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Impact of MBA Programs' Business Analytics Breadth on Salary and Job Placement: The Role of University Ranking

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Abstract:

Although many business schools have started to offer business analytics programs and courses for their MBA students, they lack understanding about how these efforts translate into job market gains for their graduates and whether all business schools have a level playing field. To bridge this gap, we use signaling theory to investigate the impacts that the business analytics breadth (BAB) level and university ranking of MBA programs have on graduates' future employment success in terms of salary and job placement. We collected and analyzed data on business analytics-relevant courses that the top 89 business schools in the United States according to Bloomberg (bloomberg.com) offered. Our findings show the vital role of university ranking in determining the efficacy of BAB to produce job market gains for students: university ranking moderated the effect of business analytics offerings on post-graduation salary and job placement. These findings provide interesting insights for researchers and business schools interested in understanding the return on investment in business analytics programs.

Keywords: Business Analytics Breadth Level, Salary, Job Placement, University Ranking, MBA, Business Analytics.

1   Introduction

Analytics has become pervasive across industry sectors (Abbasi, Sarker, & Chiang, 2016; Demirkan & Delen, 2013). Paralleling this trend, the demand for management workforce with expertise in analytics has increased, and many business schools have added new programs and courses relevant to business analytics (Mitri & Palocsay, 2015). The assumption that, to successfully utilize business analytics, managers need to be able to grasp analytical tools, know how to use them, and identify areas of business where these tools can add value has presumably driven the abovementioned trends (Lyytinen & Grover, 2017). However, even though business schools have deployed large financial and time investments in business analytics programs (Turel & Kapoor, 2016), the current literature lacks a deep understanding about the relationship between the breadth of business schools' analytics offerings in MBA programs (which we operationalize in this study as the business analytics breadth (BAB) level) and graduates' future employment. We provide first strides toward bridging this gap in the current study.

Further delving into this research gap, we note that university rankings serve as a basis for perceptions of quality and prestige (Hazelkorn, 2015). Therefore, we also theorize on and examine the moderating role that university ranking has on the relationship between BAB, job placement, and salary. To do so, we build on signaling theory (Spence, 1978) because this theory explains how employers evaluate job applicants based on signals their educational credentials transmit. We ultimately develop and test hypotheses to address the following research questions (RQ):

RQ1: Does BAB impact job placement and salary?

RQ2: Does university ranking moderate the impact of BAB on job placement and salary?

We address these questions by collecting data from bloomberg.com and the ranked universities websites, developing BAB indices for top MBA programs in the United States (US), and analyzing the proposed model with partial least square (PLS) techniques. The findings support our assertions and help researchers to better understand the roles of BAB and university ranking in affecting student job market success in terms of salary and placement. In addition, the findings provide helpful guidelines for universities that focus on educating their MBA students in the area of business analytics.

2   Relevant Literature

2.1   Business Analytics Breadth

Business analytics refers to the "extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions" (Davenport & Harris, 2007, p. 7). It is an umbrella term that explains the business intelligence capabilities and applications offered through information technologies (Cosic, Shanks, & Maynard, 2012; Park, El Sawy, & Fiss, 2017). Recent studies have shown that only a small proportion of companies can take full advantage of the opportunities that the analytics world provides; the companies that are mature in their knowledge and use of analytics across their workforce can leverage the opportunities that analytical tools and available data afford such that they improve their performance (Ghasemaghaei, Embrahimi, & Hassanein, 2017b). To achieve such maturity, companies attempt to hire not only technical people who possess deep data science[1] expertise at junior and mid-operation levels but also managers who have sufficient knowledge in the different business analytics domains (Ransbotham, Kiron, & Prentice, 2015).

