Towards a Broader Understanding of Journal Impact: Measuring Relationships between Journal Characteristics and Scholarly Impact

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Abstract**—**The impact factor was introduced to measure the quality of journals. Various impact measures exist from multiple bibliographic databases. In this research, we aim to provide a broader understanding of the relationship between scholarly impact and other characteristics of academic journals. Data used for this research were collected from Ulrich's Periodicals Directory (Ulrichs), Cabell's (Cabells), and SCImago Journal & Country Rank (SJR) from 1999 to 2015. A master journal dataset was consolidated via Journal Title and ISSN. We adopted a two-step analysis process to study the quantitative relationships between scholarly impact and other journal characteristics. Firstly, we conducted a correlation analysis over the data attributes, with results indicating that there are no correlations between any of the identified journal characteristics. Secondly, we examined the quantitative relationship between scholarly impact and other characteristics using quartile analysis. The results show interesting patterns, including some expected and others less anticipated. Results show that higher quartile journals publish more in both frequency and quantity, and charge more for subscription cost. Top quartile journals also have the lowest acceptance rates. Non-English journals are more likely to be categorized in lower quartiles, which are more likely to stop publishing than higher quartiles. Future work is suggested, which includes analysis of the relationship between scholars and their publications, based on the quartile ranking of journals in which they publish.

Keywords**—**Academic journal, acceptance rate, impact factor, journal characteristics.

I. Introduction

THE concept of impact factor was introduced in 1955 [1]. An impact factor is derived from the citation rates of individual papers in the journal they are published in [1], [2], and it is widely used in all bibliographic databases to measure the quality of journals. However, there are several limitations in the raw calculation of factors from citations [3], with discipline differences in citation rates being the most obvious one. In order to account for these differences, impact factor calculation has been normalized, for example, *Eigenfactor®* Score calculation from Journal Citation Report® (JCR®). Elsevier calculate *SJR Score* based on Scopus data using PageRank™, an algorithm used by Google Search to rank websites in their search engine results. Both *Eigenfactor®* and *SJR* score are normalized, which provide a measure to compare the quality of academic journals across disciplines.

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Besides scholarly impact, there are many other characteristics that can be used to define a journal, with acceptance rate being another notable one. Acceptance rates of scholarly journals show substantial variation between disciplines, with the study of Zuckerman and Merton [4] appearing as an important work in this area. They found disciplinary variation in rejection rates, with 20% to 40% in the physical science compared to 70% to 90% in the social sciences and humanities. Regarding the change of acceptance rate over time, there are two different voices in acceptance rates for academic journals. Some studies show that journal acceptance rates have been very stable over time and are largely unaffected by changes in submissions [5]. However, other studies indicate that when journals become more impatient to attract the attention of the public, they are more likely to accept a greater number of papers in order to increase submissions and to make their journals noticed, and therefore potentially lower the quality of the papers published by their journals [6].

Traditionally, articles from academic journals have only been available through print subscription. The Internet has recently made possible the free global availability of academic journal articles online, leading to the distribution medium appearing as another important journal characteristic. Some subscription journals allow authors to publish their manuscripts in open web repositories, and some academic journals open the access for all their published papers on the Internet [7]. By 2010, 15-20% of the 2.5 million articles published annually worldwide are being self-archived by their authors [8]. Open access is not only about public access rights or the general dissemination of knowledge, but also about increasing the impact and thereby the progress of research itself [8]. The relationship between impact and open access has attracted attention from scholars. Some studies show that open access articles are cited significantly more than articles in the same journal and year that have not been made open access [9], [10]. However open access does not make an unusable (un-citable) article usable; it simply makes a useful paper more visible. Some studies indicate that open access journals indexed in Web of Science and/or Scopus are approaching the same scholarly impact and quality as subscription journals [11]. Although these empirical studies are contradictive, it suggests that open access may have influence on scholarly impact of the journal, or vice versa.

Besides scholarly impact, acceptance rate and open access, there are many other characteristics which may be used to define academic journals, such as, distribution medium, age, and subscription cost, and so forth. In this research, we aim to provide a broader understanding of the characteristics of journals, beyond citations alone, which lead to higher scholarly impact. Due to the lack of empirical evidence on measuring the relationships between journal characteristics and scholarly impact, we seek the answers to the following specific questions:

- RQ1: What is the correlation among the characteristics of academic journals?
- RQ2: What is the quantitative relationship between scholarly impact and other characteristics of journals?

