Academic Rank and Position Effect on Academic Research Output – A Case Study of Ariel University

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Abstract

The aim of this study is to explore the effects of professional factors (academic rank and academic-administrative role) and home-unit-related factors (affiliation and number of faculty members in the faculty) on faculty members' research output, measured by number of citations. Research literature on operations research in the academia reflects a dual approach to the association between number of citations and research quality, although it is generally concurred that the number of citations is taken into consideration in assessments for promotion and tenure, and represents a measure of publication quality. The association between faculty members' administrative roles and their academic output is explored for the first time in this study.

We collected data on four citation-related variables for 315 senior faculty members, as well as their affiliation, academic rank, and administrative/academic role, if any. Structural Equation Modeling (SEM) was employed to test the model's goodness of fit.

Findings show that faculty affiliation, academic rank, and academic-administrative role affect number of citations. The association between number of citations per faculty, engagement in administrative tasks, and the number of faculty members in the faculty has significant implications for faculty promotion policies and the "price" faculty members pay for assuming administrative duties, especially in the early years of their academic career. Furthermore, the faculty also plays an important role in academic outputs, and its organizational climate may promote or disrupt research-oriented academic careers.

Keywords: academic rank, academic position, research, productivity

1. Introduction

1.1 Academia on Trial

"Not everything that counts can be counted, and not everything that can be counted counts." This caveat, attributed to Albert Einstein, seems to be an apocalyptic prophesy that came true. In recent years we are producing and consuming an increasing number of scales, indexes, and rankings of all types, and comparing everything: individuals, organizations, outputs, performance, quality, advisability, influence, satisfaction, growth, collapse, success and failure. Rankings have traditionally met the deep-seated human need for measurement and comparison (especially the need to compare oneself to others), but digital technology makes it increasingly simple for us to feed this urge. The ranking craze is largely the product of the US achievement-oriented society and its effect on all aspects of lives (Almog & Almog, 2020).

Many ranking systems are based on measurement devices, a method that is more accurate and less biased. Other systems are based on human assessments, which are inherently subjective and less accurate (Graham, Baldwin, Moffat & Zobel, 2014). Furthermore, some systems are based on one-time rankings, while other ranking systems summarize an extended period. Measurement and assessment of human outputs, and comparing outputs on a comparative scale, require generally accepted measurement instruments. Measurement of research excellence and quality has increasingly interested governments, universities, and funding bodies as measures of accountability and quality are sought (Steele, Butler & Kingsley, 2006). Research assessment rankings are essential to evaluate the research performance of individuals and the quality of academic journals (Chang, McAleer & Oxley, 2011).

In science, outputs are ranked by groups of experts, mainly through peer reviews and rating systems. Peer reviews, which are ostensibly designed to identify and improve papers worthy of publication (Lee, Sugimoto, Zhang & Cronin, 2013), indirectly create ratings, because scientists are also measured according to the prestige of the platforms in which they publish. It has been, however, argued that this is not the measure that is truly decisive. Because we have become addicted to statistics, the hierarchy of scientific outputs is currently evaluated using quantitative measures: the number of times a publication is cited in subsequent publications (Yair, Gueta & Davidovitch, 2017).

Science has always studied and mapped itself because science is used to measurements and is oriented to excellence and competition. The scientific ethos says that it is not only important to perform a task, but also to be the first and the best. It sometimes seems that excellence in science is not merely a means but also the end, and one that has been blown out of proportion. A combination of factors has heightened scientists' motivation in recent years to measure and rank themselves: the global trend toward maximizing access to information (Volovici, Mărginean, Oprescu & Vişa, 2019), growing competition among institutions (Musselin, 2018) and among researchers, the enormous growth of scientific output (Milard & Grossetti, 2019), and the increasing weight attributed to measurable outputs in funding decisions.

