International Experienced Walk-Ons or International Experienced Recruits in the last 2 years	0.002	0.000	-	0.037	-	-	-	-	-	-
Average number of Experienced Recruits that Rowed Most Often in the Varsity 8+ in the last 2 years	0.001	0.001	-	-	-	0.009	-	0.027	-	0.002
Average Program Roster Size in the last 2 years	0.000	-	-	-	0.010	-	-	-	-	-
Total number of Student-Athletes on Team Receiving any kind of Academic or Athletic Award in the last 2 years	-	-	-	-	-	-	0.042	-	-	-
Average Team GPA in the last 2 years	-	-	-	-	-	-	-	-	-	-
ORGANIZATIONAL RESOURCES										
Year Program Established	-	-	0.045	-	0.011	-	-	-	-	-
Year Institution Established	-	-	0.033	-	-	-	-	-	-	-
Average Director's Cup Ranking	0.000	-	0.000	0.002	-	-	-	-	-	0.002
US News & World Report Ranking 2016-17	0.001	0.021	0.003	-	-	-	-	-	-	-
PHYSICAL RESOURCES										
Total Number of Competitions in the last 2 years	-	-	-	-	-	-	-	-	-	-
Number of Miles from Campus to Boat Storage Facility	-	-	-	-	-	-	-	-	-	-
Number of Functional Ergs	0.000	0.015	0.011	0.010	-	0.003	-	-	-	0.001
Is the entire team able to practice together on the water?	0.045	-	-	-	-	-	-	-	-	-
Does the women's rowing program have a dedicated indoor facility?	0.008	-	0.025	0.021	-	-	-	-	-	0.037
Does the program have a tank or access to a tank?	0.036	-	-	-	-	-	-	-	-	-
Boat Storage Facility: Body of Water	-	0.040	-	-	-	-	-	-	-	-
Boat Storage Facility: Size	-	-	-	-	-	-	-	-	-	-
Boat Storage Facility: Quality/Condition	-	-	-	-	-	-	-	-	-	-
Boat Storage Facility: Equipment Storage	-	-	-	-	-	-	-	-	-	-
Boat Storage Facility: Proximity to Water	-	-	-	-	-	-	-	-	-	-
Boat Storage Facility: Dock Access	-	-	-	-	-	-	-	-	-	-
Boat Storage Facility: Ability to Host Competitions	-	-	-	-	-	-	-	-	0.046	-
Indoor Facility: Location on Campus	0.038	-	0.028	-	-	-	0.025	-	-	0.047
Indoor Facility: Size	-	-	-	-	-	-	-	-	-	-
Indoor Facility: Storage	-	-	-	-	-	-	-	-	-	-
Indoor Facility: Ventilation	-	-	-	-	0.022	-	-	-	-	-
Indoor Facility: Scheduling Availability	-	-	-	-	-	-	-	-	-	-
FUNDAMENTAL NEEDS										
Financial Resources	0.000	-	0.001	0.022	-	0.005	-	0.044	-	0.024
Human Resources	0.000	0.026	0.002	-	-	0.037	0.022	-	-	0.040
Physical Resources	0.000	-	0.001	0.037	0.007	0.021	-	-	-	0.031