Managers vitally need to grasp business analytics tools and identify areas of business where these tools can add value and communicate effectively with the data scientists who can apply the tools effectively. As a result, business schools have increasingly begun to offer new courses related to business analytics to help their MBA students improve their skills in this area (Rienzo & Chen, 2018). To achieve higher BAB levels, these schools have started to offer courses that develop skills in areas such as information technology, data, management, and analytics tools and applications (Wixom et al., 2014). Enhancing the skills in all of these areas rather just in select areas will help MBA students become more well rounded, more employable, and more familiar with analytical tools and will enable them to engage in a broad set of

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[1] While data science focuses on using qualitative and quantitative methods to extract insights about a particular issue (Asamoah, Doran, & Schiller, 2015), business analytics focuses on integrating these insights with business understanding and converting them into operational and strategic decisions (Gerrard, Mooney, & Thompson, 2018).

tasks: visualization, reporting, and analytics (Turel & Kapoor, 2016). One can reasonably assume that having this broad set of skills will help students succeed in the job market. However, we lack understanding about whether higher BAB levels, which often require time, effort, and financial investments, would adequately help business students to find proper jobs with higher salaries. Therefore, in this study, we use signaling theory, which explains the impact of signals such as university rankings, to determine whether higher BAB levels translate into successful job placement and salary.

2.2   Signaling Theory

Signaling theory (Connelly, Certo, Ireland, & Reutzel, 2011; Spence, 1978) posits that job applicants send signals about their skill level to employers by obtaining specific educational credentials and that the employers evaluate the job applicants based on the signals the educational credentials transmit. Therefore, education and the institutions through which job applicants obtain it serve as tools for them to signal their skills and abilities to employers (Ryazanova, McNamara, & Aguinis, 2017). Spence (1978) first introduced signaling theory in seminal work on labor economics. In this work, Spence (1978) focused on labor market problems to show the utility of the signaling theory in generating optimization solution for receivers and signalers alike. In particular, this theory primarily focuses on decreasing information asymmetry between the two parties (Dawson, Watson, Boudreau, & Pitt, 2016; Spence, 2002). Spence (1978) argues that high-quality job applicants can differentiate themselves from low-quality applicants by sending signals to the employers about the education credentials they have in a specific field that pertains to the employer.

According to signaling theory, applicants' education generally signals specific skills of the job seekers to employers, which impacts the employers' decision about the job seekers they select and wages they allocate to them (Cai, 2013; Dinger, Thatcher, Treadway, Stepina, & Breland, 2015). Mincer (1970) found a strong relationship between of employees' education and earnings and concluded that wages paid to employees reflect their skills and abilities. Likewise, Arteaga (2018) suggests that education has a vital role in the determination of wages. Teichler (2009) argue that employers may have different views about job applicants with similar educational qualifications based on different political biases, traditions, and other factors. For example, Rospigliosi, Greener, Bourner, and Sheehan (2014) argue that the perceived quality of the institution where job seekers obtained their degree and the courses they studied provide signals to employers about job applicants' capabilities. Therefore, in this study, we adopt the signaling theory to investigate the impact of BAB levels on job placement and salary and to examine whether university ranking influences these relations.

3   Research Model and Hypotheses

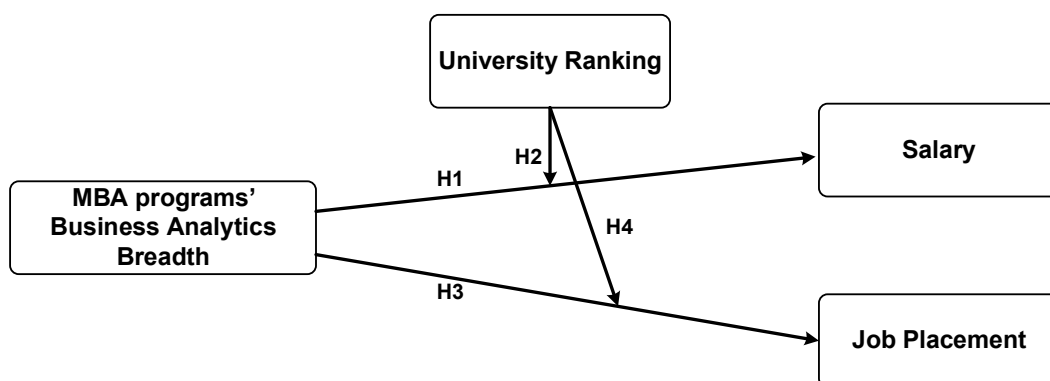Figure 1 depicts the proposed research model.

