Reassessing University and Business School Rankings: A Focus on Entrepreneurship

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Abstract

In the dynamic realm of higher education, university, and business school rankings have become influential benchmarks for institutions and aspiring students alike. Rankings have become a focal point for users, influencing the decisions and perspectives of students, employers, and more. Popular rankings such as the Financial Times' Business School Rankings and QS' World University rankings hold a prominent place, offering valuable insights into program quality, faculty expertise, and graduate outcomes. However, this thesis explores what such rankings fail to capture. While traditional metrics assess employment statistics and program attributes, they often fail to account for additional topics of interest, such as entrepreneurship. Given the impact of entrepreneurship on economic development, innovation, job creation, and societal well-being, we hypothesize that business educators should be assessed on their ability to develop talented founders. Thus we create our own "Alumni Entrepreneurship Ranking" in which we gather fresh insights into those institutions who are best at developing entrepreneurial talent. Our analysis also enables us to compare and contrast this ranking to popular incumbent rankings, while highlighting their limitations. By doing so, we aspire to initiate a discourse that adds to the evaluation of business education providers, and to build on the current assessments of institutions.

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1. Introduction

In the fast-evolving landscape of higher education, the evaluation and ranking of universities and business schools have become integral components of institutional assessment. These rankings wield considerable influence, shaping the perceptions of prospective students, faculty members, and corporate recruiters. Among the prominent entities in this domain, the Financial Times ('FT'), through its well-established business school ranking publications, stands as a beacon guiding the aspirations of both academic institutions and aspiring business leaders.

Business education rankings are nothing new. In 1977 for example, The Carter Report, the MBA Magazine, and the Ladd and Lipset Survey, conducted rankings seeking to gain insights into which MBA programs were "the best". The Carter Report placed full emphasis on the frequency of school faculty in academic journals. The MBA Magazine asked for deans' personal opinions to rank business schools. The Ladd and Lipset survey asked business school faculty to provide their own ranking of which schools they perceived as best. These rankings provided some perspective of which schools could be considered the best. However, with a wide variance in how rankings were conducted, inevitably, the rankings did not correlate well with one another, offering a lack of confidence in the insights obtainable from them (Schatz & Crummer 1993).

Nowadays, we have an almost overwhelming number of publishers of university and business school rankings, with the FT, QS, Bloomberg, Forbes, US News & World Report ('USNWR'), and many more providing their own takes on how educators should be ranked. The benefit of a large variety of publishers is the increasing amount of data points available to students in picking which institutions they should consider, especially considering that university and business school assessments have become increasingly standardized compared to earlier publishments.

US MBA rankings for example, appear to be well-devised in that they adhere to generalized views on which universities are the best (e.g. Ivy League schools consistently rank highly, adhering to the general consensus of those institutions being the "best"). The seemingly straightforward nature of these rankings in catering to general views reflects a well-established understanding of the needs and expectations within the U.S. MBA market. Conversely, beyond the US, the panorama of

university and business school rankings becomes more intricate. The heterogeneity of student needs, the comparative youthfulness of ranking methodologies, and the consequent lack of extensive testing contributes to an environment where variations in performance are more pronounced. Unlike the established U.S. MBA market, international rankings contend with a diverse array of preferences and expectations, making it challenging to devise a one-size-fits-all evaluation metric. This introduces a layer of complexity that demands a critical examination of the limitations inherent in the current systems.

While business school rankings, like that as done by the FT, provide valuable insights into program quality, faculty expertise, and alumni outcomes, they are not without their limitations. This thesis endeavors to critically analyze the current landscape of university and business school ranking providers, shedding light on what they fail to capture, while proposing an additional method of assessment. In particular, we assert that existing rankings fail to emphasize a crucial aspect of business education — entrepreneurship. As further described below, there is a growing interest among students to pursue entrepreneurship upon graduation. Popular incumbent rankings like the FT's, using their standardized approaches to rankings, would not provide valuable and relevant insights to such students given their methodology's focus on salaries and job placement. To address this deficiency, this thesis argues for the inclusion of additional dimensions to university and business school rankings, which reflect the success and scale of those alumni who pursue entrepreneurship.

By delving into alternative measures, we aim to initiate a dialogue about the need for more alternative and comprehensive methods of assessing university and business schools. In doing so, we hope to provide fresh insights into the performance of universities and business schools, and to pave the way for a more holistic approach to assessing their impact on society and the global business landscape.

2. Existing Literature and Research

University and business school rankings play a pivotal role in the decision-making of incoming students. Students rely on such rankings in making relative assessments of which education provider is "best", and seek to pursue their studies accordingly. Employers can be influenced by rankings as well, by shortlisting the highly ranking institutions for hiring preferences. As such, rankings become a "focal point", influencing student and employer decisions. In a study titled "The Impact of League Tables and Ranking Systems on Higher Education Decision-Making", a survey was conducted drawing from the membership lists of the Institutional Management in Higher Education and the International Association of Universities, with 202 responses received related to the influence of league tables and rankings of education providers. The study found an evident desire of respondents in seeing their institution achieve a high ranking. In addition, the study found the audience of ranking publications to have expanded beyond just students, having identified Governments and Industries as users of these rankings too (Hazelkorn 2007). In addition, in a study conducted on the changes in the number of applications for MBA programs, given the program's ranking, The Wharton School of the University of Pennsylvania for example, which ranked first, four times from 1994 until 2000 by the BusinessWeek's MBA ranking, received an almost 2 times increase in the amount of applications over the same period (Wuorio 2001). As such, evidence suggests rankings play an important and influential role.

Today, much of the existing research and literature on business school rankings acknowledge the widely accepted and respected rankings done by the FT and QS for example. The FT has been publishing business school rankings since 1998 (Bradshaw, D. 2023), and since, has become one of the most respected opinions on the prestige of business education globally. However, a growing trend seen across the institutions involved in rankings, is that many are voicing their disagreement with the metrics used in conducting the assessments. Recently, a number of top US Law and Medical schools, including Harvard, Yale, and Columbia University, decided to withdraw from the U.S. News & World Report ('USNWR') college rankings. The motivation behind the withdrawal was due to the "profoundly flawed" methodology

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used to conduct the ranking, which these institutions believed did not reflect their values. In addition, they stated that the USNWR ranking, disincentivized educators to help disadvantaged students. More specifically, these universities cited that the methodology used in this ranking over-emphasized student test scores and GPA, and lacked the inclusion of loan forgiveness programs, aid, and more. Consequently, the USNWR decided to adjust its ranking methodology, including factors such as diversity in place of metrics like "alumni giving" (Castillo 2023).

Following this, the deans of 3 large US Business schools; Berkeley Haas School of Business, Cornell SC Johnson College of Business, and USC Marshall School of Business, published an FT article, citing the decision of several US Law and Medical schools to withdraw from the USNWR ranking, and declared their shared concerns, aligning with the motivations behind those decisions. They argued that current business school rankings do not capture the societal value of the education they offer. The deans argued that one of their key missions in educating students, is to increase their upward social-mobility, and thus, rankings should capture the "societal value added". In addition, the business school deans stated that rankings place too much emphasis on the previous achievements of incoming students, and fail to capture the business schools' capability in helping to enhance students' skills and to improve their opportunities following graduation. They made similar suggestions as the US Law and Medical schools, in that rankings should reduce the emphasis on measures such as GPA and SAT scores used as a proxy for the quality of incoming students, and instead focus on opportunities, outputs, and longer-term outcomes. Furthermore, the deans suggested that ranking publishers should use metrics based on readily available and accessible data that is comparable across schools, and that can be verified independently (Karolyi et al. 2023).

Many agree that rankings today place too much emphasis on the salaries of alumni as a metric of success. While salary is indisputably an important data point for students assessing their outcomes following graduation, placing too much weight on this data point as a metric for success fails to take into account the whole picture. A paper released under the United Nations Global Compact, titled "Business School Rankings for the 21st Century", describes how rankings today fail to take into account important relevant factors, and recommend that publishers should "*Eliminate entirely, or reduce the weight of, the salary differential measure, which is viewed as particularly problematic*" (Pitt-Watson & Quigley 2019). As seen from a Poets & Quants ('P&Q') article, sourcing Matt Turner, a PhD market researcher at UT-Austin's McCombs School of Business, nearly half of the weighting of MBA course

rankings in 2012 were based on just salary and placement. Forbes, as an extreme example of this, only took into account the salaries earned and job placement as the method of ranking schools. Highlighted below in Figure 1, subjective opinions of alumni and recruiters also held significant weights for the method of assessments (Byrne 2012).

Figure 1: MBA Rankings criteria and weighting

Rankings Criteria	BW	U.S. News	Forbes	FT	Econ	Average
Salary & placement		35%	100%	54%	38%	45%
Alumni opinion	45%			7%	23%	15%
Recruiter opinion	45%	15%				12%
Class Profile		25%		6%	14%	9%
Faculty	10%			26%	3%	8%
Deans' opinion		25%				5%
Program metrics				4%	6%	2%
Recruiter diversity					9%	2%
Alumni network					7%	1%
Board diversity				3%		1%

Source: Poets & Quants 2012.