Cumulative knowledge and experience have also contributed to this direction. Measuring scientific output has spawned thousands of science metrics, creating a discipline in its own right, triggering research that examine, analyze, and calibrate rating instruments and formula. But yet another factor played an important role in this development: indexes of science publication databases. These indexed records of publications facilitate access to and search in publications, and generate various types of statistical data (Almog & Almog, 2020). Today's world of science includes a range of indexed lists of scientific publications (Gasparyan et al., 2016). These lists differ by field of coverage, volume, and diversity of items (some also contain newspaper articles, books, dissertations, conference papers), attributes (headings and abstracts or complete texts), access (free access or access for pay), and the type of retrievable statistical publication-related data (citations, hyperlinks, influence measures, etc.). Academia's path toward self-measurement is one of the strangest stories of times, and is yet one more element of the decadence into which academia has sunk.

1.2 Tell me Where You Publish and I will Tell You What Kind of Scientist You Are

The evaluation approach that infers a publication's quality from the number of its citations (Nieminen, Carpenter, Rucker & Schumacher, 2006) has been prevalent in science since the early twentieth century, but years passed until the idea evolved in the development of statistical tools to measure scientific quality based on citations. In 1972, the Institute of Scientific Information (ISI, now Thomson Reuters) published the first Social Science Citation Index, which has been a yearly publication since 1975. Garland, the father of modern citation analysis and founder of ISI (Bornmann, Schier, Marx & Daniel, 2012), presumed that the more important a publication was to the scientific community, the more frequently it would be cited by others. Since every journal issue contains several articles, and the articles are not identical in significance, the mean number of citations of the papers published in a journal's issue within a specific period of time must be calculated in order to evaluate a journal's quality and prestige (Garfield, 1972). The journal impact factor was thus defined as a measure of a journal's influence, and was calculated as the average number of times the papers in the journal were cited in a two-year period (later modified to a single year). Garfield believed that the measure would help libraries prioritize their journal subscriptions, and help scientists select the most suitable papers for the research and writing. In effect, the impact factor (IF) gained a much broader and significant purpose and over time has become the most important instrument in the academic world for measuring scientific performance, achievements, and prestige. Even though the IF has been criticized for indicatin g the quality of individual papers (Lariviere et al., 2016), today, there are hardly any scientific forums or committees that do not use this measure (Steele et al., 2006), from appointment and promotion committees in academic institutions and research institutions, through research foundations and funding agencies, to companies that rank institutions and countries (Almog & Almog, 2020).

1.3 A True Measure of Quality and Influence?

In 1997, Prof. P. O. Seglen of the Nordic Institute for Studies in Innovation (Frølich et al., 2018), Research, and Education (NIFU) published a paper under the frank title, "Why the impact factor of journals should not be used." One year late, Seglen published a series of articles that challenged the IF's objectivity from additional angles. The attack triggered a wave of studies and critical reviews that not only challenged the method but also the rationale underlying IF, and pointed to the harm its use caused to science and to scientists. The main critiques can be summarized as follows (Almog & Almog, 2020):

- Quality vs. quantity: Is it genuinely possible to give a quality score to a scientist on the basis of the number of times his work is cited? In principle, yes, but only if this is performed in one of the two following ways: either the number of citations for all papers is counted, or there is a review to determine whether the citations originate from one or two papers that attracted a large number of citations. The problem is that the quality of a paper is effectively based on the prestige of the publication platform. In other words, this is an indirect ranking system based on the citations of journals in which the scientist published, and not the number of times the scientist's own work was cited.