Figure 1. Research Model

In general, education makes individuals more skilled and employable. Therefore, university graduates secure employment more than those who do not have education credentials, while they also earn more on average (Van der Merwe, 2010). Smith and Kruger (2005) argue that obtaining certain education benefits graduates from both monetary and non-monetary perspectives. For example, skilled graduates could obtain benefits such as financial security (e.g., life assurance, pensions), personal benefits (e.g., brand-

name luxury goods), and financial assistance (e.g., company loans) (Van der Merwe, 2010). According to signaling theory, educational credentials indicate job applicants' unobserved abilities. Therefore, there may be a premium paid for graduates with positive signals; consequently, there should be a positive association between educational level and earnings (Blaug, 1985; Van der Merwe, 2010). Wiles (1974) compared the income of employees with a specific education with those without such education and found a positive link between education and employee salary. Brown and Sessions (1999) also argue that, since education signals the innate abilities of job applicants, it increases individuals' lifetime earnings.

Many firms still lack skillful managers with sufficient knowledge of business analytics (Turel & Kapoor, 2016). In response, many business schools try to enhance their BAB level by offering courses that develop their MBA students' abilities and expertise in areas including information technology, data, management, and analytics expertise (Wixom et al., 2014). Thus, graduates who have taken courses in the area of business analytics send signals to employers about their capabilities in the analytics area (Turel & Kapoor, 2016). Based on signaling theory, students who take a sufficient number of analytical courses and achieve high BAB level may have a better chance of obtaining higher salaries compared to others. In sum, signaling theory posits that earnings may rise because of the productivity and potential capability signals that having certain education provides (Chevalier, Harmon, Walker, & Zhu, 2004). Given the often unmet demand for business analytics skills (Chen, Chiang, & Storey, 2012; Ghasemaghaei et al., 2018; Thibodeau, 2014), a broad set of analytics courses can signal to potential employers about an applicant's potential value (Mitri & Palocsay, 2015; Schiller et al., 2015; Thibodeau, 2014). Thus, we hypothesize that:

H1:   An MBA program's BAB level increases the salary of its graduates.

Extending this view, previous studies argue that university ranking drives perceptions of high-quality students and prestige (Hazelkorn, 2015). Rospigliosi et al. (2014) suggest that the ranking of the institution where the job applicants obtained their degree provides a signal about the applicants' capabilities. Given the summative properties of signals (Connelly et al., 2011), graduates who enhanced their analytical skills in high ranked universities will likely have a more positive signal compared to others and, consequently, may have a better chance in obtaining higher salaries compared to graduates that obtained their analytical abilities by taking courses in lower-ranked universities. Thus, we hypothesize that:

H2:   University ranking moderates the effect of an MBA program's BAB level on its graduates' salary such that higher-ranked universities have a stronger effect.

Based on the signaling theory, job seekers with better educational credentials also have an advantage in terms of employment compared to job seekers with lower educational credentials (Van der Merwe, 2010). One of the main graduate employment problems relates to the mismatches between labor market needs and the skills individuals acquired in their graduate studies (Koen, 2006; Neumann & Fink, 2007). Graduates that do not have the required skills may not be able to find appropriate jobs easily and may have to stay unemployed for a while compared graduates that have sufficient skills in a particular field (Van der Merwe, 2010). As such, education related to market needs acts as a filter that separates more able applicants from the less competitive ones (Castagnetti et al., 2005). Thus, in the context of this study, MBA students who enhance their analytics level may have a higher chance to find appropriate jobs. Thus, we hypothesize that:

H3:   An MBA program's BAB level increases the job placement of its graduates.

Pericles et al. (2014) argue that the capabilities that individuals obtain in high-ranked institutions are more associated with higher subject-specific skills than the capabilities that people obtain in lower-ranked institutions. Volkwein and Sweitzer (2006) argue that universities with high rankings better deploy their resources in educating their students. Therefore, university ranking perceptually indicates graduating students' quality (Ehrenberg, 2003). Indeed, research has found a positive link between studying in prestigious universities and career benefits for graduates (Hazelkorn, 2015). Brewer and Zhao (2010) and Freid (2005) argue that a university's reputation and prestige signals the skill of its graduates. Therefore, most universities attempt to maximize their reputation (Hazelkorn, 2015). Van der Merwe (2010) argue that such signals create biases that strengthen opportunities for high-ranked schools and weaken them for low-ranked ones and, thus, cause problems for many graduates who seek employment. Given that such signaling potential can enhance the perceived abilities of candidates from high-ranked compared to others from low-ranked schools even though they may have had the same education, we hypothesize that:

H4:   University ranking moderates the effect that an MBA program's BAB level has on job placement of its graduates such that higher-ranked universities have a stronger effect.