Matt Turner added that those who were achieving the highest salaries were those who entered consulting, and that if you were not interested in such a career, then rankings are not entirely relevant to your interests. In addition, as per an FT blog assessing rankings' incorporation of sustainability, they state that by focusing on salaries earned, it can potentially undermine the desire and interest of students seeking to pursue impactful goals following graduation (Jack 2020), whether that entails founding a startup that solves a global challenge, or pursuing an impactful role in politics. As such, there is a growing pressure on publishers to alter their ranking methodologies to become more relevant and wide reaching. Consequently, the FT in their 2023 Global MBA Ranking methodology adjustment, decided to reduce the weighting on salaries from 40%, down to 32%, "to give greater emphasis to other factors". Their latest MBA rankings placed a 32% weight on salary (equally split across weighted salary after 3 years, and salary increase from pre-MBA to today). Interestingly, when comparing the current FT MBA ranking methodology to their

2012 version, as shown in Figure 1, the current ranking incorporates new factors such as "Alumni network", "Female faculty", "Female students", "International faculty", "International mobility", and more (Jack et al. 2023). While the weightings of prior rankings have shifted, the input metrics have shifted too, in tandem with changing opinions of what makes an MBA program better. As such, it's important for weights and metrics to adjust over time to remain relevant and to capture additional topics.

In addition, by assigning an excessive weight to specific financial outcomes, the conventional approach to ranking business schools tends to lose its relevance for students aspiring to career paths beyond banking and consulting. Moreover, it inadvertently compels educational institutions to engage in activities aimed at bolstering their rankings. For instance, the United Nations Global Compact has recommended a shift away from measuring solely salary levels upon graduation and their subsequent progression. Instead, they advocate awarding recognition to schools that nurture students who embark on careers with socially valuable but lower-paying organizations, such as NGOs or the public sector. This approach incorporates the positive societal impact made by graduates into the evaluation of school rankings (Pitt-Watson & Quigley 2019).

Numerous stakeholders have challenged the conventional rankings, devising alternative methods for assessing the performance of universities and business schools. There exists a growing number of rankings on specific areas, such as ranking the best business education providers with regards to entrepreneurship or ESG. For example, The USNWR, The Princeton Review ('TPR'), and P&Q , provide rankings regarding the best universities and business schools for entrepreneurship. This serves the needs of the growing number of students with a desire to pursue entrepreneurship. A global survey of over 267,000 undergraduate and graduate students, across 58 countries found that around 11% of students already own and operate their own company. Furthermore, around 18% of the surveyed students want to become entrepreneurs immediately upon graduating, and an additional 32% of students express a desire to pursue entrepreneurship within five years following graduation (Sieger et al. 2021). Thus, those interested students could place more weight on the judgements of the aforementioned entrepreneurship ranking providers, rather than the more standardized rankings done by the FT and other incumbents. Taking P&Q's ranking for example, their MBA program ranking on the "best" institutions for entrepreneurship, utilizes 16 data points in their methodology, all of which are obtained from school surveys, assigning weights ranging from 15% to 2.5%. Their comprehensive assessment encompasses factors such as the quantity of MBA students launching

businesses, the focus of elective courses on entrepreneurship, club membership, incubator space, entrepreneurs-in-residence, startup award money, faculty involvement, and it also takes into account the proportional size of the institutions (Allen 2023). The top 10 ranked institutions for 2023 can be seen below in Figure 2.

Figure 2: Poets & Quants: The Best MBA Programs for Entrepreneurship 2023

2023 Rank	School	Total Weighted Score	YoY Ranking Change
1	Washington University in St. Louis (Olin)	100.00	0
2	University of Michigan (Ross)	92.20	5
3	Esade Business School	86.70	1
4	Babson College	78.53	-2
5	London Business School	76.48	-
6	Arizona State University (W. P. Carey)	76.36	11
7	Rice University (Jones)	75.48	-4
8	IE Business School	71.33	-3
9	University of California-San Diego	70.51	6
10	Harvard Business School*	67.13	-4

Source: Poets & Quants 2023

Washington University (Olin Business School), University of Michigan (Ross School of Business), and ESADE business school were awarded the top 3 places. Olin Business School of Washington University has ranked first every year for the past 4 years. Interim dean of Washington Olin, Anjan Thakor, stated that "the recognition affirms what we already know: For us, entrepreneurship education isn't a trend. It's foundational" and that "It's the reason many of our students seek us out and come to WashU." (Allen, N. 2023). As such, a ranking which assesses specific topics, and utilizes metrics different to those of the FT for example, is capable of assessing business educators for alternative aspects. As previously mentioned, this

would be much more relevant and valuable to the growing number of students seeking to pursue entrepreneurship.

Another ranking system which has gained traction is the Corporate Knights' annual assessment of global MBA programs, titled "Better World MBA". Their approach stands apart from the mainstream in that they exclusively rely on publicly available data, such as information from a school's website and general internet search results. The ranking considers 209 business schools globally, and evaluates them based on the proportion of the core courses which incorporate concepts of sustainable development. The ranking acknowledges all fundamental content concerning environmental, social, and governance performance. The subjects covered span from employment equity to indigenous consultation, child labor, biodiversity, carbon pricing, and the reduction of corruption. In addition, in 2023, they introduced an additional metric called "Alumni/Graduate Impact", which gauges the percentage of recent graduates employed in organizations with a perceived positive impact on society. Such organizations are defined as non-profits, companies deriving the majority of their revenues from sustainable activities, or organizations which are a part of the Corporate Knights' Global 100 list (100 most sustainable companies of 2023) or the Clean 200 companies list (200 publicly traded global corporations that emphasize sustainability) developed by Corporate Knights. The top 5 outcomes of the 2023 Better World MBA ranking can be seen in Figure 3 below.

Figure 3: Corporate Knights' 2023 Better World MBA Ranking

2023 rank	2022 rank	University	Country	Sustainable curriculum (100%)	Alumni impact (Bonus: 10%)	Final weighted score
1	1	Griffith Business School	Australia	100%	53%	100%*
2	6	Duquesne University – Palumbo-Donahue School of Business	US	93%	53%	100%
3	3	Maastricht University – School of Business and Economics	Netherlands	86%	45%	100%
4	New	Bard College	US	94%		100%
5	9	University of Vermont – Grossman School of Business	US	76%	48%	93%

Source: Corporate Knights 2023.

As depicted in Figure 3, Griffith Business School based in Australia claimed the top position in 2022. Other institutions, including Duquesne University's Palumbo-Donahue School of Business, and Maastricht University's School of Business and Economics, also secured top positions in this ranking. Notably, these institutions are all absent from the FT's 2023 MBA course rankings. This divergence underscores the disparity in ranking criteria, as FT's MBA ranking emphasizes salary outcomes, while the Corporate Knights' ranking centers on societal impact (Corporate Knights 2023).

While the metrics of evaluation used in ranking education providers is important to analyze, the use of quantifiable data points, which are verifiable, and relevant to the intended overarching measurement is equally imperative. For example, as discussed above, the Corporate Knights' Better World MBA ranking seeks to measure those MBA programs that are "most sustainable". Their methodology rewards those MBA programs which contain the most content related to sustainable topics, with bonus points achieved where alumni have landed positions at predefined impactful organizations. As a result, a program which primarily offers content considered

sustainable, will receive a high rank. While that methodology can be considered verifiable and quantifiable, is it entirely relevant to the goal of the ranking? This method does not fully account for relevant aspects such as the quality of education received related to sustainability, the initiatives outside of the classroom offered by these programs, the industry collaborations of these programs, and more. Rather, the ranking simply awards those courses with the most sustainability content. Therefore it's important for the consumer of a ranking such as the Corporate Knight's Better World MBA to question the relevance of the data points used in conducting the ranking, and consequently, how well these data inputs reflect what's being measured.

3. Hypothesis

We emphasize the significance of measuring the impact of alumni as a key indicator of a university or business school's success. Specifically, we identify alumni who enter entrepreneurship as people capable of providing material impact to society. There exists plentiful information on the substantial impacts on economic development, innovation, job creation, and societal well-being that comes from those who pursue entrepreneurship. In addition, a ranking which measures entrepreneurship can offer much more relevance to the growing number of students seeking to pursue entrepreneurship upon graduation as previously highlighted.

Entrepreneurs play a pivotal role in delivering economic value to societies. This notion finds its roots in the seminal work of Joseph Schumpeter's "The Theory of Economic Development" published in 1934. Schumpeter's work underscored the critical role of entrepreneurship in economic development and its positive effects on innovation. According to Schumpeter, entrepreneurs are a core driver of progress across technologies, societies, and overall human advancement (Schumpeter 1934). More recently, a study which examined the impact of entrepreneurship on GDP growth across 44 countries utilizing data from Global Entrepreneurship Monitor research and the Global Competitiveness Report, found that highly-performing entrepreneurs acted as significant contributors to economic growth within developed countries (Peterson & Valliere 2009). In addition, a study titled "The Economic Impact of Venture Capital", published by Stanford Business School, quantified the contributions to the U.S. economy from companies which were backed by Venture Capital ('VC'). It was discovered that since 1974, 25% of net job growth for publicly listed U.S. companies originated from VC-backed firms. Additionally, VC-backed firms accounted for a substantial 44% of research and development spending (approximately $131 billion) by publicly listed U.S. companies in 2014. As such, VC-backed firms have played a momentous role in shaping the U.S. economy, acting as a key driver of economic growth and employment across the US (Gornall & Strebulaev 2015). In addition, Private Equity-backed firms wield similar influence today. Ernst & Young, a global assurance services provider, analyzed the impact of Private Equity ('PE') on the European economy, innovation, and job creation. Their findings revealed that PE-backed companies employed over 10 million people in Europe in 2023, constituting 4.3% of the total workforce (Capolaghi & Labye 2023). Furthermore, research carried out by the European Central Bank in 2009 demonstrated that PE investment

accounted for 8% of aggregate industrial spending and as much as 12% of industrial innovation (Popov & Roosenboom 2009). As such, VC and PE-backed firms have significant impact on our economies and wider societies, thus, its valuable to analyse those business educators who produce the entrepreneurial talent which establishes such businesses. In addition, as further described below, we find it valuable to conduct an additional assessment on those alumni entering into senior decision-making roles at VC and PE firms, given their influential roles in providing the capital which fuels entrepreneurship.