- Citation is not necessarily a mark of quality (Zhou, Lü & Li, 2012). The assumption that a citation constitutes proof of its significance has not been proven. No one denies that more important papers are more extensively cited, but citations are only one of many indications of quality. Papers may be cited and quoted but not necessarily because of their high quality but rather because they may be more highly accessible in libraries or online, or it may be fashionable to cite them. In many cases, a paper is cited merely to direct readers to a general topic or idea, and not due to the paper's special quality. Furthermore, it is not rare that authors prefer to cite the most recently published papers and not necessarily the most important ones.
- Limited measurement range. The two-year time window for counting citations is very narrow, especially with respect to pioneering studies whose significance may emerge only years later. Similarly, to technological innovations and revolutionary ideas, break-through scientific papers do not always gain the attention they deserve when published because they are ahead of their times. In contrast, studies have shown that a paper's high rating in the short term does not predict its long-term influence, and many works (in science as in the arts) that initially gained popularity, later faded into obscurity.
- The discipline advantages. The narrower a journal's niche, the more limited its citation potential, whereas multidisciplinary journals have the highest rankings. In dynamic fields such as computer science, economics, biochemistry, and genetics, scientific generations are extremely short, and each generation cites the generation that preceded it by only one or two years. The discipline effect is also apparent in ranking lists. For example, in the humanities, most journals are absent from the databases used to calculate ranking. Moreover, since the average number of citations of papers in these fields is low from the outset, each citation has the potential to raise a journal's IF. This is also the reason that the impact factors of small-scale journals who publish a small number of papers per year, show significant variability. A single paper with a very high (or low) number of citations is sufficient to dramatically change the journal's average number of citations.

Paradoxically, then, if we accept that citations equal quality, which is the underlying assumption of the IF ranking, the conclusion is that the majority of scientific papers that are published today (and have attracted few citations, if any) have no value and represent a waste of resources, and moreover, the entire idea of marking quality using long ranking lists is anachronistic in the digital era.

1.4 All for A Good Spot on the List

Achievement measurement is important for progress (Pfleger, Wilson, Welner & Bibilos, 2018), but when quantitative measures become a goal, the outcome could be destructive. Apparently, science does not learn from the mistakes of others, and not even from its own research. The scientific publication market has increasingly become similar to a wild jungle in which high ranking justifies almost any means, including data manipulation and, in extreme cases, even fraud (Almog & Almog, 2020).

Over time, numerous efforts were made to resolve the biases of measurements (Vaccario, Medo, Wider & Mariani, 2017). For example, the measurement frame was extended, citations were weighted according to the prestige of the citing journal, and measurements were normalized using various variables (by total number of papers, total number of citations, discipline, etc.). Still, criticism has been voiced from several directions (Yair et al., 2017):

- Dependency on the database. Academic output measures are typically based on a major database such as Google Scholar, Scopus, or Web of Science, yet because each database contains a different number of publications, a scientist's output measure is a function of the database used in the calculation. Ostensibly this appears to be a minor, technical concern, but because the major databases differ significantly in the number and type of items, rankings based on these databases may also vary significantly. The use of multiple rankings therefore prevents standardization and comparisons between scientists. Google Scholar is considered a reliable and precise database for generating measures.
- Temporal effects. H-factor evaluates a scientist's quality of work over their entire career, and disregards variance in the scientist's productivity over time. In other words, if a scientist produces little work after being awarded tenure or a certain academic rank, they are still credited with previous work, and the measure fails to reflect the current state of their research productivity.
- Discipline and language bias. The databases used to calculate the measure do not index the type of publications that are typical of the work in humanities, such as books, book chapters, working papers, reports, and especially materials that are not written in English. There is a clear over-representation of scientists from the fields of

biochemistry and medicine. Important articles that are not published in English do not appear in the databases and consequently do not receive the citations they deserve and are not counted in the measure.

The fact that most journals, and especially leading journals, are published in English confers a significant advantage to scientists who are native English speakers. Not only can native English speakers write more quickly, because they do not need to have their work translated, but they are also more familiar with the linguistic nuances that might affect journal editors, referees, and readers. English speakers have a similar advantage when applying for research fund grants, because the referees of the research proposals are typically English speakers themselves. This is also the case for international research collaborations.