4   Methodology

We collected and analyzed data on business analytics relevant courses that the top 89 business schools in the US according to Bloomberg (Bloomberg.com) offered[2]. We specifically used this website to obtain variables about the ranking, the average base salary of its MBA graduates, and the job placement for MBA graduates for all ranked business schools. We then extracted course information from the business schools' websites by employing two independent coders.

A typical MBA program in the US requires students to take some core (required) courses that all students need to take and pick some concentration courses or a few courses from a general list of electives. The analytics-rich MBA programs typically have one or more foundational (general overview) business analytics courses in the core and several more advanced (directly business analytics) courses as part of the electives or as part of some of their concentrations.

We used Turel and Kapoor's (2016) framework to create BAB index for MBA programs based on the number of courses that the four categories of foundational business analytics (BA) core courses, foundational BA elective courses, directly BA core courses, and directly BA elective courses offered. The directly business analytics courses focus on the main elements of analytics, while the foundation business analytics courses focus on enhancing student knowledge in the areas of quantitative and data management skills that more advanced business analytics specific courses require (Turel & Kapoor, 2016). For example, "data mining" course represents a direct business analytics course because it focuses primarily on directly enhancing business analytics skills (Watson, 2014). In contrast, introduction to information systems represents a foundation business analytics course because it focuses on not only business analytics but also general analytics concepts (Turel & Kapoor, 2016). The categorization of directly and foundational business analytics courses provides insight into the extent of effort and emphasis that different schools put in educating students in the area of business analytics. Table 1 lists the foundational business analytics courses and directly BA courses.

We asked two coders to each independently obtain information about the business analytics courses available in the full-time MBA programs for the top-ranked 89 universities listed on Bloomberg.com. From Bloomberg.com, they collected information on the name of the business school, rank, the average post-MBA base salary of its graduates, and post-MBA job placement of its graduates. We asked them to extract and classify business analytics (BA) courses offered in the full-time MBA programs as reflected on the examined business schools websites. They counted the number of analytics courses offered in their programs for each of the four categories: foundational BA courses in core, foundational BA courses offered as electives or concentration course, directly BA courses in core, directly BA courses offered as electives or concentration course. To categorize course as foundational versus directly BA courses, each coder had to look at not only the course description but also the course outline and the available assignments and materials. We found high consistency (almost a perfect match) in the way the coders categorized the courses. Only a few courses did not reach immediate agreement, but, after a second review, the coders reached full agreement.

Both coders were graduate research assistants who majored in business analytics, had taken business analytics courses, and had knowledge of foundational and directly BA courses offerings. Before they began researching the business school websites, we trained them to distinguish between the foundational and directly BA courses. We gave them several examples and sample lists of the two types of analytics courses. After they finished coding, we reviewed the results and allowed them to reconcile disagreements. The two coders had only minor differences that they easily reconciled. Based on the number of courses offered in the four categories, we computed the business analytics breadth (BAB) index for each business school.

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[2] Bloomberg is a popular U.S. website that delivers markets and business news and data to the world. We did not have access to how Bloomberg.com tested and validated its scales. However, many previous studies that have focused on business schools' rankings have used (e.g., Brink & Costigan, 2015; Nisel, 2014) and considered this website as a valid and reliable source.

Table 2 portrays the framework that we used to calculate the BAB index score for each business school. The BAB score ranged from 1 (low breadth; no BA courses at all) and 8 (high breadth; over two directly BA courses plus at least one directly BA elective with any combination of foundation BA courses). The BAB level of the program reflects the breadth of its coverage of business analytics (Turel & Kapoor, 2016).