As discussed, there exists rankings which seek to capture the best business educators' with regards to entrepreneurship, such as the USNWR, TPR, and P&Q. The USNWR's "Best Undergraduate Entrepreneurship Programs" 2023 ranking methodology entailed surveying deans and senior faculty members across 523 undergraduate business programs, seeking their opinions on the quality of all programs (Brooks, E. and Morse, R. 2023). TPR and P&Q use more comprehensive approaches. TPR's method evaluates schools based on academic offerings, student and faculty engagement, alumni ventures, outside-the-classroom experiences, and scholarship availability. It includes criteria such as the presence of entrepreneurship programs, the number of related courses offered, student enrollment and more. However, despite their assessment of over 300 business education providers, only 2 are non-US based, thus offering no insight programs outside of the US (The Princeton Review 2023). As discussed, P&Q's ranking is solely based on MBA programs, of which they use a small sample size, conducting their ranking on just 37 programs in 2023. In addition, their ranking doesn't capture the performance of alumni who become founders, and instead places a significant weight on the the number of alumni who launch a business within 3 months of graduation, giving no insight into how they performed. Furthermore, all of the aforementioned ranking providers, collect data points through the issuance of surveys, therefore, the comprehensiveness of the data collected is dependent on the responses received. As previously discussed, several US Law and Medical schools opted out of being included in a USNWR Ranking, thus immediately deteriorating the credibility of this ranking if it then must resort to excluding those key universities such as Columbia, Harvard, and Yale. Furthermore, in the 2023 USNWR ranking for institutions who are best at entrepreneurship, they received a 49% response rate on their surveys sent to 523 programs. Therefore, if key education providers are not responding to surveys, rankings lose relevance and credibility. For example, Harvard, Stanford, and Princeton do not feature in the USNWR and TPR entrepreneurship rankings. Although we can not definitively say these universities must be included in such a ranking, their exclusion would come at a surprise. Interestingly, P&Q's

ranking does include these notable universities such as Harvard, Stanford, and the University of Pennsylvania, however, they noted that these 3 schools did not respond to their survey, thus, they collected data using alternative methods. As such, surveying for the purpose of rankings is detrimental in the case of low response rates, and may lead to the exclusion of notable universities, therefore the ranking loses credibility almost instantly. As such, we argue for alternative data gathering methods. The digital era signifies a significant change in how we access and analyze data. Embracing tools like data scraping and big data technologies offers new avenues to gather previously unexplored data. Given the abundance of data available today, and the availability of tools to analyse such data, we believe the current rankings on entrepreneurship should be wider reaching in the institutions they assess, while also utilizing metrics which accurately measure a business educator's ability in producing high quality entrepreneurs.

As such, in our pursuit of creating an alternative ranking system to that of incumbents, we intend to emphasize those universities and business schools who develop the most successful entrepreneurs, utilizing PitchBook's well-regarded database as our primary source of data. Having outlined the impact of entrepreneurship, and the significant interest from students on the topic, we hope for incumbent rankings, like the FT's, to consider incorporating this topic further. Furthermore, given the outlined flaws in the current entrepreneurship ranking methodologies, and their limited geographical scope of assessment, we utilise alternative data points which act as quantifiable, verifiable, and relevant inputs into our ranking. Therefore, as further described below, we have created a ranking to reflect these factors, titled the "Alumni Entrepreneurship Ranking", or the "AER" for short.

4. Alternative Ranking - "Alumni Entrepreneurship Ranking"

The AER reflects metrics of university and business school alumni who pursue entrepreneurship, and rewards the success and scale of their endeavours. The AER measures four aspects; number of alumni who have founded a company, the number of companies founded by alumni which have completed an IPO, the total sum of private and public equity investment raised from alumni-founded startups, and finally, the total number of employees hired across alumni-founded startups. We perceive these metrics as quantifiable, verifiable, and relevant, for the purpose of creating a ranking measuring those educators who produce the best entrepreneurial talent. Utilising a comprehensive database from PitchBook.com, we gather the data and perform the ranking as further described in section 6 below. Using this information, we can place weights on each of the four metrics, and conclude an overall ranking for each institution, to infer which education providers are best at developing entrepreneurial talent.

In addition, building from our AER, we are able to reproduce a ranking published by PitchBook, titled "PitchBook Universities: top 100 Colleges Ranked by Startup Founders". While critiquing the methodologies used in rankings is important, assessing the precision of their outputs is of equal, if not, more importance. Thus, we reproduce PitchBook's ranking, using the same database, time constraints, and methodology, to assess the differences in outputs of the same ranking. This assessment was inspired from the several inconsistencies we spotted across PitchBook's published ranking, thus, a comparison as we conduct, assesses the precision of their ranking, and highlights the importance for users of rankings to not instantly accept a ranking's precision at face value. To note, we do not simply compare the AER to the PitchBook ranking, instead we gather the exact same data as they have gathered, some of which overlaps with the AER, and assess the differences in the results.

PitchBook's ranking, published in September 2023, is derived from the cumulative number of founders whose startups secured venture funding between January 1, 2013, and September 1, 2023. This assessment draws upon PitchBook's comprehensive global VC investment data and extensive details pertaining to over 150,000

founders. The ranking is segregated into three distinct categories, "Undergraduate", "Graduate", and "MBA", mirroring the degrees attained by a founder at their associated university or business school. The ranking includes information on the number of founders, the number of alumni-founded startups, and also the capital raised of these startups. The actual ranking is done only on the number of founders, thus the institution which produces the most founders, ranks highest.

Given the split across Undergraduate, Graduate, and MBA alumni, this can lead to double-counting of the same founder. For example, David Vélez, co-founder of Nubank, obtained a Bachelors and MBA at Stanford University, thus, Nubank is considered in both the undergraduate, and MBA categories. In addition, where a founder has studied abroad during their education, the institution where they spent their time studying abroad, will also be rewarded for the success of that founder and their associated company. Lastly, the ranking acknowledges that a single company may have multiple founders, and founders may have attended more than one educational institution, thus, multi-counting of the same company across institutions within the rankings can occur (Thorne & Rubio 2023).

For each university and business school, PitchBook provides information on the top 5 contributors to the sum of capital raised figure. When examining this information further, PitchBook fails to assign key startups to their relevant institutions, and in some cases, simply excludes notable startups altogether. For example, Greg Brockman, one of the co-founders of Open AI, an artificial intelligence-based research and deployment platform, is not accounted for in the ranking. Greg Brockman studied at both Harvard University and Massachusetts Institute of Technology ('MIT'). As of their latest fundraise in April of 2023, OpenAI has raised over $11 billion in equity financing from investors, however, Open AI does not appear as an alumni-founded startup for MIT or Harvard despite comfortably meeting the minimum sum of capital raised to be considered as a top 5 contributor to either university under each of the sub-rankings. However, the ranking does assign Open AI to Stanford University, within the MBA ranking, which would be anticipated given Open-AI's co-founder, Sam Altman, pursued an MBA at Stanford. As such, this detrimentally impacts Harvard and MIT's ranking, while boosting Stanford. As we had noted similar inconsistencies on several occasions, we could not build confidence in the precision of their ranking.

As such, we seek to reproduce the PitchBook ranking in an effort to reduce these inconsistencies and provide a more insightful ranking. While this reproduction may

alter existing metrics like founder count, company count, and sum of capital raised, more interestingly, it may lead to changes in the ranking as published by PitchBook.

5. Description of the Sample

5.1 Data Selection

We utilized data from PitchBook.com and publicly available LinkedIn data to conduct our assessments.

Firstly, PitchBook is a comprehensive financial data and technology platform that provides access to an extensive database of information on private and public companies. The use of PitchBook data presents several advantages in the context of this study. It offers access to detailed financial information, such as VC funding, PE deals, and entrepreneurial activity, of which, we can link to alumni.

PitchBook data is considered highly reliable for its accuracy and comprehensiveness. The information is meticulously curated and continually updated by a dedicated team of professionals. PitchBook utilizes its own in-house data operations team of more than 1,500 people, with an average tenure of +3 years, who have collected, assessed, and published millions of data points on companies, individuals, investments, and more, onto the platform. As such, For evaluating the entrepreneurial success of alumni, PitchBook provides a robust foundation for analysis (Pitchbook 2023).

Secondly, LinkedIn is the world's largest professional network. According to their website, LinkedIn boasts over 950 million members across more than 200 countries and territories globally. This comprehensive data source provides us with information on public and private companies, individuals' profiles, career paths, education histories, and much more. Relevant to our analysis, LinkedIn is an invaluable source of information for tracking the career trajectories of business graduates. In addition, LinkedIn acts as a second point of reference when conducting our analysis from PitchBook, allowing us to cross-check our results (LinkedIn 2023).

Publicly available LinkedIn data offers a wealth of information, and its reliability is grounded in its self-reported nature. Users willingly provide details about their educational and professional backgrounds, making it a valuable resource for researching the careers of alumni.