- The measure is indifferent to co-authors' contributions. Today, most articles are written by several co-authors who did not contribute equally to the work. Moreover, it is not rare that a co-author's name and order in the list of authors is unrelated to the author's contribution. On the other hand, a paper written by a single author should confer some bonus in the statistical calculation of the measure, but in practice they receive the same credit as authors who published together with a large number of co-authors.
- The circle of resonance and influence. As a result of its condescending and insular climate, academia tends to base decision making on citations within a specific professional milieu, disregarding the resonance of a scientist's work in other platforms that may sometimes be equally important.
- Science envy in the social sciences and humanities. Soft, qualitative sciences have traditionally suffered from a sense of inferiority in comparison to quantitative sciences because they are based on a less solid empirical foundation. To improve their image as being "insufficiently scientific," the qualitative disciplines have adopted a more quantitative semblance that is frequently no more than a disguise. Because a paper based on quantitative methods is much quicker and easier to produce than a paper based on qualitative research methods, both the number of quantitative papers and expectations of them have increased. The equation is simple: more measurements and more statistics equal more papers, which translate into more lines on one's CV and a greater contribution to one's career. The result is a vicious circle: Quantitative researchers publish more and therefore advance quicker on the academic career ladder, capture positions of academic power, and demand of their qualitative colleagues to show at least the same number of publications, if not more.
- Promotion committees have raised the bar. University promotion committees do not use official promotion criteria that are customized to each discipline. Promotion committee members are representatives of diverse faculties and departments, and the result is that committee members from disciplines in which it is not difficult to generate massive number of publications set the same standard for candidates from disciplines in which the publication process is both more difficult and slower. All academics are effectively forced to align with high publication numbers, irrespective of the immense difference between disciplines.

  Moreover, when young academics are instructed to "publish or perish," the minority who dash ahead define the norms for everyone. Records are repeatedly broken, because they create the illusion that diligent and productive academic can produce publications in such astronomical numbers. In effect, these extraordinary numbers are not achieved due to outstanding scientific achievements but in many cases due to luck and talent in obtaining funding, a focus on new and fashionable areas of research, or having an obsessive personality that drives the author to sacrifice their personal life for the sake of their career.
- The tenure and status advantage. The review process of scientific publications appears to be objective, but in effect it is influenced by the author's background and connections. The researchers in a field who have a large number of publications are usually the same group who lead conferences, host each other for sabbaticals, and invite each other to give lectures. One of the consequences of belonging to this type of clique is the covert exchange transactions of "publish me and I'll publish you." The victims of this practice are the scientists who have few connections in the "right places" or with the "right people."
- The discipline and method advantage. Research in any field requires more or less time, depending on the topic and the circumstances, but in some scientific fields it is possible to conduct research and publish more quickly, due to their quantitative or laboratory nature. Moreover, many of the researchers in the "hard sciences," and especially in the life sciences, maintain large teams of assistants, who include doctoral students and post-doc researchers who work on several studies simultaneously, which gives the primary investigator the time to obtain more grants and produce more publications. These sciences also have an additional publication advantage: They typically do not engage in politically sensitive issues and therefore their probabilities of rejection are lower (although it is true that some natural sciences sometimes touch upon political sensitivities, for example researchers

who study the connections between genetics and behavior, environmental pollution, or global warming, but they are the exception). In other words, it is more difficult to publish a paper on social issues that are inherently sensitive and controversial, compared to a paper on molecular sciences or the galaxies.

- The male advantage. Similarly, to other professional expectations, expectations in the world of science continue to be dictated and disseminated by men driven by "masculine thinking" which is competitive and achievement oriented, in which the motivation to win justifies all means and marginalizes social and family obligations ("Anything you can do I can do better"). In short, to wave the high-publication flag, one must dedicate oneself to work and neglect many other things that are equally important in life. Men tend to do so more than women, which is the reason that most extremely productive scientists are men. Perhaps it is more accurate to say that while women increasingly adapt to male culture and many female researchers meet publication expectations, studies show that they pay a heavy personal toll to do so.
- The egotistical effect. Studies show that researchers who place their own personal promotion above altruistic goals, and devote fewer efforts to teaching and community service, accumulate more publications. Studies also show that competitive and highly demanding institutions do extract more publications from their faculty members, but this comes at a heavy psychological toll.
- The group effect. Since the 1970s, important inventions and ground-breaking scientific theories have been attributed to collaborations among scientists, both in research efforts and in publications, while the number of single-author publications declined (from 60% in the 1970s to 15% today), and is disappearing even in fields where research is typically a more individual endeavor.