Table 1. List of Foundational Business Analytics Courses and Directly Business Analytics Courses

Foundational business analytics courses	Directly business analytics courses
Statistics	Business analytics
Decision models	Data analytics
Decision sciences	Data science (R, Python)
Data models and decisions	Machine learning
Decision making	Business analytics in finance
Managerial decision modeling	Business analytics in accounting
Spreadsheet modeling	Data analytics in finance
Introduction to information systems	Data analytics in accounting
	Marketing analytics
	Supply chain analytics
	Healthcare analytics
	Business intelligence
	Data mining
	Data warehousing
	Databases
	Big data
	Predictive analytics
	Data visualizations
	Business forecasting

Table 2. BAB Index Score

BAB Index	Number of courses			
	Foundational BA in core	Foundational BA in elective	Directly BA in core	Directly BA in elective
1	None	None	None	None
2	One or more	1 or more	None	None
3			None	One
4			None	Two
5			None	Three
6			One	None
7			One	One
8			Two or more	Any number

5   Results

Table 3 provides descriptive statistics of the BAB indices, job placement, and salary in the business schools we examined and the inter-variable correlations.

Table 3. Correlation Matrix†

	Mean (SD)	BAB	Job placement	Salary	University ranking
BAB	4.69 (1.46)	1			
Job placement	0.86 (0.10)	0.284**	1		
Salary	$89,935 ($24,075)	0.396**	0.477**	1	
University ranking	45 (25.69)	-0.347**	-0.625**	-0.852**	1

† Low-ranking numbers represent high-ranked universities; hence, there are negative correlations between university ranking and other factors.
** $p < 0.01$

We used partial least squares (PLS) to assess the developed hypotheses for this study in a hierarchical fashion. We first tested the direct effects model. Both relationships between BAB and salary ($\beta = 0.396$; $p < 0.01$) and BAB and job placement ($\beta = 0.286$; $p < 0.01$) were significant. Hence, we found support for H1 and H3. We next tested the moderating role[3] of university ranking on the relationship between BAB, job placement, and salary (see Figure 2). We found that, while BAB did not significantly impact salary ($\beta = 0.093$; $p > 0.05$) or job placement ($\beta = 0.100$; $p > 0.05$) at average levels of university ranking, the moderation effects were significant, which suggests that the effect that BAB has on student success in the job market depends on university rankings. Specifically, the findings suggest that university ranking significantly moderates the impact that BAB has on salary ($\beta = -0.176$; $p < 0.05$) and the impact that BAB has on job placement ($\beta = 0.194$; $p < 0.05$), which supports H2 and H4, respectively. Overall, these findings indicate that the effect that BAB has on job placement and post-graduation salary is in part a function of the university's rankings.
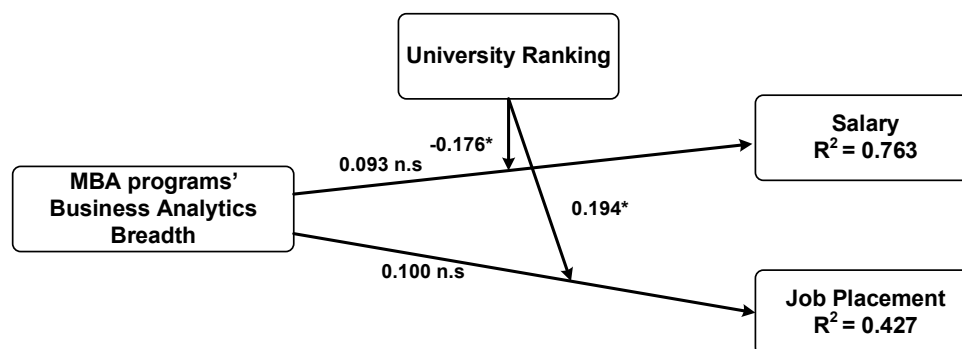

Figure 2. Research Model Results

5.1   Interaction Plot for the Impact that University Ranking has on the BAB–Salary and BAB–Job Placement Relationships

The significance of the moderating impact of university ranking on the relationship between BAB and employee salary and BAB and job placement implies that university ranking plays a critical role in enhancing job seekers' salary and success in finding jobs. To shed more light on these effects, we used the Interaction Software Package[4]. Figure 3 shows the resulting plots; the t-values and the levels of significance appear near each regression line. The plots illustrate interesting and novel insights. For example, Figure 3a shows that BAB level highly impacted graduates' salary when students graduated from top-ranked business schools and that these schools had the highest BAB level. However, at mean rankings and 1 or 2 standard deviations from the mean of university rankings, BAB had no significant influence on salary. Furthermore, Figure 3a shows that graduates of universities with the lowest rankings