5.2 Data Description & Limitations

We utilized a PitchBook database with information related to 113 universities and business schools, of which the selected 113 institutions are typically those featuring in the incumbent rankings of the FT, QS, and others. We developed code in the high-level programming language, Python, to extract the key information we needed for our assessment. For the chosen universities and business schools, we extracted information relating to the quantity of founders, the quantity of alumni-founded companies which have become publicly listed, the total sum of equity financing raised by alumni-founded startups, and lastly, the sum of employees hired across these startups. As further described below, we define a startup as a company which has received venture financing in the last 10 years, inspired from the same methodology as used by PitchBook in a similar analysis. Utilizing this information, we can create our own ranking based on these metrics, and compare that to the incumbent rankings of universities and business schools.

A limitation to the data that we have gathered is that since PitchBook acts as the sole provider of the data, our analysis is limited and vulnerable to their ability in providing comprehensive and accurate information. Although it's considered as a high quality source of information, PitchBook acknowledges that it's not 100% accurate, for example, stating that they have about a 5% margin of error on private company valuation data (Phillips 2016). Furthermore, we noticed limitations ourselves in conducting this analysis. In one example, Fredrik Hjelm, the co-founder of Voi Technology, a provider of electric vehicle rental services, did not have an entry on his PitchBook profile related to his educational background. As such, a significant company which has raised over $500 million in funding across several capital fundraises, is therefore excluded from the ranking, detrimentally impacting the Stockholm School of Economics' ('SSE') ranking given Fredrik Hjelm is a former student of the business school. In addition, as we aspired to obtain increasingly granular data, like the specific courses which founders studied, the data became increasingly inaccurate and/or unavailable, thus we could not split by specific degree types, but rather by Undergraduate, Graduate, and MBA alumni. As a result, inaccurate or non-existing data points on the PitchBook platform can be detrimental to the precision of the results that we obtain.

Furthermore, our AER faces a limitation regarding founders who have studied abroad. Such founders will have their startup associated with all institutions they spent time studying with. For example, Jeppe Rindom, the co-founder of Pleo Technologies, an all-in-one business spending platform, pursued his MSc Finance and Accounting degree at Copenhagen Business School. However, during Jeppe Rindom's pursuit of this degree, he spent a study abroad semester at SSE. As such Pleo's metrics, such as financing raised, is associated with both business schools. While it is not possible to definitively determine which business school played a more crucial role in Jeppe Rindom's entrepreneurial endeavors and success, it would be reasonable to assume in this case, that Pleo should only be associated with Copenhagen Business School. However, given the limitations of the PitchBook database, it's not possible to assign the success of Pleo only to the primary business school at which the founder studied.

Finally, while PitchBook impressively provides information on over 3,700,000 private and public companies, with increasingly comprehensive information on larger companies, it does not capture all companies. Particularly the smallest startups may not appear on PitchBook's database. While this may not be significant if we rank universities and business schools based on the capital raised of alumni-founded startups, it can prove detrimental in assessing the true quantity of founders and their associated startups. Nonetheless, the aggregate of the undocumented information on the smallest-sized startups would unlikely bring an overall material change to the rankings we have concluded.

We also utilized Linkedin as a source of information, firstly in gathering the total alumni counts for the institutions involved in our analysis of the proportion of alumni entering into entrepreneurship, VC, and PE. In addition, we utilized LinkedIn Sales Navigator to gather counts on the number of alumni actively working in senior roles at VC and PE firms. However, there are notable limitations associated with using LinkedIn data for this analysis. These limitations can affect the accuracy and completeness of the data, ultimately influencing the reliability of any conclusions drawn from such analyses.

One significant limitation of LinkedIn is self-reporting bias. Individuals selectively present information on their LinkedIn profiles, and can emphasize their achievements while downplaying or omitting less favorable aspects of their career history. This bias can create an overly positive or skewed representation of an individual's professional journey, potentially distorting the overall trends in the data. In addition, selection

bias is also an issue. The alumni who actively maintain and update their LinkedIn profiles may systematically differ from those who do not. Therefore, any trends or insights drawn from LinkedIn data may not be representative of the entire alumni population.

There also exists a lack of verification when analyzing LinkedIn data. Unlike official records, there's a limited ability to confirm the accuracy of the information presented on profiles. This lack of verification opens the door to individuals exaggerating or even falsifying their accomplishments, education, or other aspects of their career, which can affect the reliability of the data. Furthermore, incomplete data is another challenge. Not all alumni may have LinkedIn profiles, and even among those who do, not everyone maintains them regularly. This can result in gaps and missing data, potentially leading to biased and incomplete analyses.

Inconsistencies and discrepancies in LinkedIn profiles further complicate the analysis. Individuals may report the same information differently, use varying job titles and descriptions, and structure their profiles in various ways, making data aggregation and interpretation challenging. These inconsistencies can undermine the accuracy of any comparative analysis.

In conclusion, despite the comprehensiveness and generally well-regarded sources of information we utilize, there exists limitations which can influence the output of our analyses which are important to be aware of when drawing conclusions and interpreting the results.

6. Methodology

We conducted several assessments in our analysis. First, we begin by developing our own ranking, separate to those of incumbent rankings. Given our desire to focus on the alumni entrepreneurship, we develop a ranking of both universities and business schools based on the alumni's entrepreneurial success and their wider impact to society.

We utilized the PitchBook database to source information on the number of alumni who have founded a company, the number of companies founded by alumni which have completed an IPO, the total sum of private and public equity investment raised by alumni startups, and lastly, the total number of employees hired across alumni startups. We applied a time constraint which matches that as used in Pitch-Book's University ranking, whereby we only include "*companies that received a round of venture funding between Jan. 1, 2013, and Sept. 1, 2023*". This enabled us to primarily account for currently active founders and companies, and to also set up a like-for-like comparison to that of PitchBook's ranking. We ranked each institute based on each of these 4 metrics, then set an equal weighting of 25% on each of the 4 ranked positions, to come to a weighted rank, of which we could comparatively rank universities and business schools with. For example, an institute which ranked 1st for founder count (most founder alumni), 2nd for number of publicly-listed alumni-founded startups, 3rd for capital raised, and 4th for number of employees hired by alumni founded startups, would yield an overall weighted rank of 2.5. This enabled us to then sort by the lowest weighted rank output, to capture the best performing institutions by the obtained metrics. Ties seldom occurred in conducting our ranking this way, therefore in order to keep consistent comparisons, there can be cases where two institutions have the same ranking. We began by analysing the AER on a global scale, ranking institutions across North America, Europe, Asia, and the Middle East. Then we further drill-down into rankings across Europe-based institutions, and business schools more specifically, to give a better insight into the European landscape.

During the establishment of our main ranking, we experimented with various criteria before selecting the aforementioned metrics which we believed best reflected the entrepreneurial success of alumni. One criterion under consideration was the average time taken by alumni to start their first company after graduation, however, we excluded this metric in the end given the inability to determine whether an alumni

becoming a founder sooner, is a definitively better thing. Nonetheless, we include this study in our additional analysis to showcase the results. For this calculation, we included all companies (regardless of their latest venture round) and only considered the date of the first company founded by each individual. We calculated the average time in years taken by graduates from each institution. We also assessed the median value, to protect against outliers, and further recalculated the average only considering students that graduated after 2008. We arbitrarily selected 2008 as a cutoff point due to the impact of the financial crisis.

Given the comprehensive database we had access to, we were also able to select certain points in time to assess the counts of the aforementioned four metrics. Thus, we conducted a further analysis on how the AER evolved over time. We arbitrarily chose four years as the time between each data point, thus we begin with our data as of the 1st of September 2023, and obtained counts on four prior points in time (2019, 2015, 2011, and 2007). This shows us which educators have been consistently top performing in their ability to produce successful entrepreneurs, and more interestingly, which institutions have become better or worse in doing so. Thus, we conduct the same AER, but at each point over the selected period, back until 2007 (when PitchBook was founded).

In addition, utilising our founder count figures, we conducted an additional study, on a sample of the top European Business Schools from our Pitchbook database, and assessed the proportion of alumni entering into entrepreneurship to give a better indication into the relative scale of each institution's ability to produce entrepreneurial talent. For total alumni figures, in many cases this figure is readily available on each institution's website, however, in some occasions, this figure is not readily available. Thus, to enable a like-for-like comparison across educators, we utilized total alumni counts from the institution's relevant LinkedIn page. We acknowledge the limitations of using LinkedIn as a data point for total alumni count. Primarily, this figure includes currently enrolled students, as well as alumni. Also, not all alumni have LinkedIn accounts and there's a lack of verification regarding those accounts already on the platform. Furthermore, while alumni may have LinkedIn accounts, there occurs cases whereby no entry has been made for an individual's educational background, and as such would not be accounted for. Despite these limitations, they exist across all of the assessed institutions, thus it enabled a more equitable comparison, rather than taking some alumni figures from the official institution's website, and others from Linkedin at their disadvantage.

We also utilized LinkedIn Sales Navigator, a platform often used by professional sales teams which offers comprehensive search capabilities, to assess the proportion of alumni entering into senior, decision-making roles of VC and PE firms, and also, the founders of such firms. As discussed in our hypothesis, VC and PE-backed firms have material impact on economic development, innovation, and the wider society. Thus, analysing the proportion of alumni entering into such roles, in a decision-making capacity, highlights an institution's ability in producing talent which provides the important funding for entrepreneurs. As we seek to capture those alumni in key, decision-making roles at these firms, we specifically sought fund founders and partners at VC and PE firms as a proxy for this. We gathered counts on the total number of alumni currently in such positions by incorporating filters provided by LinkedIn Sales Navigator. For example, for industry, we selected "Venture Capital and Private Equity Principals", then applied a filter regarding seniority level, of which we select "Owner / Partner", to obtain a total count of an institution's alumni who serve as partners or fund founders across VC and PE. A limitation of this is the inability to split between alumni in roles across VC and PE, given the industry filter is a combination of both. We conduct this analysis on the same peer group of European Business Schools as seen in the previous assessment on the proportion of alumni entering into entrepreneurship.