In sum, the research literature addresses the issue of quality and quality in research, due to the heavy pressure brought to bear on faculty members to publish articles. Academics are involved in heated debates on potential biases and their effect on journal ranking, ranking of academic departments, and promotion procedures in various institutions.

The various measures that were developed for academic works and their authors can be expected to accompany us far into the future. Various databases have begun to add bibliometrics to data records, and publish display journal impact factors on their websites. These measures are in increasing use in academic promotion decision making in many institutions, in determining research institution rankings, in databases, and also in national policy making based on international comparisons of publications and citations. Some institutions have developed their own measures. For example, Israel uses the Bar Ilan Index and the Jerusalem Index.

1.5 Israel's Commission of Higher Education (CHE) Policy and Publication-Based Funding

According to the position of the CHE (n.d.), which is reflected in its publication-based funding policy, publication and citation patterns vary across scientific disciplines and are not comparable. For example, in the humanities and related fields, the main avenue of academic publication is books rather than articles published in scientific journals. Nonetheless, there is no reliable, objective, and comprehensive source of information on the books published by Israel's university researchers, and even had such a source been available, it is not clear how books or book chapters can be compared with journal articles, or even how to compare books for their scientific impact. Moreover, articles in the humanities and other related fields, including education and law, do not appear in the same international databases that index citations, and as a result it is not possible to assess the scientific impact of publications in these fields.

One of the principles of the CHE's funding policy is to measure outcome with respect to the period that is closest as possible to a budget year. The CHE's funding decisions rely on the number of scientific papers published by university faculty members and the impact factors of these articles. Every year, the Henrietta Szold Institute collects information for the CHE Planning and Budgeting Committee on all the scientific articles published by year in the journals indexed by specific databases.

1.6 The CHE Encourages Excellence in Academic Roles

New teaching and learning methods, competition over resources, and changing cultural attitudes are challenging higher education systems across the world. The academic system in Israel faces additional challenges stemming from the rapid growth in the number of academic institutions, social and demographic changes, and the rising dominance of the country's high-tech sector. To lead the academia forward and help it adapt to an accelerated pace of change, there is a need to develop the leadership qualities and managerial skills of senior university and college faculty. A network of leaders in the academia was established to develop these qualities in senior academics across the country.

For the past three years, the Edmund de Rothschild Foundation, Rothschild Partnerships, and the CHE have joined efforts in the launch of a new, unique training program for future leaders of the academic system, The aim of the program is to prepare senior-level academics to assume leadership roles and initiate change at all levels of the academic and administrative cadre. Beginning in the 2018-2019 school year, and annually, 30-35 academic and administrative faculty members participate in designing a learning community that includes or is expected to include deans, deputy presidents, and department and school heads in academic functions, and deputy general directors in administrative functions. Program participants will learn about the national and institutional challenges facing Israel's higher education system and will develop solutions for them. They will study cases of success from Israel and around the world, in order to gain a broad understanding of ideas and avenues of action that might lead to change and rejuvenation.

CHE policy is working to challenge faculty members to play an active role in academic leadership but will such training be at the expense of participants' research activities?

Moreover, in the specific case of Ariel University, Ariel College only recently attained university status, and was the first university to be established in Israel in over 40 years (the most recent university to be established was the Ben Gurion University of the Negev). In the test of time, the question arises as to whether Ariel University has met its goals for research activity.

