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BIBLIOMETRIC ANALYSIS OF DISSERTATION RESEARCH IN MANAGEMENT

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Abstract

The purpose of this exploratory and descriptive research is to evaluate a representative sample of reference lists of the selected dissertation research in the field of Management in Pakistan by using descriptive citation analysis methods, citation patterns and citation evaluation on a modified, validated objective Tunon & Brydges rubric. Furthermore, the sample was divided into two clusters to compare the mean impact factors of reference lists of the two clusters to see if the quality of dissertations in Management, in general, is improving over time. Another comparison is made to see how the quality of theses completed at public universities fares in contrast to the quality of theses completed at private universities. The findings of the research show that Ph.D. theses in the field of Management appear to have been improving in terms of quality as the total mean impact factor of the theses completed in the second cluster (2013-2017) was statistically speaking significantly different from that of the first cluster (2008-2012). However, no statistically significant difference was noted between the total impact factor mean of public universities" reference lists when it was compared to that of private universities, allowing the researcher to conclude that the quality of the Ph.D. thesis has been improving for the ten years studied, however, there was no qualitative difference between theses completed at private universities and those which were completed at the public universities.

Keywords: Bibliometric, Dissertation, Research, Citation Pattern

Introduction

There are various ways to evaluate the quality of scholarly communication. Some of them have been categorized as objective, and others have been labeled as subjective methods of evaluation of quality. Under the objective methods, various emerging bibliographic techniques are increasingly being developed and used to evaluate the quality of scholarly communication. The current science of bibliometrics allows us to detect patterns of authorship, scholarly output and literature usage. Many of these measures are currently being used as proxy indicators for the research impact or even the quality of research produced.

In every field today, new research is being built upon previous works, and the process of acknowledging those earlier works in a research paper is the concept of citation for acknowledging those works. Therefore, the citation count of a research paper can be assumed to be a proxy for research impact as well as for its quality. However, experts

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advise metrics based on factors like citation counts, which must be devised through a robust process and should be interpreted by discipline experts who appreciate the specific citation patterns of a particular discipline. No wonder the current wisdom is that bibliometric indicators should be used as an aid to supplement expert evaluation.

Funding for research is facing legitimacy issues, and the entire model of higher education is being challenged and revamped in accordance with neoliberal ideals. Consequently, universities have to justify their funding and research on the basis of cost and benefit analysis. Scholars, commercial interests like owners of scholarly publication databases, and regulators alike are struggling to come up with agreed-upon standards through which the quality of published research can be evaluated. This very need to assess research quality, its impact and contribution on a national scale required numerical, algorithm-based evaluative bibliometrics to be deployed, if not solely, then at least to supplement what experts have already termed as informed peer review.

Obviously, the evaluation of research quality is important for various stakeholders. Impact, and especially long-term impact, is an important consideration in scientific publications these days. In fact, the application of the same principles is being used for calculating the impact of journals in the form of a journal impact factor. The Journal Impact factor is generally considered to be the most authentic metric to measure the scientific impact of journals, yet it has its share of critics.

Initially, citation analysis of reference lists of theses and dissertations produced by students was used by specialists in the field of library sciences to figure out the usage of library resources and to best manage their resources on the basis of usage by students enrolled in any given institution. It is the most widely used method in the current science of bibliometrics. Bibliometrics can be defined as the research field in which the quantitative aspects of bibliographic material are studied (Broadus, 1987). It is generally believed that Alan Pritchard (1969) coined the term Bibliometrics around the same time that the term scientometrics was used by Nalimov & Mulchenko (1969) concerning literature on science and technology, while some other researchers around the same time used another closely related term of infometrics to describe the same science of quantitative study of bibliographic data. It is a field that exists at the convergence of library and information science research disciplines, where bibliographic material is analyzed using various quantitative methods aided by breakthroughs in the information sciences. Bibliometrics has been used to figure out research trends in a given field, discover the structure of a field, and locate missed opportunities in a field. It is also used to identify the most important authors in a field, seminal papers, research institutions, countries and regions which have been contributing significantly to a given field. Numerous software tools have been available to do bibliometric analysis, and experts opine that each one of them has its strengths and limitations.