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[3] We operationalized moderation by including an interaction term.
[4] See www.danielsoper.com

had the lowest salary premiums due to BAB even with a high BAB level. Interestingly, Figure 3b shows that university rankings at the top (mean and above) did not significantly modulate the effect that BAB had on job placement. BAB level had a significant impact on job placement only for universities with rankings lower than the mean level, which means that graduates from top-ranked universities had better job placement even in the absence of business analytics exposure. However, graduates from lower-ranked universities can benefit from increasing BAB at their schools: they can more easily find jobs when their schools have broader analytics offerings (based on their BAB levels).

5.2 BAB Level and University Ranking Combinations Analysis

We followed Ghasemaghaei, Hassanein, and Turel's (2017a) procedure to further examine the role that BAB and university ranking have on salary and job placement. We used median split to classify universities in our sample based on their BAB level and their ranking level. Table 4 describes the emergent four groups and their mean salaries and job placements. As in the table shows, out of the 89 sampled business schools, only 16 had high levels of BAB and a high ranking (i.e., fourth group: top ranking, high BAB). Graduates in this group had the highest salary, while graduates in universities in the second and fourth groups had the highest job placement. In addition, as the table shows, out of 40 low-ranked universities, six had high BAB levels and, out of the 49 high ranked universities, 16 had high BAB level. Interestingly, the majority of the universities (67) had a low BAB level. The top schools with a low BAB level may have had such a low BAB level due to the fact that it may be easy for graduates from these schools to find good jobs regardless of the education the schools provide compared to lower-ranked and even non-ranked schools.
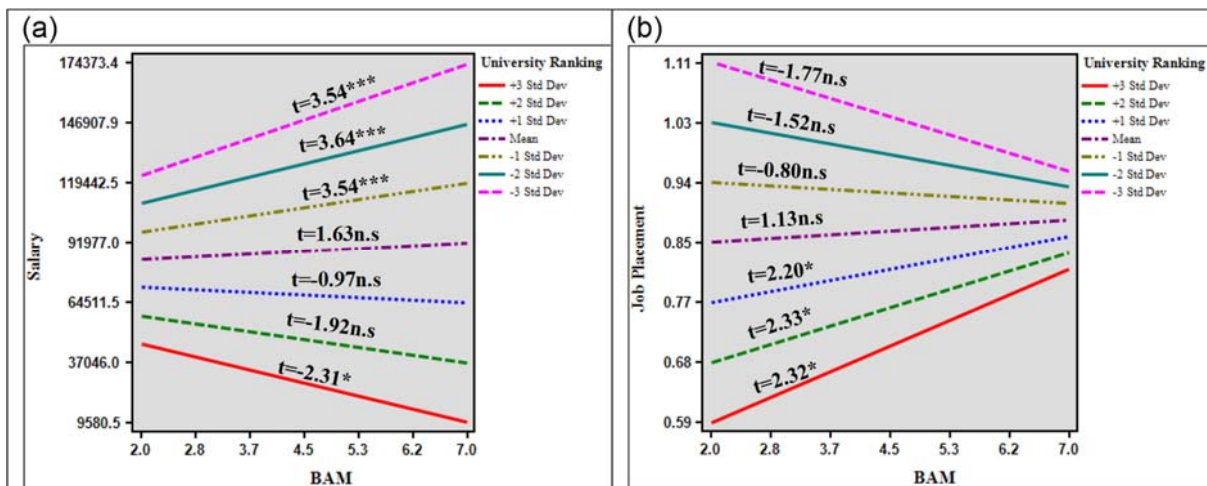

Figure 3. Interaction Plots

Table 4. Means and Standard Deviations (SD) of Salary and Job Placement for Universities with Different Levels of BAB and Ranking