The Academic College of Judea and Samaria was established in the late 1980s. Originally operating as a regional college and extension of Bar Ilan University, the institution became Israel's largest public academic college in the mid-1990s, and in 2002-3 was accredited by the CHE to award academic degrees as an independent college. Since its establishment, the College operated in a research university format, and in December 2012 the CHE in Judea and Samaria voted to grant full university status to Ariel University (Molavi, 2013). The current study is the first of its kind to examine whether this academic institution met its research goals, based on a review of the faculty's publications record.

The current study focuses on the effects of professional factors (academic rank and administrative-academic role) and home unit (faculty and number of faculty members) on faculty members' research output, measured by publication citations. Citation data are based on four sources: H-index (total number of citations), citations from 2015, and H-Index from 2015. The study also examines associations between faculty members' publication volume, affiliation, and academic or administrative role in their institution.

Research is a primary criteria for evaluating academic faculty (Davidovitch & Eckhaus, 2018, 2019b; Eckhaus & Davidovitch, 2019) and therefore citation analysis is a criterion for faculty members promotion or tenure reviews. The number of citations their publications attract is considered a reflection of the quality of their publications (Reed, 1995). There is a significant difference between the number of citations by faculty, where medical and life sciences lead in citations, and social sciences researchers have the lowest number of citations (Dunleavy, 2014). This may be due to the fact that social sciences and humanities literature reviews are inadequate, and require a more systematic review, especially to handle qualitative research and analyses (ibid).

Research hypotheses:

Faculty effect

H1. There is a statistically significant difference between faculties with respect to the number of citations.

Rank effect (H2-H4)

H2. Senior lecturer rank (*SLEC*) positively affects research productivity.

H3. Associate Professor rank (AP) positively affects research productivity.

H4. Full Professor rank (FP) positively affects research productivity.

Role effect

H5. Holding an academic or administrative role negatively affects productivity.

* Note: In all cases, research productivity was measured the number of citations based on all four citation variables.

2. Method

2.1 Sample and Analysis

We collected information on the citations of 315 senior faculty members of Ariel University, including their affiliation, rank, and academic role, if any. Citation data include: H-index, total number of cites (TotalCites), cites from 2015 (Cites2015), H-Index from 2015 (HIndex2015). We sampled the most senior ranking faculty members, some of whom also hold additional academic or administrative roles: Senior lecturer (SLEC; 35.7%), associate professor (AP; 17.2%), and full professor (FP; 15.6%). Faculty ranks with typically low productivity rates were excluded from the study. These include experts (9.7%), and teachers, senior teachers, and lecturers (21.7% in total). The ages of the faculty members ranged from 32 to 50 (43.8%), 51 to 66 (39.2%) and 67 to 88 (17%); 32.4% were female, and 67.6% were males. For citation counts, we used Google Scholar. Google Scholar is a particularly valuable source of citation data because its coverage extends beyond traditional peer-reviewed publications (Sanchez, 2017).

To construct a model that illustrates research productivity as a function of number of citations, we added two general variables (affiliation and individual rank), for which we constructed a binary variable (1= belongs to the faculty or has this rank, 0 = otherwise). Affiliation to faculty was added as controlled variable to all citation variables. Faculties were: Social Sciences (33.3%), Health Sciences (9.2%), Natural Science (24.8%), Architecture (1.9%), Engineering (29.2%), and Medicine (1.6%). We then developed a model that describes the association between academic ranks and academic/administrative roles (HasRole) and the four citation variables.

Correlations were naturally placed among faculties, among citation variables, and among ranks and role. We employed Structural Equation Modeling (SEM) to test the model's goodness of fit (Eckhaus, 2019a, 2019b; Eckhaus & Sheaffer, 2019). Model fit was estimated using CFI, TLI, TLI, RMSEA, and CMIN / DF. Acceptable fit indices are CMIN/df < 3, CFI > 0.95, RMSEA < 0.08 (Ohara et al., 2017), and TLI and NFI above .95 (Davidovitch & Eckhaus, 2019a).