There are three major bibliographic databases: Web of Science (WoS), Scopus and Google Scholar. The first two are subscription-based, but Google Scholar is accessible free of cost.

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Thomson Reuters currently owns WoS, and it is the oldest and most reliable database for performing citation analyses. Numerous studies have been conducted to study its characteristics. It contains a number of citation indices. Scopus, owned by Elsevier, is also a subscription-based database launched in 2004; it has been studied by scholars as well (Waltman, 2016). Google Scholar, which is actually a search engine, indexes online scholarly literature. Google Scholar was also launched in 2004, and very little is known about its coverage (Waltman, 2016). Higher Education Institutions often have access to WoS and or Scopus through a web interface, which is good enough for performing basic citation analyses on a smaller scale. Advanced citation analyses require direct access without the limiting impact of the web interface. Professional bibliometric centers are said to have direct access, or in the alternative, they use specialized web-based tools such as InCites and SciVal for WoS and Scopus, respectively (Waltman, 2016). Similar mega-citation analyses through Google Scholar are difficult. However, sometimes an app called Publish or Perish (Harzing, 2010) is used to conduct such analyses.

The thesis presents an important component of overall research activities; therefore, it is important to know thesis' state of the art of any field to see the trends, direction and structure of the research. Consequently, this study evaluated the reference lists of a sample of 30 theses in Management completed over ten years in various Pakistani universities. The study focused on descriptive citation analysis, citation patterns, and quality of citations by using Tunon & Brydges" objective rubric (2005a) and comparison of mean impact factors of split data design to see quality differences over time as well as to calculate quality differences between theses produced in private universities versus those completed at public universities. As the researcher did not have access to any paid subscription-based databases, he conducted a manual citation analysis of these theses reference lists by relying on sources available online.

Research Problem

For this paper, the researcher identified the research problem as such: How do reference lists of theses in Management look in terms of their composition and quality of sources cited in those reference lists? What are some of the trends in their composition, and is the quality of the thesis" reference list improving over time?

Research Questions

Later, the researcher converted the research problem into two quantifiable research questions:

1. What are the differences between the quality levels of reference sources used in doctoral dissertations in Management completed at public universities versus those completed at private universities from 2008 to 2017?
2. Is the quality of Management theses" reference lists improving over time as measured by comparison of mean impact factor of citations" sources of two clusters of theses completed from 2008-2012 and 2013-2017?

Literature Review

Traditional peer review, which is the gold standard of research quality evaluation, is a time-consuming process that causes bottlenecks in academic scientific publishing. Therefore, alternative forms of quality evaluation mechanisms have been suggested, discussed and evaluated in the academy itself and by the allied commercial players operating in the arena of scholarly publications. Bibliometric analysis of references cited in a scholarly journal, though the technique initially developed to manage library acquisition practices, has become another process to evaluate the quality of scientific communication. This appears to be a somewhat objective criterion. Most of such bibliometric studies initially have been conducted either in the field of library sciences or in conjunction with some of the objectives of library sciences like library search skills (Tunon & Brydges, 2005a), library collection management (Mahajan, 2017), library collection (Romic & Mitrovic, 2014), collection development tool budget (Edwards, 1999), utility of library holdings, (Becker & Chiware, 2015), subscription of relevant journals (Jayaprakash & Kannappanavar, 2015) etc. However, of late bibliometric research has also been used to evaluate the quality of student researchers' library search skills set after training (Green & Bowser, 2003), quality of thesis (Beile et al., 2003, 2004), quality of cited work (Tunon & Brydges, 2008; Eckel, 2009), evaluation of a researchers' status and their research productivity, of institutions and countries (Serenko & Bontis, 2004) and citation patterns and composition, and comparison of related PhD programs (see, e.g., Brydges & Tunon, 2005a; Tunon & Brydges, 2006; Tunon & Brydges, 2009). The adoption of bibliometrics techniques to evaluate the quality of scientific communications by national quality regimes has given bibliometrics a whole lot of prestige, and those exercises implicitly legitimatize it by validating its techniques and science (Gogolin, 2012).