Furthermore, we compare our new ranking with that of incumbent rankings; the Financial Times' 2022 European Business School ranking, and QS' 2023 World University rankings on business and management studies, to evaluate the significance of differences across our ranking and incumbents'. Given the evidently different inputs used across these rankings and ours, we would expect to see noticeable differences when comparing both. However, such differences highlight the value in conducting rankings using different methodologies, which rewards institutions for aspects which are not included in current rankings. If there existed little difference across the incumbent ranking and ours, then there would be little value in doing a ranking on an alternative topic. Thus we approach the assessment with a desire to see deviations to merit conducting an alternative ranking in the first place. A limitation in our ability to conduct this cross-ranking comparison, is that our source of data from PitchBook is of 113 universities and business schools, quite rarely, there exists cases where a university or business school is included in a popular incumbent ranking, of which we have not been able to gather significant data on given the limited scale of our PitchBook database. These exclusions are noted where relevant in our comparisons.

Finally, we re-assess PitchBook's University ranking given we had noted incon-

sistencies in the ranking's outputs. First we arbitrarily chose the Graduate section of the Pitchbook University ranking to conduct a comparison against. Throughout the extraction of the same metrics used in PitchBook's ranking, we utilize the same constraints and methodologies as they have done in their analysis, such as calculating capital raised as the sum of pre-IPO equity financing. In addition, we faced the same limitations which PitchBook faced in the calculation of their ranking, thus we can compare the rankings in a like-for-like manner. To compare our outputs to that of PitchBook, we opted to re-rank the original PitchBook ranking according to capital raised figures, rather than by founder count, as they have originally done. We decided to rank by capital raised due to the greater impact of including a highly successful startup's capital raised sum on the overall ranking relative to the positive change of an additional founder to founder count. Using Klarna as an example, if we were to compare our ranking to that of PitchBook's based on founder count, by capturing Klarna in our analysis, given its exclusion in PitchBook's, we would be adding +1 founder to SSE's founder count which would not show a material change to SSE's positioning. However, by including the +$4.5bn capital raised by Klarna (the largest sum raised among SSE alumni-founded startups), in a ranking based on capital raised, there would likely be a more material change to SSE's ranking, and thus, it would reward the success of Klarna and it's founders more than a ranking sorted by the quantity of founders. Therefore we believe that ranking according to the sum of capital alumni-founded startups have raised, rewards the success of these founders, rather than a university or business school's ability to produce a high quantity of founders, regardless of their impact, success, and scale. Nonetheless, the purpose of this comparison is to provide insight into the precision of PitchBook's original ranking, of which can be done regardless of which metric we opt to rank by.

7. Results

7.1 Alumni Entrepreneurship Ranking

First we highlight the outcomes of the AER, conducted through a weighted ranking placing equal emphasis on 4 metrics; founder count, IPO count, capital raised, and employee count. Given the data extracted from PitchBook, we obtain the results in Table 1, which reflects the top 15 ranked universities and business schools within our sample of 113 institutions.

Table 1: Alumni Entrepreneurship Ranking, top 15, Global

Rank	Region	Institute	Founder Count	IPO Count	Capital Raised ($m)	Employees Count
1	US	Stanford University	5,028	119	305,380	588,827
2	US	Harvard University	3,188	100	256,750	455,837
3	US	University of California, Berkeley	3,127	81	172,928	298,251
4	US	University of Pennsylvania	3,028	67	165,601	426,306
5	US	Massachusetts Institute of Technology (MIT)	2,882	81	160,805	369,208
6	US	Cornell University	1,873	39	87,928	168,577
7	US	Columbia University	2,079	41	78,720	161,963
8	US	University of Southern California (USC)	1,538	32	90,743	159,075
9	US	University of California, Los Angeles (UCLA)	1,490	33	73,831	164,311
9	Europe	University of Oxford	1,872	33	66,338	150,194
11	Asia	Tsinghua University	815	96	85,577	293,787
11	US	New York University	1,790	29	72,733	149,871
13	US	Yale University	1,375	34	71,917	134,988
14	US	Northwestern University	1,776	21	67,308	185,200
15	US	University of Chicago	1,264	37	64,133	122,998

Source: PitchBook data

In a global comparison, the AER suggests Stanford University should rank first, followed by Harvard University, and University of California, Berkeley, compromising the top 3 in the rank. From our data extraction, we can also pinpoint the top contributors of the capital raised from each university. For Stanford University, JUUL, Open AI, and Robinhood, are some of the biggest contributors to their $305 billion capital raised figure. Harvard's Open AI, Stripe, and Northvolt, are some of the top-ranked contributors to their $257 billion capital raised figure.

Of the top 15, we find 13 US-based universities, 1 Asia-based, and 1 European-based university. This may be explained by the differing stages of development and maturity across VC and startup ecosystems globally. One explanation of the US' dominance in these rankings is due to our focus on metrics which are heavily reliant on local startup ecosystems, as such, differences across the scale and maturity of private markets globally can materially skew our global rankings. For example, as per Deutsche Bank's Wealth management division report on VC trends in 2020, the United States is considered as having a significantly larger share of the global VC market, based on the sum of capital invested, as shown in Figure 4. Given the evident leadership of the US in VC markets, it could be expected to see a ranking which is heavily exposed to VC environments, to significantly reward those placed in the most "buzzing" VC ecosystems (Nolting et al. 2021).

Figure 4: Regional Breakdown of Global Venture Capital Investment in 2020

Source: Venture Pulse, Q1'21, Global Analysis of Venture Funding, KPMG Private Enterprise. Data provided by PitchBook. Data as of April 21, 2021.

● Americas	52.8%
● Asia	31.0%
● Europe (incl. UK)	15.7%
● Other	0.5%
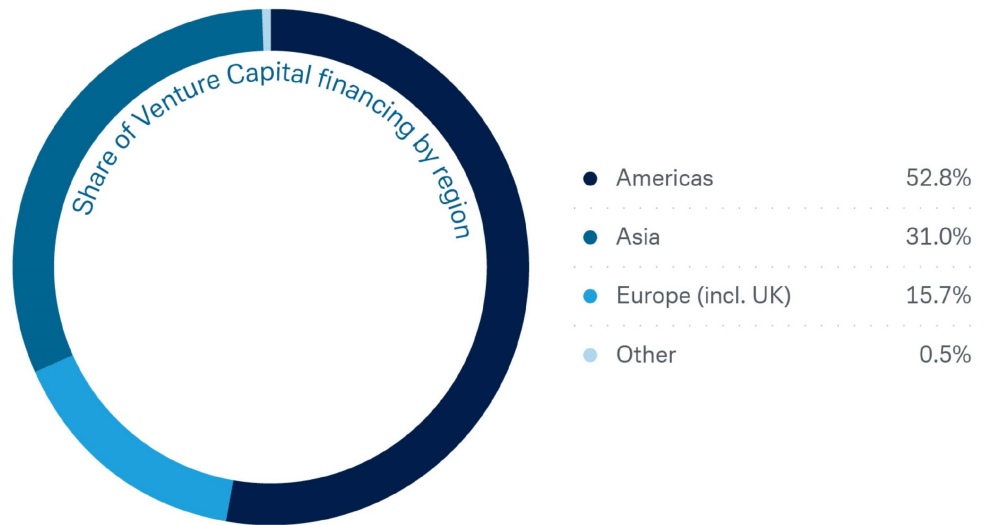
Source: Deutsche Bank Wealth Management 2021.

To gain better insights of this ranking across European-based universities and

business schools, we repeat this ranking while only including European-based institutions, resulting in the outcome in Table 2. This reflects the top 15 universities and business schools from our ranking conducted on a sample of 42 European-based institutions.

Table 2: Alumni Entrepreneurship Ranking, top 15, Europe

Rank	Region	Institute	Founder Count	IPO Count	Capital Raised ($m)	Employees Count
1	Europe	University of Oxford	1,872	33	66,338	150,194
2	Europe	University of Cambridge	1,342	20	38,020	89,515
3	Europe	INSEAD	994	14	36,999	144,659
4	Europe	Imperial College London	1,107	12	23,655	66,289
5	Europe	London School of Economics and Political Science	962	7	27,932	108,374
6	Europe	University of London	653	22	17,847	34,130
7	Europe	London Business School	665	8	17,047	67,879
8	Europe	HEC Paris	621	10	14,222	57,068
9	Europe	Stockholm School of Economics	289	14	14,213	76,010
10	Europe	University College London	450	9	11,510	38,812
11	Europe	Copenhagen Business School	438	12	8,034	29,693
12	Europe	Ecole polytechnique	469	3	13,471	36,522
13	Europe	Lund University	386	16	5,897	10,547
14	Europe	University of Bristol	334	4	6,556	40,825
15	Europe	University of Warwick	376	5	6,084	27,562

Source: PitchBook data

When focusing on European universities and business schools, the AER suggests Oxford University to place first, followed by the University of Cambridge and INSEAD respectively. Some of the biggest contributors to Oxford's significant capital raised figure were Kavak, Inflection AI and Monzo.

A limitation of the above rankings is that it compares universities against business schools. Universities typically have significantly larger enrollments than that of business schools, and as such are not a like-for-like comparison in a ranking conducted on absolute values. Consequently, we assign a definition of either "University" or "Business School" based on the institution's definition of itself, and/or by looking at the course offerings of each institution. Below in Table 3, we can see the same ranking performed on our defined Business Schools, in a European context again.