APPENDIX 3: SIGNIFICANCE CHART: ANOVA ANALYSES BASED ON INSTITUTION TYPE

Variables	Omnibus ANOVA *Type of Institution (p)*
FINANCIAL RESOURCES	
Total Budget	0.020
Number of Student-Athletes on Athletic Aid	0.000
Number of Student-Athletes on Full Athletic Scholarship	-
Head Coach Base Salary	0.011
Assistant Coach Base Salary Pool	0.000
HUMAN RESOURCES	
Average Number Admissions Slots in the last 2 years	-
Number of Program Head Coaches in the last 5 years	0.047
Combined Total Years of National Team Experience on Coaching Staff	-
Number of Coaches With or Working Towards a Master's Degree or Higher	-
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	0.003
Number of Inexperienced Walk-Ons or Inexperienced Recruits Who Transitioned to the Varsity Team the Following Year	-
Average number of Experienced Recruits who Signed on to the Team in the last 2 years	-
Total number of International Experienced Walk-Ons or International Experienced Recruits in the last 2 years	-
Average number of Experienced Recruits that Rowed Most Often in the Varsity 8+ in the last 2 years	-
Average Program Roster Size in the last 2 years	0.000
Total number of Student-Athletes on Team Receiving any kind of Academic or Athletic Award in the last 2 years	-
Average Team GPA in the last 2 years	-
ORGANIZATIONAL RESOURCES	
Year Program Established	-
Year Institution Established	-
Average Director's Cup Ranking	0.003
US News & World Report Ranking 2016-17	-
PHYSICAL RESOURCES	
Total Number of Competitions in the last 2 years	-
Number of Miles from Campus to Boat Storage Facility	-
Number of Functional Ergs	-
Is the entire team able to practice together on the water?	-
Does the women's rowing program have a dedicated indoor facility?	-
Does the program have a tank or access to a tank?	-
Boat Storage Facility: Body of Water	-
Boat Storage Facility: Size	-
Boat Storage Facility: Quality/Condition	-
Boat Storage Facility: Equipment Storage	-
Boat Storage Facility: Proximity to Water	-
Boat Storage Facility: Dock Access	-
Boat Storage Facility: Ability to Host Competitions	-
Indoor Facility: Location on Campus	-
Indoor Facility: Size	-
Indoor Facility: Storage	-
Indoor Facility: Ventilation	0.048
Indoor Facility: Scheduling Availability	-
FUNDAMENTAL NEEDS	
Financial Resources	0.010
Human Resources	-
Physical Resources	-

APPENDIX 4: SIGNIFICANCE CHART: ANOVA ANALYSES BASED ON ENROLLMENT SIZE

Variables	Omnibus ANOVA	Post Hoc Tests *Tukey for Equal Variances assumed. Games-Howell for Equal Variances not assumed.*											
		Small to Medium		*Small to Large*		*Medium to Large*		*Medium to Extra-Large*		*Large to Extra-Large*		*Extra-Large to Small*	
		Tukey	*Games-Howell*	*Tukey*	*Games-Howell*	*Tukey*	*Games-Howell*	*Tukey*	*Games-Howell*	*Tukey*	*Games-Howell*	*Tukey*	*Games-Howell*
	(p)	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*
FINANCIAL RESOURCES													
Total Budget	0.005	-		-		-		-		-		0.002	
Number of Student-Athletes on Athletic Aid	0.000		-		0.001		-		-		-		0.000
Number of Student-Athletes on Full Athletic Scholarship	-												
Head Coach Base Salary	0.010		-		-				-		-		-
Assistant Coach Base Salary Pool	0.000	-		0.035		-		0.023		-		0.000	
HUMAN RESOURCES													
Average Number Admissions Slots in the last 2 years	-												
Number of Program Head Coaches in the last 5 years	-												
Combined Total Years of National Team Experience on Coaching Staff	-												
Number of Coaches With or Working Towards a Master's Degree or Higher	0.036	-		-		-		0.021		-		-	
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	0.000	-		-		-		0.000		0.010		0.000	
Number of Inexperienced Walk-Ons or Inexperienced Recruits Who Transitioned to the Varsity Team the Following Year	-												
Average number of Experienced Recruits who Signed on to the Team in the last 2 years	-												
Total number of International Experienced Walk-Ons or International Experienced Recruits in the last 2 years	-												
Average number of Experienced Recruits that Rowed Most Often in the Varsity 8+ in the last 2 years	-												
Average Program Roster Size in the last 2 years	0.000	-		-		-		0.001		0.035		0.000	
Total number of Student-Athletes on Team Receiving any kind of Academic or Athletic Award in the last 2 years	-												
Average Team GPA in the last 2 years	-												
ORGANIZATIONAL RESOURCES													
Year Program Established	-												
Year Institution Established	-												
Average Director's Cup Ranking	0.000		0.034		0.001		-		-		-		0.001
US News & World Report Ranking 2016-17	-												
PHYSICAL RESOURCES													
Total Number of Competitions in the last 2 years	-												
Number of Miles from Campus to Boat Storage Facility	-												
Number of Functional Ergs	-												
Is the entire team able to practice together on the water?	-												
Does the women's rowing program have a dedicated indoor facility?	-												
Does the program have a tank or access to a tank?	-												
Boat Storage Facility: Body of Water	-												
Boat Storage Facility: Size	-												
Boat Storage Facility: Quality/Condition	-												
Boat Storage Facility: Equipment Storage	-												
Boat Storage Facility: Proximity to Water	-												
Boat Storage Facility: Dock Access	-												
Boat Storage Facility: Ability to Host Competitions	-												
Indoor Facility: Location on Campus	-												
Indoor Facility: Size	-												
Indoor Facility: Storage	-												
Indoor Facility: Ventilation	-												
Indoor Facility: Scheduling Availability	-												
FUNDAMENTAL NEEDS													
Financial Resources	0.001	-		0.048		-		-		-		0.001	
Human Resources	-												
Physical Resources	-												