There is a long line of criticism on bibliometric analysis and its validity. As early as 1998, Seglen warned us that citation rates and journal impact factors were not suitable for the evaluation of research. The study cited many nuanced factors that must be considered before assigning appropriate weightage to such seemingly objective criteria as bibliometrics citation analysis (Seglen, 1998).

Bibliometric data is readily available, and the last decade saw a rise in those easy-to-use tools, which would generate bibliometric tools for evaluation purposes. This method of comparison, if used properly, also gives a semblance of objectivity. The deployment of bibliometric data for comparing research groups like individual researchers also has its limitations. Bornmann et al. (2008) listed three conditions that must be met before bibliometric data can be considered valid for comparative evaluation purposes between research groups: 1) the scientific impact of the research groups or their publications are looked at by specific statistical techniques, namely box plots, Lorenz curves and Gini coefficients to represent distribution characteristics of the data, 2) appropriate and relevant reference standards after a thorough critical examination are used to assess the impact of research group, 3) statistical analysis of citation counts is done keeping in mind that citations are a function of various factors besides quality (Bornmann et al., 2008). However, the impact of citations becomes more questionable, as demonstrated by a 2014 study. The study investigated the relationship between a research

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paper's visibility and the number of citations it received (Ebrahim et al., 2014). A case study of two researchers who were avid users of marketing tools showed that a research article's visibility greatly influences the impact of citations, thus making citation analysis a questionable tool for assessing research quality (Ebrahim et al., 2014). No wonder researchers are jumping on the bandwagon of dissemination of their research for all sorts of social media platforms dedicated to the research world.

Another study on similar lines by Jarwal et al. (2009) evaluated whether the three most commonly used bibliometric indicators, impact factor, citations per paper and Excellence in Research for Australia's list of ranked journals, can predict the quality of research papers as determined by experts. The analysis was based on the Mock Research Quality Framework exercise conducted by Monash University in 2006-7 (Jarwal et al., 2009). The study noted a significant relationship between all three bibliometric indicators and the international assessors' scores on the basis of a five-point quality scale. Surprisingly, however, only a small amount of variance could be explained. However, some evidence suggests variation among disciplinary groupings and researchers suggest a cautious approach should be taken while using these indicators as proxies for research quality (Jarwal et al., 2009).

In fact, research by two Iranian scholars, Azadeh & Vaez (2013), revealed numerous inaccuracies in references to PhD theses. Edwards (1999) used citation analysis as a collection development tool by doing a bibliometric study of polymer science theses and dissertations. Similarly, a longitudinal seminal survey on Iowa State University's Digital Repository was done by Kushkowski et al. (2003). These researchers studied 9100 citations from 629 theses written between 1973 and 1992 and concluded graduate students prefer current research regardless of their discipline of study (Kushkowski et al., 2003). They discovered over half of the citations were less than ten years old, while more than 87 percent of total citations were of journals and monographs. They further observed that theses were getting lengthier with time, and the average number of citations varied by the discipline groupings they used in their study (Kushkowski et al., 2003).

Eckel (2009) conducted a citation analysis of 96 master's theses and 24 Ph.D. dissertations completed between 2002 and 2006 at Western Michigan University's College of Engineering and Applied Sciences. After analyzing 2903 citations from master's theses and 2886 citations from doctoral dissertations, the study concluded, among other things, that the sources used by postgraduate candidates tended to be of higher academic and scholarly quality (Eckel, 2009). Walsh & Ridge (2011) used bibliometric methods to evaluate American dissertation research from 1999 to 2009 in nanotechnology to report dissertations on nanotechnology had experienced tremendous growth and that those theses were mainly concentrated at engineering departments of major research universities and were primarily sponsored by federal funding.