Table 3: Alumni Entrepreneurship Ranking, top 15, European Business Schools

Rank	Region	Institute	Founder Count	IPO Count	Capital Raised ($m)	Employees Count
1	Europe	INSEAD	994	14	36,999	144,659
2	Europe	London Business School	665	8	17,047	67,879
3	Europe	HEC Paris	621	10	14,222	57,068
4	Europe	Stockholm School of Economics	289	14	14,213	76,010
5	Europe	Copenhagen Business School	438	12	8,034	29,693
6	Europe	ESCP Business School	315	2	8,174	31,043
7	Europe	Bocconi	356	3	6,308	22,075
8	Europe	ESADE Business School	277	4	7,015	18,906
9	Europe	ESSEC Business School	302	3	6,009	20,138
10	Europe	IE Business School	254	2	11,056	18,201
11	Europe	IESE Business School	252	4	2,773	13,111
12	Europe	EDHEC Business School	148	1	3,402	24,457
13	Europe	IMD Business School	95	3	4,005	4,574
14	Europe	EMLYON Business School	111	1	823	4,203
15	Europe	Frankfurt School of Finance & Management	28	0	872	2,151

Source: PitchBook data

In our ranking of institutions which reflects business schools, we find INSEAD, London Business School, and HEC Paris to place in the top 3. This ranking gives us better insight into the context of institutions which more closely reflect pure business schools, providing a more insightful ranking when assessing the performance of such an institution.

In addition, we can assess how this same ranking has evolved over time. Thus, we analyze again how this same group of European business schools performed since 2007, as discussed in our methodology. As such, in Table 4, we can assess the trends over time relating to business schools' ability to produce successful founders.

Table 4: Momentum Analysis, top 15, European Business Schools

Region	Institute	Average Position	Change since 2007	2023 Rank	2019 Rank	2015 Rank	2011 Rank	2007 Rank
Europe	INSEAD	1.0	**0**	1	1	1	1	1
Europe	London Business School	2.6	**+2**	2	2	2	3	4
Europe	HEC Paris	3.0	**-1**	3	3	3	4	2
Europe	Stockholm School of Economics	3.4	**-1**	4	4	4	2	3
Europe	Copenhagen Business School	5.0	**0**	5	5	5	5	5
Europe	ESSEC Business School	7.2	**-3**	9	8	7	6	6
Europe	IE Business School	7.4	**-2**	10	6	6	7	8
Europe	Bocconi	8.4	**+2**	7	9	9	8	9
Europe	ESCP Business School	8.6	**+6**	6	7	8	10	12
Europe	EDHEC Business School	10.2	**-5**	12	12	11	9	7
Europe	ESADE Business School	10.6	**+5**	8	10	10	12	13
Europe	IESE Business School	11.2	**0**	11	11	12	11	11
Europe	EMLYON Business School	13.2	**-4**	14	14	14	14	10
Europe	IMD Business School	13.2	**+1**	13	13	13	13	14
Europe	Frankfurt School of Finance & Management	15.0	**0**	15	15	15	15	15

Source: PitchBook data

As seen in Table 4 above, there has been a long-term dominance among the high-ranking schools. INSEAD, London Business School, and HEC Paris, consistently remained as top ranked in our assessment over time. Interestingly, we can identify which schools have become relatively better or worse at producing entrepreneurial talent over time. For example, since 2007, ESCP Business School has jumped 6 places up to its 2023 ranking. Conversely, EDHEC has dropped 5 places on the same metric. While it may be easy to conclude that these schools have become "better" or "worse" over time, the changes seen in the input metrics can be caused by many factors, thus a deeper dive into the changes could be worthy of a further study.

While the absolute figures of the aforementioned metrics can provide insight into an institution's ability to develop founders, it's also important to recognise the relative size of the associated institutions when conducting a ranking of such. For example, according to our comparison conducted in Table 3, INSEAD boasts the most founders across our European business schools, with approximately 994 founders. However, it's important to recognise enrollment size, thus, we compare our total founder count to total alumni figures. As discussed, we use the business school's associated LinkedIn page to gather alumni count, with an acknowledgement of the inherent limitations in doing so. Continuing with our most recent comparison of European-based business schools, below, in Table 5, we can see the results of our ranking on the total founder count as a proportion of total alumni.

Table 5: Proportion of alumni founders, top 15, European Business Schools

Rank	Region	Institute	Total Alumni	Founder Count	Proportion
1	Europe	Stockholm School of Economics	34,511	289	0.8%
2	Europe	INSEAD	166,121	994	0.6%
3	Europe	London Business School	114,917	665	0.6%
4	Europe	HEC Paris	110,430	621	0.6%
5	Europe	ESCP Business School	81,435	315	0.4%
6	Europe	ESSEC Business School	84,051	302	0.4%
7	Europe	ESADE Business School	82,598	277	0.3%
8	Europe	IESE Business School	75,284	252	0.3%
9	Europe	IE Business School	89,652	254	0.3%
10	Europe	Bocconi	126,391	356	0.3%
11	Europe	Copenhagen Business School	160,043	438	0.3%
12	Europe	EDHEC Business School	56,990	148	0.3%
13	Europe	EMLYON Business School	57,909	111	0.2%
14	Europe	IMD Business School	55,650	95	0.2%
15	Europe	Frankfurt School of Finance & Management	38,982	28	0.1%

Source: PitchBook data, LinkedIn

As seen in Table 5 above, when taking into account the size of the business school relative to total founder count, the rankings adjust in a manner which rewards those business schools who are more effective in producing a greater number of founders with less total enrollment. Given this adjustment, SSE places first place, followed by INSEAD and London Business School. Given the limitation to our alumni count, in that it includes current students, it would be inaccurate to interpret that for example, 0.8% of SSE alumni become founders. However, this could pave the way for a future research study with access to a more accurate count on alumni.

Overall, our results highlight the entrepreneurial success of university and business school alumni across the world. For students seeking to study at a university or business school which develops successful founders, a ranking such as this can be helpful. However, given the limitations of our database, we cannot deep-dive into the results relating to the specific programs of each institution. Furthermore, the aforementioned limitations should also be taken into account when obtaining insights from these results.

7.2 Additional Analysis

Alongside the creation of our ranking, we came across additional relevant data points which could be used in comparing the performance of business educators, one example being, the proportion of alumni operating as key decision makers in roles across VC and PE firms. As discussed, these firms play pivotal roles in providing the capital necessary for entrepreneurs, as such business educators could also be assessed in their ability to produce alumni entering into such roles. Table 6 below, reflects the ranking of the same sample as Table 5, and assesses the proportion of alumni holding founder or partner roles across VC and PE firms.

Table 6: Proportion of alumni in VC/PE, top 15, European Business Schools

Rank	Location	Institute	Total Alumni	Alumni in senior VC/PE roles	Proportion
1	Europe	Stockholm School of Economics	34,511	246	0.7%
2	Europe	INSEAD	166,121	949	0.6%
3	Europe	London Business School	114,917	611	0.5%
4	Europe	HEC Paris	110,430	413	0.4%
5	Europe	Bocconi	126,391	471	0.4%
6	Europe	IESE Business School	75,284	269	0.4%
7	Europe	IMD Business School	55,650	186	0.3%
8	Europe	ESCP Business School	81,435	256	0.3%
9	Europe	EMLYON Business School	57,909	137	0.2%
10	Europe	ESADE Business School	82,598	192	0.2%
11	Europe	IE Business School	89,652	201	0.2%
12	Europe	ESSEC Business School	84,051	188	0.2%
13	Europe	Copenhagen Business School	160,043	291	0.2%
14	Europe	Frankfurt School of Finance & Management	38,982	61	0.2%
15	Europe	EDHEC Business School	56,990	89	0.2%

Source: LinkedIn

As seen in Table 6, SSE, INSEAD and London Business School hold the top 3 places in their ability to produce alumni in senior positions of VC and PE firms. Interestingly, this top 3 is the same as the top 3 institutions in our ranking of the proportion of alumni who become founders, as seen in Table 5. As such, these 3 business schools excel in producing alumni who directly enter entrepreneurship, and who indirectly support those entrepreneurs, thus giving insight into the capabilities of these business schools on providing education and facilities related to entrepreneurship.

As discussed, one criterion under consideration in the development of our methodology, was the average time taken by alumni to start their first company after graduation. We decided against using this metric in the ranking as it is not a definitively better thing to start a company sooner than others. Nevertheless, we believe this metric holds interest and could be applied in a different scope of research. Table 7 below, presents our findings based on the top 15 European business schools from the AER.

Table 7: Time to Founder, top 15, European Business Schools

Location	Institute	Avg. Years to Founder	Median Years to Founder	Avg. Years to Founder (>2008)
Europe	Bocconi	10.59	8.26	2.81
Europe	EDHEC Business School	9.68	6.59	3.22
Europe	INSEAD	9.63	8.42	1.84
Europe	ESCP Business School	9.35	6.59	2.78
Europe	ESSEC Business School	8.77	6.75	1.47
Europe	Stockholm School of Economics	8.63	6.59	2.07
Europe	IE Business School	8.54	5.83	2.14
Europe	Frankfurt School of Finance & Management	8.49	6.59	3.17
Europe	London Business School	8.36	6.01	1.19
Europe	HEC Paris	8.22	5.59	0.73
Europe	ESADE Business School	8.13	6.59	1.87
Europe	Copenhagen Business School	8.03	6.07	1.70
Europe	IMD Business School	7.12	7.59	1.62
Europe	EMLYON Business School	7.00	4.64	0.50
Europe	IESE Business School	6.98	4.92	0.94

Source: PitchBook data

The average time to found a company for the schools in Table 7 is 8.5 years. After the graduation date constraint is considered, the average falls to approximately 2 years. It appears that since 2008, alumni are starting their first company sooner after graduation compared to earlier years. This trend is observable across all institutes considered in our analysis of the PitchBook data set.