3. Results

First, in order to investigate significant differences between the faculties (H1), we conducted a one-way ANOVA test on the total number of citations between faculties. The test for Homogeneity of Variances (Levene test) was significant ($p < .001$), implying that a non-parametric test is required. We therefore performed the Kruskal-Wallis test. Results show a statistically significant difference between faculties ($\chi2(5) = 38.01$, $p < .001$). Table 1 presents the ordered mean rank differences and the mean total number of citations. Figure 1 illustrates the results.

Table 1. Mean number of citations and rank differences, by faculty.

Faculty	N	Mean Rank	Mean Total Cites
Medicine	5	233.20	5061.80
Nature	71	166.24	1798.69
Health	26	151.33	1548.85
Engineering	75	118.98	711.44
Social Science	84	106.19	671.89
Architecture	3	77.67	654
Total	264		

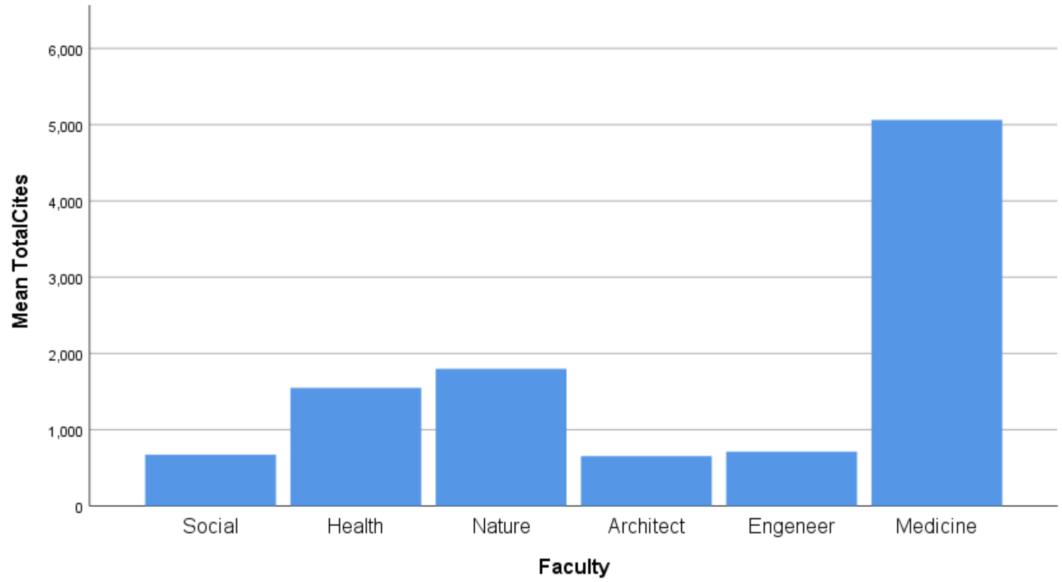

Figure 1. Total citations, by faculty.

Next, we investigated faculty members' academic ranks by faculty. Table 2 presents the mean number of citations (total citations) for each of the three ranks investigated, for all the faculty members who noted their rank. Data for Social Science_B are after excluding data for the Israel Studies, Archeology, and Israeli Heritage Departments.

Table 2. Mean total citations, by faculty

Faculty	N	Mean Citations	N	Mean Citations	N	Mean Citations
	Senior lecturers		**Associate Prof.**		**Full Prof.**	
Medicine	0	-	0	-	4	6165.50
Nature	29	941.38	12	2026.67	12	4052.33
Health	7	563.71	6	1599.33	4	5774.50
Engineering	20	551.70	13	709	13	2043.69
Social Sciences	36	349.94	13	1369.92	10	1858.50
Social Sciences_B	30	373.27	10	1758.80	8	2209.13
Architecture	2	4.50	1	1953	0	-
Total	94	583.90	45	1397.67	43	3291.65

For each rank and faculty – we measured the mean total number of citations, and number of faculty members for each of the ranks.

At senior lecturer rank, the number of faculty members (29) have the highest citation mean, followed by health and engineering. Although the Faculty of Social Sciences has the largest number of senior lecturers, the number of faculty members' citations is lower than all other disciplines.