To answer these two research questions, firstly, we collected and consolidated a large, comprehensive set of academic journal data obtained from multiple sources, which is explained in Methodology and Data analysis sections. Next, we analyzed the consolidated dataset to answer these two specific questions in the Results section. Finally, we summarized our findings and provided a discussion of possible future work in the Discussion and Conclusion section.

II. Methodology

A. Data Attributes

Previous work has compiled a set definition of characteristics on academic journals from various bibliographic data sources [12]. This work used data analysis approach to collect journal related data from five data sources resulting in 13 characteristics to define academic journals. From this work, the important characteristics of academic journals are considered as: *Scholarly Impact*, *Subject Category*, *Age*, *Size*, *Distribution Medium*, *Open Access*, *Peer Review*, *Acceptance Rate*, *Pricing*, *Language*, *Country*, *Status*, and *Issue Frequency*.

B. Data Collection

Based on the 13 attributes, we consolidated and compiled a dataset of refereed academic journals, which was collected from *Ulrich's Periodicals Directory* (*Ulrichs*) dated in January 2016, *SCImago Journal & Country Rank* (*SJR*) from 1999 to 2015, and *Cabell's* (*Cabells*) for 2015. We downloaded *SJR* reports on the Web based across 17 years from 1999 to 2015 [13]. All unique journals are combined for this research. A total of 28,944 unique *SJR* journal records was consolidated, which includes 22,606 in 2015, 414 in 2014, 297 in 2013, 271 in 2012, 264 in 2011, 341 in 2010, 286 in 2009, 386 in 2008, 277 in 2007, 350 in 2006, 338 in 2005, 1,023 in 2004, 290 in 2003, 666 in 2002, 369 in 2001, 421 in 2000, and 345 in 1999.

To match the timestamp of *SJR* data, we extracted the snapshot data of *Cabells* dated in December 2015 [14]. And we extracted *Ulrichs* data on the Web in January 2016 [15].

Cabells journals and *Ulrichs* journals are matched to *SJR* journals based on *ISSN* and *Journal Title*. The match process leads 18326 *Ulrichs* journals and 5987 *Cabells* journals found in *SJR* data. The data collection and consolidation process is explained in Fig. 1.

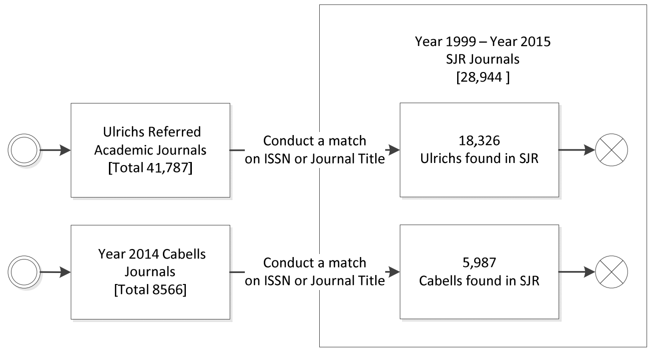

Fig. 1 Data collection and consolidation process for this research

C. Data Dictionary

The data type, data range, data source, and description of these 13 attributes in the consolidated dataset are explained in Table I.

D. Data Analysis Methods

1) RQ1: What Is the Correlation among the Characteristics of Academic Journals?

To answer research question 1, we conducted a correlation analysis of the consolidated dataset in Weka data mining software using *PrincipalComponents* algorithm. The results of the correlation analysis are explained in Results section.

2) RQ2: What Is the Quantitative Relationship between Scholarly Impact and Other Characteristics of the Journals?

To answer research question 2, we adopted an embedded data field, *SJR Best Quartile,* in all 17-year *SJR* reports, for data analysis. *Quartile* rankings are calculated based on the scholarly impact distribution that a journal occupies in its subject categories [16]. Q1 represents the top 25% of the scholarly impact distribution, Q2 for middle-high position (between top 50% and top 25%), Q3 for middle-low position (top 75% to top 50%), and Q4 for the lowest position (bottom 25% of the scholarly impact distribution). All *SJR* journals are categorized in *Quartile* categories. For example, in the year 2015, Q1 contains 6,512 journals with an average *SJR* score of 1.64; Q2 contains 5,665 journals with an average *SJR* score of 0.49; Q3 contains 5,390 journals with an average *SJR* score of 0.24; and Q4 contains 5039 journals with an average *SJR* score of 0.12. As noted in Table I, the variables in the consolidated dataset include both categorical and numeric data. As such, univariate analysis of variance (ANOVA), using Games-Howell post-hoc tests with 95% confidence interval, are used to analyze the differences in means for numeric data, including *Scholarly Impact*, *Age*, *Size*, *Acceptance Rate*, *Pricing*, and *Issue Frequency*. Chi-square tests are applied to categorical data, including *Distribution Medium*, *Open Access*, *Language*, *Country*, and *Status*. Both ANOVA and chi-square tests are conducted in IBM SPSS Statistics package (Version 24).