7.3   Comparisons across Ranking Publishers

To better understand the variance across our ranking and that of incumbent rankings, we also compare our ranking to that of the Financial Times' 2022 European

Business School Ranking and QS' 2023 World Universities Ranking for Business and Management studies.

First, the FT's 2022 European Business School ranking is calculated based on the joint performance of a business school over the FT's five main published program rankings: Executive MBA, MBA, Masters in Management, and two rankings of non-degree executive education programs. The online MBA and Masters in Finance rankings are not included. The overall business school rank is calculated by placing a 25% weight on the rank achieved by each of the Executive MBA, MBA, and Masters in Management program, based on their relevant FT ranking, following the removal of non-European institutions. The remaining 25% weighting is split equally across Executive Education, with 12.5% weight placed on customized programs, and the other 12.5% weighted on open programs (Chan et al. 2022).

As discussed in our methodology, there exists schools which rank highly in FT's 2022 European business school ranking, of which our PitchBook dataset does not provide adequate data upon. As such we note the exclusion of these institutions from our comparison, which in this case refers to ESMT Berlin and WHU – Otto Beisheim School of Management. In addition, we conduct this comparison primarily on pure business schools, which leads to the exclusion of business schools within larger universities. This exclusion is due to another limitation of our data source, which is caused by the inability to differentiate between alumni who studied within the business school of a university, or in non-business related programs within the same university. For example, the University of Oxford's Saïd Business School boasts many successful founders, however, under the constraints of our data set, the metrics associated with these founders are counted under the whole of the University of Oxford, rather than just the Saïd Business School. Therefore, in order to keep a like-for-like comparison, we exclude those business schools whereby our ranking reflects the wider university they are associated with, otherwise we would be comparing the metrics associated with the entire University of Oxford against a business school, which would not be a fair comparison. Therefore, we reconstruct our European-only AER to include only comparable business schools to FT's ranking. For example, in our original European AER, as seen in Table 2, University of Oxford ranks first, however, to reconstruct the ranking in the context of comparing it to FT's ranking, we now exclude the non-comparable institutions, which results in the removal of the University of Oxford and the University of Cambridge, and now places INSEAD as first place in the European AER. The results of this analysis can be seen below in Table 8.

Table 8: Comparison: Financial Times vs the AER

Location	Institute	2022 FT Ranking	AER Ranking	Difference vs. FT
Europe	HEC Paris	1	3	**-2**
Europe	London Business School	2	2	**0**
Europe	ESCP Business School	3	6	**-3**
Europe	Bocconi	4	7	**-3**
Europe	IESE Business School	6	11	**-5**
Europe	EDHEC Business School	7	12	**-5**
Europe	ESSEC Business School	9	9	**0**
Europe	IE Business School	10	10	**0**
Europe	IMD Business School	11	13	**-2**
Europe	EMLyon Business School	12	14	**-2**
Europe	INSEAD	15	1	**+14**
Europe	Esade Business School	17	8	**+9**
Europe	Stockholm School of Economics	20	4	**+16**
Europe	Frankfurt School of Finance & Management	26	15	**+11**
Europe	Copenhagen Business School	36	5	**+31**

Source: Financial Times

The results of this comparison highlighted notable differences in ranking, even more so as we move lower down the FT ranking. For example, INSEAD, ESADE, SSE, Frankfurt School of Finance and Management, and Copenhagen Business School, merit sizable position improvements in our ranking, with an average 16 place increase across the five schools. IESE Business School and EDHEC Business School are the biggest downgrades in our ranking, both declining 5 places in our analysis. We find a 0.106 correlation across the two ranking methods, indicating a low correlation (Calkins 2005).

Looking beyond just European business schools, we also compared the AER to QS' 2023 World University rankings on business and management studies. The ranking is conducted on institutions offering business and management programs, of which they are ranked according to five indicators; Academic reputation (based on responses from 130,000 academics who are asked to list up to 10 domestic and 30 international institutions which they consider to be excellent for research in the given area), Employer reputation (survey responses of more than 75,000 graduate

employers worldwide who are asked to identify up to 10 domestic and 30 international institutions they consider excellent regarding graduate recruitment), research citations per paper, the H-index (measures productivity and impact of an institution, based on the set of the academic's most cited papers and the number of citations they have received in other publications), and lastly, the International research network index (index which reflects the ability of institutions to diversify the geography of their international research network) (QS World University 2023).

As such, we can analyze the differences across our ranking and QS'. Below in Table 9, we can see the top 15 institutions by QS' ranking, against our placement of these institutions.

Table 9: Comparison: QS vs the AER

| Location	Institute	2023 QS Ranking	AER Ranking	Difference vs. QS
US	Harvard University	1	2	-1
Europe	INSEAD	2	31	-29
Europe	London Business School	3	55	-52
US	Stanford University	4	1	+3
US	Massachusetts Institute of Technology (MIT)	5	5	0
US	University of Pennsylvania	6	4	+2
Europe	Bocconi	7	92	-85
Europe	University of Cambridge	8	25	-17
Europe	University of Oxford	9	9	0
Europe	HEC Paris	10	57	-47
Europe	London School of Economics and Political Science	11	42	-31
US	University of California, Berkeley	12	3	+9
Asia	National University of Singapore	13	42	-29
US	Northwestern University	14	14	0
Europe	Copenhagen Business School	15	73	-58

Source: QS: Top Universities.

We obtain similarly remarkable differences in our comparison against QS' rankings. As previously discussed, given the importance of local VC and startup ecosystems on our metrics, those universities and business schools located in the most "buzzing" ecosystems, perform the highest in our rankings. As such, we see the most notable differences against the QS rankings where a non-US based institution is ranked towards the top of the QS Ranking. The comparison against this rankings

yields a 0.355 correlation, implying low correlation (Calkins 2005).

Finally, we compare our data against PitchBook's 2023 "Top 100 Colleges Ranked by Startup Founders". This comparison can give insight into the disparity of the results obtained from the same database, and on the same metrics, under the same constraints and limitations. Below in Figure 5, we can see the variances in outcomes of the top 5 universities, sorted by most capital raised based on PitchBook's rankings within the "Graduate" category.

Figure 5: PitchBook University top 100 Ranking comparison: Position 1-5
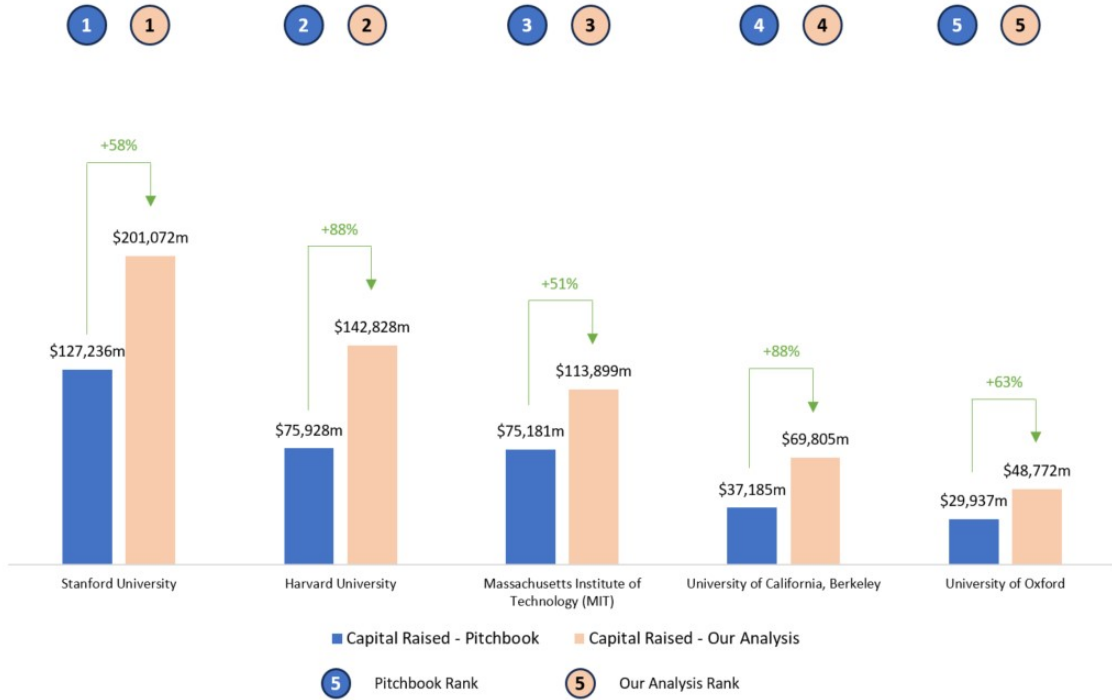
Source: PitchBook.

In the above figure, the top 5 universities, sorted by the capital raised of Graduate alumni-founded startups, sees no changes regarding ranking. However, regarding the actual sum of capital raised, sizable differences exist. PitchBook's methodology appears to exclude significant startups, despite these companies meeting their stated timeframe criteria, such as the pre-discussed Open AI example. Some of the other

notable startups excluded in PitchBook's overall analysis includes Uber (+$13bn pre-IPO equity financing raised, co-founder Travis Kalanick is a UCLA alumni), Grab (+$10bn pre-IPO equity financing raised, co-founder Anthony Tan is a Harvard and University of Chicago alumni). More specifically in the Graduate segment, PitchBook also exlcudes Klarna (+$4.5bn raised, founder Sebastian Siemiatkowski is an SSE alumni). Thus the exclusion of high-achieving startups all together, or in specific university cases, could most likely explain the disparity in capital raised figures.