Numerous bibliometric studies have been done in the neighboring Indian context. Zafrunnisha (2012) undertook an analysis of the characteristics of literature used by writers of Ph.D. theses in psychology at selected universities in the Indian state of Andhra Pradesh. In the business field, during the same year as above, Kumar & Dora (2012) conducted a citation analysis of 49 doctoral dissertations submitted at the prestigious

Indian Institute of Management, Ahmedabad, during the 2004 to 2009 period. They concluded that the top 48 journals ranked among the 30 most used journals contributed to more than 55 percent of journal citations, while journals happened to be the most cited sources. (Kumar & Dora, 2012). In a case study, Banateppanvar et al. (2013) conducted a citation analysis of doctoral theses in botany submitted to Kuvempu University, India. Jayaprakash & Kannappanavar (2015) conducted a citation analysis of doctoral dissertations in commerce submitted to Goa University (2015). They prepared a list of ranked cited journals and authors and discovered that the majority of the scientists preferred to publish research papers in joint authorship and preferably in the journals (Jayaprakash & Kannappanavar, 2015). Mahajan (2017) conducted a citation study of Ph.D. history dissertations at Punjab University, Chandigarh, to collect data to help collection management of the Library of Panjab University. Wani and Zainab (2017) reviewed and examined the eminence of scientometric indicators in scientific research productivity in their article.

Using Harzing's Publish or Perish software, Halverson et al. (2012) determined the most frequently cited sources on the subject of blended learning. Through these findings, they concluded the places, people and trends at the forefront of blended learning scholarship. Five researchers from Spain conducted a bibliometric analysis of research activity in the agronomy category by evaluating quantitative and qualitative features of the research from the Web of Science between 1997 and 2011 to establish a ranking of countries and research centers (Canas-Guerrero et al., 2013).

Mishra et al. (2014) researched citation patterns of PhD research scholars in English by using bibliometric techniques. In the same year, Romic & Mitrovic (2014) used citation checking of PhD dissertation references as a tool for evaluating library collections of the National and University Library of Zagreb. Borthakur (2015) did a citation analysis of theses and dissertations in chemistry submitted to the LNB library, Dibrugarh University, between 2009-2013.

A cross-sectional exploratory study was done by Jessica M. Hanna (2015), which was part of her doctoral thesis. She compared the quality of research being produced in two different types of postgraduate programs: traditional and online doctoral degree programs exclusively in the field of education leadership (Hanna, 2015). Condic (2015) examined and compared bibliographies of student dissertations and faculty publications and then presented various descriptive and analytical data from the study. Faculty consistently used higher quality citation sources in comparison to students, Condic (2015) concluded.

Renowned scholar and internet fame Harzing (2005) evaluated Australian research output in Economics and Business by employing citation analysis. Since then, Harzing (2017) has been publishing more and more on citation analysis after her strenuous stints with the UK Research Excellence Framework (REF) and Australian Execellence in Research for Austrialia (ERA). Her latest white paper claims that a long, cumbersome peer-reviewed process as currently practiced in the UK's REF could be replaced by a much simpler exercise based on metrics.

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There is a series of papers by Tunon & Brydges in which first they created and validated two rubrics, one objective and another one subjective. Later, they used these validated rubrics to evaluate and compare theses produced in the field of youth studies of various traditional and nontraditional programs.

The library professor team of Tunon and Brydges decided to assess the effectiveness of library training programs by doing a citation analysis of dissertations for education department doctoral students enrolled in distance education programs. In order to assess 144 youth studies dissertations reference lists, they constructed a subjective and objective rubric (Brydges & Tunon, 2005). Johanna Tunon and Bruce Brydges's (2005a) initial study looked into reference lists obtained from 143 doctoral dissertations from the Child and Youth Studies program at Nova Southeastern University to evaluate the quality of students' library search skills. In short, they examined the relative merits of applying citation analysis and evaluative bibliometric techniques for making judgments on candidate's library search skills (Tunon and Brydges, 2005a). They used a validated subjective rubric with five criteria: the breadth of resources, the depth of literature review as shown through the citing of critical historical and theoretical works, depth as demonstrated through the scholarliness of citations chosen, currency and relevancy (Tunon & Brydges, 2005a). In fact, this study, by measuring the quality of doctoral dissertation reference lists of two different programs by using rubrics and citation analysis, yielded similar outcomes. The pair did not stop there; they followed up by doing three more studies on the same line.