The following section demonstrates the data analysis results of two research questions.

TABLE I
LIST OF ATTRIBUTES IN THE CONSOLIDATED DATASET

Attributes	Data Type	Data Range	Description
Scholarly Impact	Numeric	0.1- 32.928	Data (*SJR* score) is captured from *SJR*. *Scholarly Impact* data is for every journal in the list.
Subject Category	String		Data is captured from *Cabells*. *Scholarly Impact* (*SJR* score) from *Scopus* is normalized to minimize the difference between disciplines [13]. Therefore, there is no need to analyze the quantitative relationships between *Scholarly Impact* and *Subject Category*. This data field is ignored in the further analysis.
Age	Numeric	0-249	Data is captured from *Ulrichs*. *Age* is in numeric format. Null value is allowed, which means that no age value can be found for this journal.
Size	Numeric	1- 88102	Data is captured from *SJR*. *Size* is in numeric format. Null value is allowed, which means that no size value can be found for this journal.
Distribution Medium	String	'1'; '2'; '3'	Data is captured from *Ulrichs*. This is a categorical data field. There are three value types: '1', '2', and '3'. '1' stands for Print Only; '2' stands for Online Only, and '3; stands for 'Both Print and Online'.
Open Access	String	'Yes'; 'No'	Data is captured from *Ulrichs*. If the journal provides open access, *Open Access* value is 'Yes'; otherwise 'No'.
Peer Review	String	'Yes'; 'No'	Data is captured from *SJR*. This is a categorical data field. There are two value types: 'Yes' and 'No'. Due to all journals are peer reviewed. This data attribute is ignored in further study.
Acceptance Rate	Numeric	0-100	Data is captured from *Cabells*. *Acceptance Rate* is in numeric format. Null value is allowed, which means that no *Acceptance Rate* can be found for the journal.
Pricing	Numeric	0- 20879	Data is captured from *Ulrichs*. *Pricing* is in numeric format. Null value is allowed, which means that no *Pricing* can be found for the journal.
Language	String	'English'; 'Non-English'	Data is captured from *Ulrichs*. This is a categorical data field. There are two value types: 'English', and 'Non-English'.
Country	String	'US or UK'; 'Others'	Data is captured from *SJR*. This is a categorical data field. There are two value types: 'US or UK', and 'Others'.
Status	String	'Active'; 'Inactive'	Data is captured from *Ulrichs*. This is a categorical data field. There are two value types: 'Active', and 'Inactive'.
Issue Frequency	Numeric	0-365	Data is captured from *Ulrichs*. *Issue Frequency* is in numeric format. Each journal has an *Issue Frequency* value.

III. RESULTS

The results of the data analysis are presented in two research question sections.

A. RQ1: What Is the Correlation among the Characteristics of Academic Journals?

Attributes of *Scholarly Impact* (A), *Age* (B), *Size* (C), *Distribution Medium* (D), *Open Access* (E), *Acceptance Rate* (F), *Pricing* (G), *Language* (H), *Country* (I), *Status* (J), *and Issue Frequency* (K) are represented by A, B, C, D, E, F, G, H, I, J, and K, respectively, in the correlation matrix in Table II.

From Table II, it is evident that the highest correlation of 0.39 occurs between Language and Country, which is reasonable to expect to be related. However, even this correlation is not regarded as high, which indicates that there is no particular correlation between any data attributes that characterize academic journals.