Group	Number of universities	Salary		Job placement	
		Mean	SD	Mean	SD
1 (low ranking, low BAB)	34	$71,920	11384	0.80	0.11
2 (top ranking, low BAB)	33	$101,850	22708	0.90	0.05
3 (low ranking, high BAB)	6	$76,643	19528	0.88	0.06
4 (top ranking, high BAB)	16	$108,625	20874	0.90	0.05

We examined the significance of between-group differences in salary and job placement with ANOVA models. Figure 4 illustrates the findings with job placement (%) and salaries (indexed to US$100k). The results indicate that graduates from universities in the second and fourth groups had the highest salary. Most importantly, as Figure 4 shows, employees who graduated from top-ranked universities that had a high BAB level and employees who also graduated from top-ranked universities but had a low BAB level

had no considerable difference in their average salary. The also findings show that universities in all groups but the first one had the highest means for job placement, which means that graduates of top-ranked universities had high job placement. In addition, graduates from lower-ranked universities with high levels of BAB also had good job-placement prospects, which illustrates the value that BAB adds for lower-ranked universities.
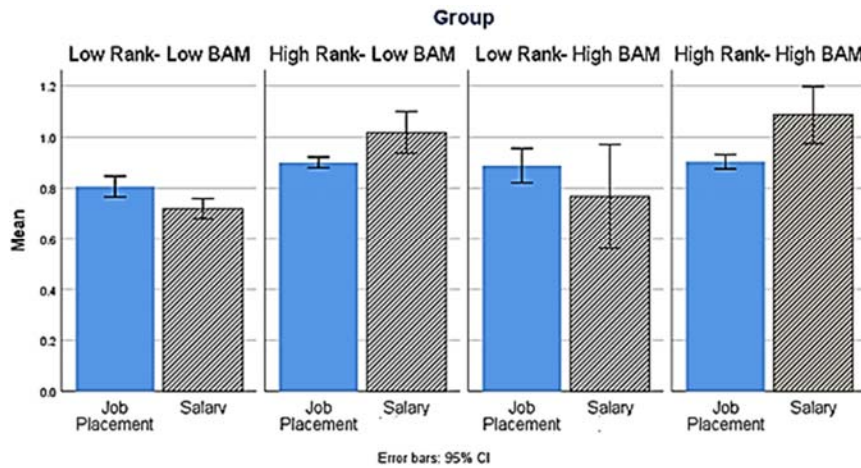

Figure 4. Group Comparisons in Terms of Salary and Job Placement

6   Discussion

An observable shortage of managers who have strong business analytics background and skills exists (Turel & Kapoor, 2016). Many business schools understand the potential of this shortfall for their students and, in response, have developed courses that can help their students meet these market demands (Mitri & Palocsay, 2015; Schiller et al., 2015; Thibodeau, 2014; Watson, 2014; Wixom et al., 2014). However, researchers have not examined and quantified the value of such efforts. We also do not know whether all schools can uniformly benefit from the same business analytics education efforts. We address these gaps in this study. We built on signaling theory to theorize how the business analytics breadth levels of MBA programs and school ranking contribute to student success in terms of earnings and job placement. Our findings reveal that school ranking, as a manifestation of its reputation, greatly influences how the breadth of a school's business analytics offerings translates into increased earnings and job placement success for its graduates. We note several noteworthy implications.

Specifically, our findings provide novel and unique insights about the impact that BAB level has on salary and job placement. They indicate that BAB has a significant direct impact on both salary and job placement. That is, on average, BAB does influence salary and job placement improvements. However, university ranking moderated both of these relationships, which means that low-ranked and high-ranked schools benefit differently from developing business analytics programs. It also means that offering more analytical courses would not necessarily help MBA students to find jobs and/or help them land jobs with higher salaries—these effects depend on the school rankings. The success of such endeavors depends on the university's ranking—presumably through the signals such rankings provide.

Our research uniquely contributes to developing deeper insights into the moderation effect that university ranking has on the relationship between BAB and salary and between BAB and job placement. Notably, our interaction plots indicate that BAB significantly impacts the salary of graduates of top-ranked universities but does not enhance the salary of graduates from lower-ranked universities. Moreover, the interaction plots indicate that BAB does not significantly enhance job placement for students who graduate from top-ranked universities but does increase job placement for graduates from lower-ranked universities.