APPENDIX 5: SIGNIFICANCE CHART: ANOVA ANALYSES BASED ON COMPETITIVE SUCCESS

Variables	Omnibus ANOVA	Post Hoc Tests *Tukey for Equal Variances assumed. Games-Howell for Equal Variances not assumed.*					
		Gold to Silver		*Silver to Bronze*		*Bronze to Gold*	
		Tukey	*Games-Howell*	*Tukey*	*Games-Howell*	*Tukey*	*Games-Howell*
	(p)	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*	*(p)*
FINANCIAL RESOURCES							
Total Budget	0.004	-		-		0.003	
Number of Student-Athletes on Athletic Aid	-		-		-		-
Number of Student-Athletes on Full Athletic Scholarship	0.001	-		0.049		0.001	
Head Coach Base Salary	0.000		-		0.020		0.022
Assistant Coach Base Salary Pool	0.000	-		0.030		0.000	
HUMAN RESOURCES							
Average Number Admissions Slots in the last 2 years	-						
Number of Program Head Coaches in the last 5 years	-						
Combined Total Years of National Team Experience on Coaching Staff	-						
Number of Coaches With or Working Towards a Master's Degree or Higher	-						
Average Number of Inexperienced Walk-Ons or Inexperienced Recruits that Joined the Team in the last 2 years	-						
Number of Inexperienced Walk-Ons or Inexperienced Recruits Who Transitioned to the Varsity Team the Following Year	-						
Average number of Experienced Recruits who Signed on to the Team in the last 2 years	0.006	-		-		0.006	
Total number of International Experienced Walk-Ons or International Experienced Recruits in the last 2 years	0.036	-		-		-	
Average number of Experienced Recruits that Rowed Most Often in the Varsity 8+ in the last 2 years	0.045	-		-		-	
Average Program Roster Size in the last 2 years	0.019	-		-		0.015	
Total number of Student-Athletes on Team Receiving any kind of Academic or Athletic Award in the last 2 years	-						
Average Team GPA in the last 2 years	-						
ORGANIZATIONAL RESOURCES							
Year Program Established	-						
Year Institution Established	-						
Average Director's Cup Ranking	0.001		-		0.003		0.000
US News & World Report Ranking 2016-17	0.046	-		-		0.038	
PHYSICAL RESOURCES							
Total Number of Competitions in the last 2 years	-						
Number of Miles from Campus to Boat Storage Facility	-						
Number of Functional Ergs	0.007	-		-		0.013	
Is the entire team able to practice together on the water?	-						
Does the women's rowing program have a dedicated indoor facility?	-						
Does the program have a tank or access to a tank?	-						
Boat Storage Facility: Body of Water	-						
Boat Storage Facility: Size	-						
Boat Storage Facility: Quality/Condition	0.021	-		0.043		-	
Boat Storage Facility: Equipment Storage	-						
Boat Storage Facility: Proximity to Water	-						
Boat Storage Facility: Dock Access	-						
Boat Storage Facility: Ability to Host Competitions	-						
Indoor Facility: Location on Campus	-						
Indoor Facility: Size	-						
Indoor Facility: Storage	-						
Indoor Facility: Ventilation	-						
Indoor Facility: Scheduling Availability	-						
FUNDAMENTAL NEEDS							
Financial Resources	0.003	-		0.023		0.009	
Human Resources	0.002		-		0.002		0.001
Physical Resources	0.007	-		-		0.008	