TABLE II
CORRELATION MATRIX FOR ALL JOURNAL CHARACTERISTICS

	B	C	D	E	F	G	H	I	J	K
A	0.02	0.17	0.05	0.01	-0.08	0.05	-0.08	-0.05	-0.02	0.14
B	-	0.03	-0.01	-0.15	-0.04	0.01	0.14	0.04	-0.04	0.04
C		-	0.02	0.03	0.00	0.07	-0.01	0.03	-0.03	0.19
D			-	-0.13	-0.03	0.08	-0.08	-0.11	-0.34	0.01
E				-	0.03	-0.03	0.07	0.28	-0.01	-0.03
F					-	0.01	0.01	0.03	0.01	0.00
G						-	-0.08	-0.05	-0.05	0.08
H							-	0.39	0.04	0.00
I								-	0.07	-0.05
J									-	-0.02
K										-

B. RQ2: What Is the Quantitative Relationship between Scholarly Impact and Other Characteristics of Journals?

The results are presented based on the characteristics of academic journals: *Scholarly Impact*, *Age*, *Size*, *Distribution Medium*, *Open Access*, *Acceptance Rate*, *Pricing*, *Language*, *Country*, *Status*, *and Issue Frequency*. For each characteristic of the journals, a data analysis based on *SJR Quartile* ranking is presented, and the results of ANOVA or chi-square analysis by SPSS is also provided.

1) Scholarly Impact

SJR report uses *Scholarly Impact* to divide all journals into four *Quartiles*. After data consolidation, there are 6,931 journals in Q1, 6,516 journals in Q2, 7,384 journals in Q3, and 8,113 journals in Q4.

ANOVA tests yield the results showing academic impact of each quartile is significantly different (p = .000), validating the quartile distribution of impact scores. Q1 (M = 1.6, SD = 2.04) is significantly higher than Q2 (M = 0.5, SD = 0.27), Q2 is significantly higher than Q3 (M = 0.2, SD = 0.12), and Q3 is significantly higher than Q4 (M = 0.1, SD = 0.37). The following sections provide results of analysis to consider how the journals within these quartiles differ on other journal characteristics.

2) Age

The mean value of *Age* in each *Quartile* is calculated. The mean *Age* value for Q1 is 35.94 (SD = 24.89) years, Q2 is 33.66 (SD = 24.11) years, Q3 is 34.45 (SD = 25.06) years, and Q4 is 34.49 (SD = 26.75) years. The results from univariate analysis of variance show that journals in Q1 are significantly older than journals in Q2 (p = 0.000) and Q3 (p = 0.016), but not Q4 (p = 0.058). The age difference in Q2 and Q3 (p = 0.419), the age difference in Q2 and Q4 (p = 0.493), and the age difference in Q3 and Q4 (p = 1.000) are not significant.

3) Size

In this research, the *TotalDocs3Years* attribute from the *SJR* journal rankings in the dataset is adopted as *Size* of journals in the consolidated data used for this research. We calculated the mean value of *Size* for each *Quartile*. The mean *Size* value for Q1 is 454.03 (SD = 1347.91), Q2 is 233.93 (SD = 430.90), Q3 is 157.93 (SD = 354.89), and Q4 is 116.20 (SD = 357.94). ANOVA test results show that number of publications each year of each quartile is statistically significantly different ($p < 0.05$). Therefore, it can be concluded that that higher quartile journals publish more articles than lower quartile journals each year.

4) Distribution Medium

Distribution Medium attribute has three types: Online Only, Print Only, and Online & Print. The total number of each *Distribution Medium* type for each Quartile is counted. Out of 1,489 journals providing print-only, Q1 contains 17.9%, Q2 contains 18.0%, Q3 contains 27.1%, and Q4 contains 37.1%. Out of 1,405 journals providing online-only, Q1 contains 31.8%, Q2 contains 25.1%, Q3 contains 23.8%, and Q4 contains 19.2%. Out of 15,282 journals providing both print and online access, Q1 contains 35.0%, Q2 contains 28.5%, Q3 contains 22.4%, and Q4 contains 14.1%.

The chi-square results show that the distribution medium values across different quartiles are statistically significantly different, X2 (9, N = 28944) = 5342.76, $p < 0.05$. Thus, it can be concluded that higher quartile journals distribute their articles via online more than lower quartile journals, and lower quartile journals distribute their articles via print-only more than higher quartile journals.

5) Open Access

The total number of journals with and without *Open Access* for each *Quartile* is counted. The chi-square results show that the open access methods across different quartiles are statistically significantly different, X^2 (6, N = 28944) = 5053.46, $p < .05$. Out of 15,830 journals which do not provide open access, 35.0% are from Q1, 27.3% are from Q2, 21.7% are from Q3, and 16.0% are from Q4. On the other hand, out of 2351 journals which provide open access, 22.0% are from Q1, 28.1% from Q2, 31.2% from Q3, and 18.7% from Q4. Therefore, it can be concluded that higher quartile journals provide less open access, while lower quartile journals provide more open access, except the lowest quartile, which provide the least open access among all quartiles.