Ultimately, these findings extend signaling theory to a new context and develop a model that explains unique yet important variables in IS education. As such, they pave the way for further studies on IS education factors and how they translate into student success in the job market. Note that business educators do not typically question the value of investment in and development of business analytics programs. However, we show that we need more research to set the boundary conditions for success in

developing business analytics programs. We use signaling theory to do so, but future research could extend our model and/or use additional theories to explain why and when some business analytics programs work better than others in terms of helping students obtain jobs faster and jobs that pay more. For example, future research could extend our model to include also factors known to influence student employment success (e.g., family education, family social economic status, job market conditions, economic conditions, geography, and career aspirations) and/or directly measure the signaling power of university rankings and BA programs (as opposed to using proxies for signaling power). We ultimately believe that our results provide a useful basis for researchers want to understand the role that BAB levels and university ranking have in influencing graduates' salaries and job placements.

From a practical perspective, our findings provide helpful guidelines for business schools. Notably, they show that a university with a higher ranking enhances the salary and job placement of MBA graduates and that, on average, BAB level significantly influences students' success in the job market. Therefore, business schools need to know that BAB level typically enhances graduates' salary if they graduated from a top-ranked school. In fact, lower-ranked universities should consider the fact that BAB level does not considerably enhance their graduates' salary. This finding suggests that top-ranked universities could spend many resources to add additional courses or programs in the data analytics area if they want to increase their graduates' average salary. However, top-ranked universities should notice that BAB level does not significantly impact their graduates' job-placement prospects. These graduates can easily find jobs without taking many courses in the data analytics area. In contrast, if lower-ranked universities plan to enhance their graduates' job-placement prospects, they can do so by increasing their BAB level.

6.1   Limitations and Future Research

We note that our study has several limitations that pave the way for future research. First, we focus only on business schools from the US and examined possible short-term impacts of BAB. Future studies could replicate and extend this study in other countries, consider long term effects of BAB, and consider BA courses and programs that other schools offer. Second, our findings show that graduates from top-ranked universities see more success compared to graduates from lower-ranked universities, which could arise due to the impact of various factors such as the quality of the alumni network, differences in prior business analytics experience, the qualifications of students who get an offer from the top-ranked universities, and the quality of the courses that these universities offer (Tracy & Waldfogel, 1994). To some extent, we controlled for such factors in our model by including ranking's direct effect on the employment outcomes. Nevertheless, future studies could investigate the impact that these factors have on the success of MBA graduates in a more nuanced way. Third, most top schools in the US admit MBA students with some managerial experience (typically at least three years). Nevertheless, not all managers receive business analytics education via MBA programs. Therefore, future studies could investigate how firms should educate their current managers (outside of MBA programs) to effectively leverage business analytics in their organizations.

Fourth, offering elective courses in analytics does not necessarily mean that the students will take them. In fact, students take courses due to various reasons such as teaching quality, social influence (i.e., what friends take), course schedule, and course suitability (Soutar & Turner, 2002). Therefore, we need more research to investigate the key factors that influence students to take courses that their schools offer. Moreover, our business analytics index reflects only whether courses exist on the roster and does not include measures of quality of courses and instruction; we assumed that they average out across the examined schools. Hence, future research can further examine how such quality variables can refine our findings. Fifth, in this study, we collected and analyzed data on business analytics relevant courses that the top 89 business schools in the United States according to Bloomberg offered. The other schools that we did not consider in this study might not behave like the 89 top business schools we considered. We need more research to investigate whether we can generalize our results to other business schools.

Sixth, we focus specifically on the BA breadth level in the MBA program and do not consider whether having a center for analytics would serve as another important signal about graduates' competency to employers. As such, future research could explore this relationship.

Finally, we obtained information about the business analytics courses available in the full-time MBA programs for each school. Future studies could also collect data on which courses students actually took to better understand the impact of BAB level on post-graduation salary and job placement.

7   Conclusion

In this study, we address a vital gap about the impacts of investment in the development of business analytics courses and university ranking on salary and job placement of MBA graduates. We show that not only the breadth of business analytics programs but also the ranking of universities provides important signals that influence how business analytics breadth levels translate into job-place success factors for MBA graduates. We call for more research on these important yet overlooked student-success factors.

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