While the ranking among the top 5 universities remains the same, once we go further beyond the top 5 performers within the Graduate category, ranking differences emerge. Figure 6 contains the institutions ranked 6th to 10th as per PitchBook's count of capital raised. Notable differences can be seen with the University of Cambridge, which drops 8 places in our ranking, and with Tsinghua University, which gains 4 places in our ranking.

Figure 6: PitchBook University top 100 Ranking comparison: Position 6-10
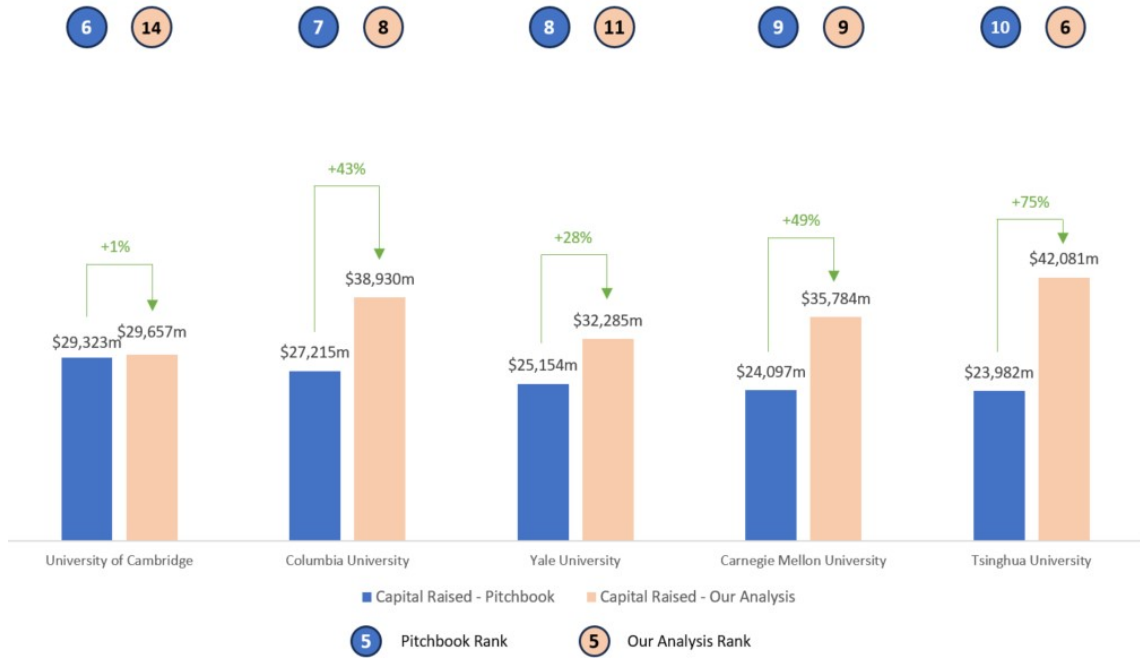
Source: PitchBook.

These deviations in the rankings continue to exist as we go further down the top 100. Table 10 reflects the biggest gainers regarding the differences across the two rankings. Notable differences include SSE, the Chinese Academy of Sciences, and Ecole polytechnique, all receiving rank increases of 30 places or more in our analysis.

Table 10: Comparison against PitchBook ranking: Biggest gainers

Location	Institute	PitchBook Ranking	AER Ranking	Difference vs. PitchBook
Europe	Stockholm School of Economics	81	47	+34
Asia	Chinese Academy of Sciences	46	15	+31
Europe	Ecole polytechnique	83	53	+30
Canada	University of British Columbia	53	25	+28
Canada	University of Waterloo	68	49	+19
US	North Carolina State University	86	70	+16
Asia	National University of Singapore	64	52	+12
US	University of Washington	37	26	+11
US	Georgetown University	76	65	+11
US	Purdue University	38	29	+9

Source: PitchBook.

Overall, our comparison against the PitchBook data highlights deviations, which become increasingly material as we go beyond the top ranked universities and business schools. As we conducted this comparison only on the "Graduate" section of PitchBook's ranking, we would anticipate ranking deviations to appear again if we conducted this same assessment on the "Undergraduate" and "MBA" sections. As such, we conclude in this comparison against PitchBook's ranking, that while rankings published by reputable sources such as PitchBook can provide great insight into the relative performance of educational institutions, it's important to not simply accept ranking outcomes at face value.

8. Implications for further research

One crucial area for future exploration lies in the refinement of ranking methodologies. Future research should delve into alternative metrics that consider the diverse achievements of graduates, encompassing factors such as entrepreneurship. As discussed, a growing number of students have voiced their interest in entrepreneurship following graduation, hence, an established and well-conducted ranking which incorporates the entrepreneurial success of an institution's alumni would provide more insight than that of the plentiful incumbent rankings on traditional metrics like salaries and test scores. Furthermore, not all students are interested in entrepreneurship either, and perhaps have interests which are also not measured by incumbent rankings. Thus, future research could explore the topics of interest to prospective students, and use this feedback in the development of further rankings, which over time, could accommodate the interests of a wider audience than today.

The current rankings on the best institutions for entrepreneurship are overly focused on the US and are exposed to problems associated with non-responses to surveys issued. Given the volume of public data accessible today, and the widespread availability of tools to analyse such data, there exists opportunities to assess alternative methods of conducting such rankings, utilising sources other than surveys. Future research could delve into the alternative possibilities in data gathering for the purpose of creating a ranking, as we have done, enabling publishers to overcome the issues associated with sending out surveys to obtain data. Furthermore, while our ranking does not drill-down into specific courses, like Masters in Management, or Masters in Finance programs, future studies could explore the possibilities to do this, providing users of such a ranking with more specific information on the actual programs which are best at producing successful entrepreneurs.

Future assessments of established rankings' use of quantifiable, verifiable, and relevant data in conducting rankings is important in pushing for high quality standards among rankings. In addition, delving into the outcomes of rankings in an effort to assess their precision, as we have done above, could inspire ranking publishers to provide additional transparency into the data inputs used in rankings. As such, continued research on this area could assess the effectiveness of incumbent ranking methodologies and the data inputs used, and therefore push for higher standards amongst ranking providers, while also equipping the users of rankings, such as stu-

dents, with a more critical perspective when gaining insights from them, rather than assuming their accuracy at face value.

Finally, ethical considerations must be a focal point in future research too. The influential role of rankings in shaping institutional reputation and student choices necessitates a thoughtful examination of the potential negative consequences. Researchers should explore ways to mitigate these consequences, fostering an ethical and responsible approach to the evaluation of educational institutions.

9. Conclusions

This thesis undertook a critique of existing university and business school rankings, shedding light on their limitations and what they fail to account for.

Recognizing the limitations of conventional approaches, while highlighting the growing student interest in entrepreneurship in tandem with the limited scope of rankings on the topic, we built a new ranking on entrepreneurship. We emphasised the importance of data inputs which are quantifiable, verifiable, and relevant in our desire to measure the best institutions for entrepreneurship. A comparative analysis of the AER against established rankings, such as the FT's and QS', unveiled substantial divergences, highlighting the value of new rankings which assess alternative metrics and topics. As such, we hope for the popular incumbent rankings, like the FT, to seek more ways of incorporating entrepreneurship into their assessments. Not only would this provide value to the growing number of students seeking to pursue entrepreneurship, but it would also recognise the impact entrepreneurs have on innovation, economic development and more, thus adding to the assessment of the performance of business educators.

In addition, this leaves us with the question of what other topics are the consumers of rankings interested in, which are not being captured? Future research should seek to understand the popular topics of interest which are not adequately assessed in current rankings, such as our ranking related to entrepreneurship. Furthermore, to avoid having educators declining to participate in rankings, ranking publishers should regularly consider updating their methodologies to remain relevant in the ever-changing landscape of business education.

In addition, our method of assessing the "best" universities and business schools for entrepreneurship allowed us to highlight the alternative possibilities in conducting rankings. Although our ranking utilizes few metrics, we were capable of performing our ranking on a more global scale, offering capabilities to drill-down into specific regions, which can provide value to those interested in rankings on non-US based institutions. As such, the current ranking publishers for entrepreneurship should allocate resources in replicating their analysis in a global context, to reach the large audience of prospective college students outside of the US interested in pursuing entrepreneurship following their studies. In addition, we highlighted the problems with

current entrepreneurship ranking publishers' reliance on surveys for data gathering. This method puts their rankings at risk of losing credibility when top universities are not a part of the assessment due to non-responses and a lack of data points. Thus, ranking publishers should consider different methods of data capture which takes advantage of the volumes of publicly available data today.

Finally, the accuracy of the methodologies used to conduct rankings is an imperative aspect to consider as well. While most rankings may be accepted by users at first glance, diving-deeper into the methodologies and outputs, as we have done with PitchBook's top 100 Universities ranking, can yield concerns regarding the outcomes of the ranking. In addition, this poses the question of how educators and ranking publishers can work more closely together, to create more transparency, make relevant data points more widely available, and therefore, provide more accuracy in the preparation of rankings.

In essence, this thesis not only critiqued the shortcomings of prevalent ranking methodologies, but also proposed an additional topic of assessment to compare the performance of business educators. Thus, in future, we hope this topic will be further explored, for the benefit of all stakeholders involved.

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