In their second study in the same year, Tunon and Brydges (2005) analyzed the entire youth studies program. Further, they compared the results of local and distance groups within the program while validating both instruments. After their two back-to-back studies, the researchers concluded that citation analysis could be used in conjunction with their subjective or objective rubrics. In other words, they claimed both rubrics to be effective for assessing the quality of reference lists. Later, the following year, they conducted what they termed as their formative study, in which they used their subjective rubric with descriptive citation analysis to compare 144 theses from nontraditional programs with 59 dissertations from 10 traditional institutions. They concluded that dissertation reference lists of both traditional and nontraditional institutions were more similar than those reference lists were different. In explaining their results, they employed both constructivist and social construction theories as those constructs provided insights into the citation analysis as a tool for evaluating the library search skills of PhD candidates. The study also documented the differences in the composition of cited sources in those reference lists. Their formative study was followed by one more study, which they rightly labeled as an expanded study (Tunon & Brydges, 2008) in which they attempted to see that the results of formative research were generalizable to other programs. Distance students in education produced a total of 452 dissertations, including educational programs from the same institution, in addition to the initial 144 dissertation reference lists in youth studies used in the formative research.

Furthermore, 34 more recent youth studies dissertations were added to the original 144 dissertations. Those dissertations were from six different education doctoral programs, and each varied in terms of its methodology of delivering instruction. As had

been the case with the previous study, citations were used as descriptive indicators of document content via the use of a citation analysis method that counted resources used in dissertation reference lists. The same methodology was used for analyzing the citations as in the researchers' previous studies (Brydges & Tunon, 2005; Tunon & Brydges, 2005, 2006). An algorithm was used to generate an objective score for each reference list.

Consequently, the current study uses an adapted version of Tunon & Brydges's objective rubric. The researcher of the current research contacted Johanna Tunon for an algorithm, but because of its proprietary nature, it was not shared. However, its scoring logic was shared as it has been in public purview in one of their papers. Consequently, the study used its scoring logic, which is complementary to the field of Management that it intends to assess. The adapted version and the scoring scheme were validated by a panel of local experts in the field after initial validation by researchers in other faculties in an iterative process lasting over nine months.

Table 01: Stats of Experts Participated in Rubric Validation Exercise

Faculties	PhDs	Ph.D. Scholars
Management Sciences	2	3
Computer Sciences	3	0
Sciences	3	0
Biomedical Engineering	2	2
English	1	1
Education	1	0
Pharmacy	2	0

Student engagement (SE) literature, especially in the context of higher education, is one emerging field, and Aparicio et al. (2020) went one step further by employing bibliometric analysis techniques instead of just doing a subjective evaluation of bibliographic data dating from 1998 to 2018. Their study reveals seminal publications and journals, which aided most of those publications by circulating them, places where those researchers conducted their research, and identified those groups of scientists that generated the most important strands of SE research (Aparicio et al., 2020).

Ali & Aboelmaged (2020) did something interesting by observing discrepancies in emphasis, methodology and time horizons of previous literature reviews in the field of academic misconduct research in higher education; they decided to do a bibliometric analysis of the last twenty years of research in the field. Their painstakingly constructed analysis had key insights as to the identities of important research clusters, countries at the forefront of the research and the actual evolving trajectory of the study in the field during the past twenty years. In doing so, they discovered areas suitable and promising for future research as well (Ali & Aboelmaged, 2020).

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Like the above two studies in the specialized fields, four researchers contributed the same to the field of family firm internationalization, a phenomenon strengthened and noticed by improvements in ICT and trade liberalization regimes of the world. They identified important journals and authors in the field whose work forms the intellectual basis of the field by doing what researchers themselves labeled as performance analysis: a mix of quantitative analysis like a number of publications and qualitative indicators measuring impact like the number of citations received by a paper (Alayo et al., 2020). The current study could not have traversed into the realm of performance analysis since theses in the sample never received any citation as they were never published, to begin with.