6) Acceptance Rate

The average *Acceptance Rate* of each *Quartile* is calculated. The mean *Acceptance Rate* value for Q1 is 26.62 (SD = 16.65), Q2 is 33.49 (SD = 18.69), Q3 is 36.69 (SD = 20.64), and Q4 is 35.66 (SD = 20.68). ANOVA tests show that the differences between Q1-Q2, Q1-Q3, Q1-Q4, Q2-Q3 are statistically significantly different ($p < 0.05$), and the differences between Q2-Q4 (p = 0.260) and Q3-Q4 (p = 0.853) are not significantly different. This means that the top quartile has the lowest acceptance rate, middle-high quartile has slightly lower acceptance rate than middle-low quartile, while the bottom quartile has similar acceptance rates. Therefore, it can be concluded that the top quartile has the lowest acceptance rate, while the other quartiles have similar acceptance rates.

7) Pricing

The average *Pricing* of each *Quartile* is calculated. ANOVA test results show that the mean subscription costs for journals in each quartile are all statistically significantly different to each other ($p < 0.05$). The mean journal subscription cost for Q1 is 1443.4 (SD = 2006.12), Q2 is 1192.5 (SD = 1997.82), Q3 is 864.3 (SD = 1740.36), and Q4 is 458.2 (SD = 1130.81). Therefore, it can be concluded that the higher quartile journals set higher subscription costs. Vice versa, the lower quartile journals are cheaper for subscription.

8) Language

The *Language* attribute has two types: English, and Non-English. The total number of each *Language* type for each *Quartile* is counted. In total, there are 16,487 English journals. Assuming these journals being 100%, Q1 contains 36.4%, Q2 contains 28.8%, Q3 contains 21.8%, and Q4 contains 13.1% of English journals. Assuming 1694 Non-English journals being 100%, Q1 contains 4.0%, Q2 contains 14.0%, Q3 contains 33.7%, and Q4 contains 48.2% of Non-English journals.

The chi-square results show that the language values across different quartiles are statistically significantly different, X^2 (6, N = 28944) = 6412.57, $p < 0.05$. Thus, the conclusion can be drawn that English journals are more likely categorized in higher quartiles, while Non-English journals are more likely to be categorized in lower quartiles.

9) Country

The *Country* attribute has two types: US or UK, and Others. The total number of each *Country* type for each *Quartile* is counted. There are 10,311 journals from US or UK. Assuming these journals being 100%, Q1 contains 44.2%, Q2 contains 28.8%, Q3 contains 17.4%, and Q4 contains 9.6% of all journals from US or UK. There are 7,870 journals from other countries. Assuming these journals being 100%, Q1 contains 19.2%, Q2 contains 25.6%, Q3 contains 30.1%, and Q4 contains 25.1% of all journals from other countries.

The chi-square results explain that the country values across different quartiles are statistically significantly different, X^2 (6, N = 28944) = 6676.50, $p < 0.05$. Therefore, it can be concluded that higher percentage of journals from US or UK are categorized in higher quartiles, while no obvious quartile ranking pattern for journals from other countries is found.

10) Status

The *Status* attribute has two types: Active, and Inactive. The total number of each *Status* type for each *Quartile* is counted. There are 17,035 active journals and 1,146 inactive journals. Assuming all active journals being 100%, Q1 contains 34.4%, Q2 contains 28.0%, Q3 contains 22.5% and Q4 contains 15.0% of all active journals. Assuming all inactive journals being 100%, Q1 contains 17.1%, Q2 contains 18.5%, Q3 contains 28.7%, and Q4 contains 35.7% of all inactive journals.

The chi-square test results demonstrate that the status values across different quartiles are statistically significantly different, X^2 (6, N = 28944) = 5188.07, $p < .05$. Therefore, it can be concluded that low quartile journals more likely become inactive, while higher quartile journals more likely stay active.

11) Issue Frequency

The average *Issue Frequency* of each *Quartile* is calculated. ANOVA test results show that the mean issue frequency for journals in each quartile were all statistically significantly different to each other ($p < 0.05$), except Q3-Q4. The mean *Issue Frequency* value for Q1 is 7.2 (SD = 5.87), Q2 is 5.7 (SD = 7.08), Q3 is 5.1 (SD = 9.79), and Q4 is 4.6 (SD = 3.63). Therefore, the conclusion can be drawn that higher quartile journals have more frequent issues than lower quartile journals, and middle-low quartile and lowest quartile have similar number of issues per year.