APPENDIX 6: ROWING RESOURCE SURVEY INSTRUMENT

Please respond to the following questions about the Varsity Women's Rowing program in 2015-16 and 2016-17.

Heavy/Open Weight Information Only

Q1. Approximately what year was the rowing program established?

1950 1963 1976 1989 2002 2015

Q2. What is the program's **approximate** operating budget?

$0 $250,000 $500,000 $750,000 $1,000,000

Q3. What is the program's **approximate** recruiting budget?

$0 $100,000 $200,000 $300,000 $400,000 $500,000

Q4. Please indicate how the athletic department budgets athletic scholarship funding for the rowing program. Complete the appropriate text box below.

Equivalencies (Indicate the FTE)

Dollar Amounts

Q5. How many rowing student-athletes receive any amount of scholarship aid?

0 25 50 75 100

Athletic Aid

Academic Aid

Q6. How many of the student-athletes with athletic aid receive a **full athletic scholarship**?

0 5 10 15 20

Q7. How many admission slots does the program typically receive in a typical year?

0 25 50 75 100

Q8. What was the program's GPA in each of the last two years?

0.00 1.00 2.00 3.00 4.00

2015-16

2016-17

Q9. Please describe the program's staff. Select all that apply.

	Full-Time (12 mo)	Full-Time (9 mo)	Part-Time (Indicate FTE)	Other, please describe
Head Coach	☐	☐		
Assistant Coach 1	☐	☐		
Assistant Coach 2	☐	☐		
Assistant Coach 3	☐	☐		
Graduate Assistant	☐	☐		
Boatman/Rigger	☐	☐		
Director of Operations	☐	☐		
Other, please describe	☐	☐		
Other, please describe	☐	☐		

Q10. Please describe the program's staff base salaries. Slide the bar for applicable individuals.

$0 $75,000 $150,000 $225,000 $300,000

Head Coach

Assistant Coach 1

Assistant Coach 2

Assistant Coach 3

Graduate Assistant

Boatman/Rigger

Director of Operations

Other, please describe

Other, please describe

Q11. How many head coaches has the program had in the last five years?

0 1 2 3 4 5 6 7 8 9 10

Q12. Approximately how many years of national team experience (e.g. Junior, U23, and Senior) does the current coaching staff have collectively?

0 25 50 75 100

Q13. How many coaching staff members have completed or are currently working towards a Master's degree or higher?

0 1 2 3 4 5

Q14. In each of the last two years, how many unique competitions did the program participate in (fall and spring seasons combined), excluding the conference championship? (e.g. multi-day regatta counts as 1; multi-team dual counts as 1)

0 5 10 15 20

2015-16

2016-17

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Q15. Please describe your boat storage facility.

- ○ Private boathouse for women's team
- ○ Shared boathouse, please describe other tenants
- ○ Other boat storage facility, please describe

Q16. In approximately what year was the boat storage facility built (or last extensively renovated)?

1800 1843 1887 1930 1974 2017

Q17. To what degree does the boat storage facility meet the needs of the program?