However, the above bibliometric studies of the three emerging fields of student engagement in higher education, academic misconduct in higher education and family firm internationalization do validate the current main idea that bibliometric study is the right tool to assess research output in the emerging field of Management in Pakistan as research in this field is an emerging phenomenon in the country fueled by a number of economic, social, academic factors and some global phenomenon like neoliberalism, improvements in ICT and trade integration.

Methodology

For the current study, the researcher used the mean impact factor score as a proxy for quality and the overall Tunon & Brydges (2005, 2008) adapted objective rubric score.

For analysis purposes, the researchers adapted Tunon and Brydges's (2005) objective rubric. This adaptation was a product of an iterative inductive process as the first Tunon and Brydges objective rubric was selected. The researcher decided to condense various categories of objective rubrics according to the data requirements through an inductive process. Hence, the original Tunon & Brydges objective rubric was simplified into the following categories:

Table 02: Tunon & Brydges Modified Categories for Reference Lists Analysis
Categories
N
Total Number of Citations
Number of Academic/Scholarly Journal Citations
Mean Impact Factor
Number of Books or Book Chapters Citations
Number of Unpublished/Published Dissertations
Number of Conference Papers
Number of Reports

Web Sites/Internet Sources
Miscellaneous
Subjective Rubric Overall Score

Sample of the Study

This part of the research entails the evaluation of reference lists of theses of Management. Initially, all theses stored in the repository under the categories of Business Administration and Management were located. Then, the researcher, by reading their abstracts and other descriptors, attempted to categorize them into various fields within the Business Administration and Management Sciences. In creating those categories, the researcher took great inspiration from an article published in the British Journal of Management, which reviewed the UK State of Management Research after the 2001 Research Assessment Exercise (Besant et al., 2003). The categories evolved, and the researcher now and then sought the opinion of his supervisor to define the contours of these categories; initially, 69 theses were categorized into the Management category, which was later expanded into some 98 theses.

Finally, based on the said configuration, the researchers decided to do a purposive, non-random, judgmental sampling as 36 theses out of the initial 69 theses were produced by two Islamabad-based universities. Had a random sample been chosen, there was a high probability that it might not have been representative in terms of multi-dimension criteria that the researcher eventually used. Consequently, the researcher used a judgmental sample.

Through an iterative process of several rounds over a year or so, the researcher questioned and re-questioned his assumptions and reconsidered his strategies in light of evolving data. The researcher eventually arrived at this list. Before the start of purposive sampling, the researcher spent time setting out a multi-dimensional criterion that would guide him in his selection. After much debate, reading of the literature and soul-searching, the requirements were developed; the researcher realized that the sample must represent the length and breadth of the Pakistani higher education scene in Business Administration and Management Sciences. Being aware of the fact that education is a provincial subject after the passage of the landmark 18th Amendment to the Constitution, the researcher attempted to traverse inter-provincial differences in terms of the quality of higher education by composing a sample to include this fault line. Obviously, the story does not stop there, as intra-provincial differences were equally important, and so was the urban-rural divide, or rather, major urban centers versus smaller towns' differences. Likewise, another fault line that the researcher wanted to account for was the differences between public and private universities. In a similar vein, the researcher wanted to see if the quality of theses is improving over time, so the researcher decided that the sample should cover at least ten years.

For a sample size of 30 theses, the researcher managed to incorporate theses from 19 different universities situated across Pakistan in six different cities. The list further

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appears to be a good mix of private and public universities as thirteen universities were public and the remaining 17 universities were private in the list. Furthermore, these 30 theses were evenly spread over 10 years, thus allowing the researcher to see any overall improvements in five-year clusters.