IV. Discussion & Conclusion

In this research, we aimed to provide a broader understanding of the characteristics of journals that are associated with, and potentially lead to, higher scholarly impact. We adopted a set of important characteristics used to define academic journals, which are *Scholarly Impact*, *Age*, *Size*, *Distribution Medium*, *Open Access*, *Acceptance Rate*, *Pricing*, *Language*, *Country*, *Status*, and *Issue Frequency* (Gu and Blackmore, forthcoming). We then used correlation analysis, and analysis of variance, to analyze this consolidated data set to answer our research questions.

Firstly, to answer the research question of whether correlation between journal characteristics exists, we conducted a correlation analysis over the 13 data attributes, finding that there is no particular correlation between any journal characteristics. These results support existing research that notes the prevalence of English as the language of knowledge communication [17], with no clear relationship between the country a journal is published in, and the language used for its articles. Additionally, this indicates that a simple relationship between journal characteristics and scholarly impact is not evident.

Secondly, to answer the research question seeking to identify the quantitative relationship between journal characteristics and scholarly impact, we adopted an existing data field from SJR reports, that is, the *SJR Best Quartile*. All *SJR* journals are equally divided into four Quartiles: Q1, Q2, Q3, and Q4, with Q1 denoting the top 25% of the scholarly impact distribution, Q2 for middle-high position, Q3 for middle-low position, and Q4 for the lowest position. We conducted our analysis based on these four *SJR Quartiles* and identified the quantitative relationships between *Scholarly Impact* and other characteristics. ANOVA tests are conducted using the Games-Howell post-hoc test with 95% confidence interval on numeric data, including *Scholarly Impact*, *Age*, *Size*, *Acceptance Rate*, *Pricing*, and *Issue Frequency*. Chi-square tests are conducted on categorical data, including *Distribution Medium*, *Open Access*, *Language*, *Country*, and *Status*. Interesting quantitative relationships arise from the data analysis based on *SJR Best Quartiles*.

From our analysis, the average *Age* of journals in the top quartile was higher than the middle-high quartile, but the age difference between the higher quartile and lower quartile journals was not significant. Higher quartile journals publish more articles than lower quartile journals. Higher quartile journals distribute their articles via online more than lower quartile journals, and lower quartile journals distribute their articles via print-only more than higher quartile journals. Higher quartile journals provide less open access, while lower quartile journals provide more open access, except the lowest quartile, which provides the least open access among all quartiles. Top quartile journals have the lowest acceptance rates, while all other quartiles have the similar acceptance rates. The higher quartile journals set higher subscription costs and lower quartile journals are cheaper for subscription. Non-English journals are more likely to be categorized in lower quartile journals, and English journals are more likely to be categorized in higher quartile journals. Higher numbers of journals from US or UK are categorized in higher quartiles, while there is no obvious quartile ranking pattern for journals from other countries. Low quartile journals more likely become inactive, while higher quartile journals more likely stay active. Higher quartile journals publish more frequent issues than lower quartile journals, and middle-low quartile and lowest quartile have similar number of issues per year.

While the consolidated data set contained a significant number of journals, this research may suffer limitations from the data collection process. That is, the sample of *SJR* journals used in this study may not capture the full diversity of scholarly journals. There are many journals falling out of *SJR* range, however it is impossible to have a normalized *Scholarly Impact* measure for all *Ulrichs* journals. The use of the *Ulrichs* data source provides a rich source of data by which to characterize journals, and thus, is an important component of the research. In addition, the *Acceptance Rate* variable is also a source of limitation, as only a relatively small number of journals within the dataset include a value for this variable, and this is also limited to a handful of disciplines.

Despite these limitations, this research provides a useful analysis of the characteristics of journals and their relationship to scholarly impact. While journal impact, as calculated via the citation rates of individual articles, provides a reasonable proxy for the quality of a journal [18], we identify a broader set of characteristics that differentiate journals and align to impact measures. To extend the utility of this work, further research is recommended to determine any relationship between scholars and their publications based on the *Quartile* ranking of the journals in which they publish. Both scholars and academic journals are under undergoing dramatic growth in the current digital age [19]. Analysis of journal characteristics and the *Quartile* ranking of journals will assist us to understand the pattern of scholar types at an institutional level, and allow us to explore the changing patterns in relationships over time.

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