	Not at all	Slightly	Somewhat	Mostly	Completely
Size of facility	○	○	○	○	○
Quality/Condition of facility	○	○	○	○	○
Equipment storage	○	○	○	○	○
Proximity to water	○	○	○	○	○
Dock access	○	○	○	○	○
Ability to host competition	○	○	○	○	○
Other, please describe	○	○	○	○	○

Q18. Please estimate Miles and Minutes from campus to the program's boat storage facility.

0 15 30 45 60 75 90

Miles

Minutes

Q19. Is the entire team able to practice together on the water?

- ○ Yes
- ○ No, please describe limitations

Q20. To what degree does the body of water meet the needs of the program? Consider width, length, turns, other patrons/activities, ability to host competition, etc.

- ○ Completely, please explain
- ○ Mostly, please explain
- ○ Somewhat, please explain
- ○ Slightly, please explain
- ○ Not at all, please explain

Q21. Does the women's rowing program have a dedicated indoor facility?

- ○ Yes
- ○ No

Q22. To what degree does the dedicated indoor space meet the needs of the program?

	Not at all	Slightly	Somewhat	Mostly	Completely
Location on campus	○	○	○	○	○
Size of space	○	○	○	○	○
Storage	○	○	○	○	○
Ventilation	○	○	○	○	○
Scheduling availability	○	○	○	○	○
Other, please describe	○	○	○	○	○

Q23. How many functional ergs does the program have?

0 20 40 60 80 100

Q24. Does the program have a tank or access to a tank?

- ○ Yes
- ○ No

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Please use the following definitions to answer the questions below about the program's student-athletes.

Experienced recruit: *student-athlete with prior rowing experience who went through the formal recruiting process*

Experienced walk-on: *student-athlete with prior rowing experience who did not go through the formal recruiting process*

Inexperienced recruit: *student-athlete without prior rowing experience who went through the formal recruiting process*

Inexperienced walk-on: *student-athlete without prior rowing experience who did not go through the formal recruiting process*

Q25. In each of the last two years, approximately what was the **total roster size** for the program? (All rowing student-athletes)

0 25 50 75 100 125 150

2015-16

2016-17

Q26. In each of the last two years, approximately how many student-athletes joined the team as **inexperienced walk-ons or inexperienced recruits**?

0 25 50 75 100

2015-16

2016-17

Q27. In the last two years, approximately how many **inexperienced walk-ons or inexperienced recruits** transitioned onto or stayed on the Varsity team the following year?

- ○ All
- ○ Most
- ○ Half
- ○ Some
- ○ None

Q28. In each of the last two years, approximately how many **experienced recruits** signed to the program?

0 10 20 30 40 50

2015-16

2016-17

Q29. In each of the last two years, approximately how many of the program's **experienced recruits or experienced walk-ons** were international students?

0 10 20 30 40 50

2015-16

2016-17

Q30. When looking at the most frequent Varsity 8+ lineup in each of the last two years, approximately how many student-athletes were/are **experienced recruits**?

0 1 2 3 4 5 6 7 8 9

2015-16

2016-17

Q31. Approximately how many total student-athletes received academic and/or athletic awards in each of the last two years? (e.g. Institutional, Conference, National, Coaches Association academic or athletic honors)

0 25 50 75 100

2015-16

2016-17

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Q32. Overall, to what extent do you feel your athletic department supports the rowing program's fundamental needs in the following categories:

	Never	Sometimes	About half the time	Most of the time	Always
Financial Resources (budget, scholarships, etc.)	○	○	○	○	○
Physical Resources (equipment, facilities, etc.)	○	○	○	○	○
Human Resources (staff, student-athletes, etc.)	○	○	○	○	○

Q33. What is the program's biggest advantage in achieving or maintaining competitive success?

Q34. What is the program's biggest obstacle to achieving or maintaining competitive success?

Q35. What are three terms that best characterize the team culture?

Term 1

Term 2

Term 3

. If you have additional comments relating to any of your answers, please enter them in the text box below.

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Click the next button to submit your responses.

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