Table 03: Final list of Number of Selected Theses, Universities & Cities

S.No.	City	University	Number
1	Islamabad	Air University	1
2	Islamabad	CUST	2
3	Islamabad	Foundation University	2
4	D.I. Khan	Gomal University	1
5	Karachi	ILMA	1
6	Islamabad	International Islamic Univ.	2
7	Islamabad	Preston University Kohat	1
8	Islamabad	Iqra University	1
9	Hyderabad	Isra University	1
10	Islamabad	Maju	2
11	Lahore	NCBA&E	2
12	Islamabad	NUML	3
13	Islamabad	NUST	2
14	Peshawar	Qurtuba Univ. Peshawar	2
15	D.I. Khan	Qurtuba Univ. D.I. Khan	1
16	Karachi	Univ. of Karachi	2
17	Lahore	LUMS	2
18	Peshawar	Univ. of Peshawar	1
19	Lahore	Univ. of Punjab	1

A sample of 30 theses may seem small. Still, earlier, two citation analysis studies of PhD dissertations in the field of education had comparable sample size to the final list of 30 dissertations as Beile et al. (2003) study assessed 30 education dissertations" reference lists from three different universities while Haycock (2004) evaluated 43 dissertations completed at University of Minnesota's education department by conducting a bibliometric study.

Findings and Discussion

The two research questions and findings are discussed below:

What are the differences between the quality levels of reference sources used in doctoral student theses in Management completed at public universities versus those completed at private universities?

In order to find answer to the above hypothesis, the 30 theses sample was divided into two groups, one set of theses completed at public universities and another group of those theses, which were completed at private universities. Public universities produced 13 theses versus private universities, which granted 17 doctorates in the sample. There was no statistically significant difference in any category of data compared between theses completed at public universities versus theses completed private universities. This is interesting finding as private universities charge a lot in terms of fee etc.. Yet, analysis revealed that there is not any difference between theses completed at private universities when they were compared with theses completed at public universities over 10 years.

Is quality of Management theses" reference lists improving over time as measured by comparison of mean impact factor of citations" sources of two clusters 2008-2012 and 2013-2017?

To find out if the overall quality of theses is improving over time, the purposive sample of 30 theses scattered over ten years was divided into two clusters of 15 theses each. The impact factor of each eligible source of reference lists was calculated and then mean impact for each thesis was determined. Finally, the total of mean impact factors of each cluster was compared to see if there was a statistically significant difference between them. The statistical analysis yielded that there was a statistically significant difference between total mean impact factors of both clusters, thus supporting the hypothesis that overall quality of theses is being improved over time.

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Table 04: Descriptive Comparison of Thesis completed between 1st Cluster (2008-2012) and 2nd Cluster						
Criteria	Number of Thesis Completed Between 1st Cluster 2008-2012	Number of Thesis Completed Between 1st Custer 2008-2012	Number of Thesis Completed Between 2nd Cluster 2013-2021	Number of Thesis Completed Between 2nd Cluster 2013-2021	T-test Sig. (2-tailed)	Effect size
	Mean	Range	Mean	Range		Eta Square
N	15		15			
Total Number of Citations	200.86	64-380	319.66	95-720	0.028*	0.16
Number of Academic/Scholarly Journal Citations	98.6	5-254	225.93	83-495	0.002*	0.28
Mean Impact Factor	2.808	0-4.15	3.465	2.37-4.30	0.045*	0.13
Number of Books or Book Chap. Citations	73.06	10-267	66	10-158	0.751	
Number of Unpublished/Published Dissertation	3.4	0-19	3.8	0-11	0.811	
Number of Conference Papers	2.53	0-13	3.8	0-14	0.352	
Number of Reports	4.26	0-13	3.93	0-14	0.907	
Web Sites/Internet Sources	10.33	0-47	5.13	0-14	0.211	
Miscellaneous	8.66	0-20	13.8	1-34	0.105	
Objective Rubric Overall Score	44.94		71.72		0.027*	0.16

As these values are above than the required cut-off of 0.05, you can conclude that there is no difference between thesis completed in public and private university.

The effect size was calculated when the value in the Sig. (2-tailed) column is equal or less than 0.05 (e.g., .03, .01, .001) and the ""t"" value is greater than 2.5.

As all the sig values are greater than 0.50, therefore effect size was not calculated. The Independent sample t-test was performed after checking assumption of quality of variance usingLevene's Test.

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Table 05: Descriptive Comparison of Thesis between Public and Private Sector Universities

Criteria	Number of Thesis completed in Public University	Number of Thesis completed in Public University	Number of Thesis completed in Private University	Number of Thesis completed in Private University	T-test Sig. (2-tailed)	Effect size
	Mean	Range	Mean	Range		Eta Square
N	13		17			
Total Number of Citations	254.46	85-380	264.7	64-720	0.856	-
Number of Academic/Scholarly Journal Citations	147	5-320	173	0-495	0.556	-
Mean Impact Factor	3.15	1.69-4.51	3.12	0-430	0.909	-
Number of Books or Book Chap. Citations	75.3	15-180	65.11	7-267	0.649	-
Number of Unpublished/Published Dissertation	4.92	0-19	2.58	0-10	0.16	-
Number of Conference Papers	1.76	0-7	4.25	0-14	0.066	-
Number of Reports	5.76	0-40	2.82	0-12	0.3	-
Web Sites/Internet Sources	9	0-35	6.67	0-47	0.598	-
Miscellaneous	12.61	23-Apr	10.17	0-34	0.449	-
Overall Objective Rubric Score	57.11		59.27		0.865	

In the above presented table, all the sig. (2-tailed) values are greater than 0.05

1. As these values are above than the required cut-off of .05, you can conclude that there is no a statistically significant difference between thesis completed in public and private university.
2. The effect size was calculated when the value in the Sig. (2-tailed) column is equal or less than .05 (e.g., .03, .01, .001) and the ""t"" value is greater than 2.5.
3. As all the sig values are greater than 0.50, therefore effect size was not calculated.
4. The Independent sample t-test was performed after checking assumption of quality of variance usingLevene's Test.

Contribution

No such study has ever been conducted in Pakistan, which evaluated reference lists of Management theses for any purposes. This research attempted to see if the quality of reference list is improving over time by comparing two clusters of the sample spread throughout 10-year. Furthermore, the research tried to gauge any differences between

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references lists of theses produced in public universities versus those theses, which were produced in private universities. Business universities" administrators, PhD program managers, curriculum designers, thesis supervisors, evaluators, examiners and last but not the least, the regulators in Pakistan can take stock of this research to improve the quality of teaching on how to improve library search skills and especially information search skills among PhD students. These skills eventually impact on the quality of theses produced as those are essential for optimal usage of electronic databases of scholarly communication.

Practical and Scholarly Significance

No such study has ever been conducted in Pakistan, which evaluated reference lists of Management theses. In fact, Pakistan's assertive higher education regularity body has not done any descriptive citation analysis, citation patterns on PhD theses in Management. This study has shed light on much-needed librarian faculty collaboration in the field for strengthening PhD programs in general and especially PhD programs in the field of Business Administration and Management Sciences. Besides, the importance of library search skills for PhD candidates come to the fore because of this paper. Currently, no such programs are in place. Administrators and PhD program managers could strengthen their PhD programs by adding a library training and electronic databases search training component to their course offerings.

The university administrators, PhD program managers, curriculum designers, thesis supervisors, evaluators, examiners and last but not the least, the regulators in Pakistan can take stock of this research to improve the quality of teaching how to conduct library research skills and especially those competencies, which are required to search scholarly communication from electronic databases.

Limitations and Future Directions

The researchers did not have access to any paid/subscription-based databases. Likewise, now numerous softwares have been developed to analyze bibliometric data, however researchers did not have access to those apps either. Therefore, most of the tedious work of listing of citations, identification of sources and their ranking etc. was done manually. Of course, at a time of artificial intelligence and machine reading, this manual process is inherently flawed and entailed numerous risks. Moreover, the research evaluated only a small sample of 30 theses for reference list analysis, perhaps in future a more comprehensive study could be done to get a more accurate picture. Besides, broadening the dataset, the researchers can also look into currency factor of theses" reference lists, which is also an important implicit indicator of quality (Tunon & Brydges, 2009).

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