At associate professor rank - Associate professors in the Faculty of Medicine have the highest mean citation value, following by Health, Natural Sciences, Engineering, and finally Social Sciences and Humanities.

At full professor rank – Full professors in the Natural Sciences have the highest mean citation, following by Health and then Engineering.

Although the Faculty of Medicine and the Faculty of Health have the smallest number of full professors, these faculties have the highest mean citations.

The School of Architecture was found to have the smallest number of citations, but this finding is inconclusive due to the small number of senior faculty members from the School of Architecture in the sample.

Finally, we generated the SEM model (Figure 2).

Above, we saw that affiliation affects number of citations. Now we proceed to examine the number of citations by rank and the effect of academic/administrative role. To this end we enter faculty affiliation as a control variable.

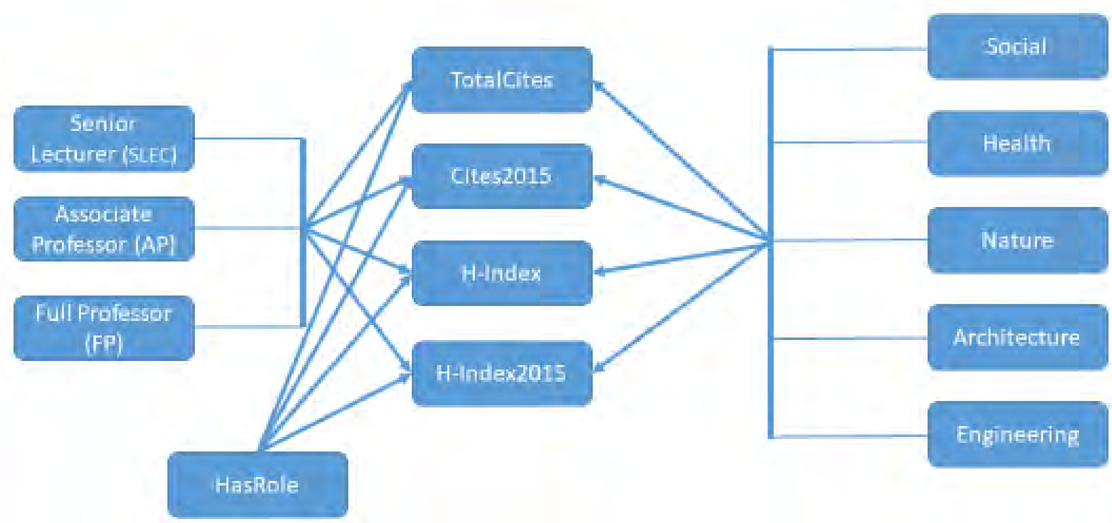

Figure 2. Research model.

The hypothesized model shows a good fit: CMIN / DF = 2.77, CFI = .99, RMSEA = 0.075, NFI =.98, TIL=.95. All hypotheses were supported. All relationships between AP and FP to the citations variables are positive and highly significant (supporting H3 and H4, respectively). The effect of *SLEC* on the citations variables (H2) was partially supported, with a positive association with *hIndex* and *hIndex2015*, but not with *TotalCites* and *TotalCites2015*. *HasRole* negatively affects all citation variables (H5).

We also observe that the relationship among the four citation indexes, including those after 2015, is very high, and strongly statistically significant. This implies that there is no real difference in the number of citation after 2015, compared to the total number of citations.

Finally, we entered the age variable in order to examine its effect on the model. Results show that age showed a statistically significant association with only one of the four citation variables, which is insufficient to draw solid conclusions. Further research is needed to examine age in relation to the research production, especially since previous studies found experience to be a dominant factor for academic contribution (Davidovitch & Eckhaus, 2020; Eckhaus & Davidovitch, 2020).

Figure 3 illustrates the differences between mean of the total cites and cites from 2015, by academic rank. Figure 4 illustrates the differences between mean of the hindex and hindex from 2015, by rank.

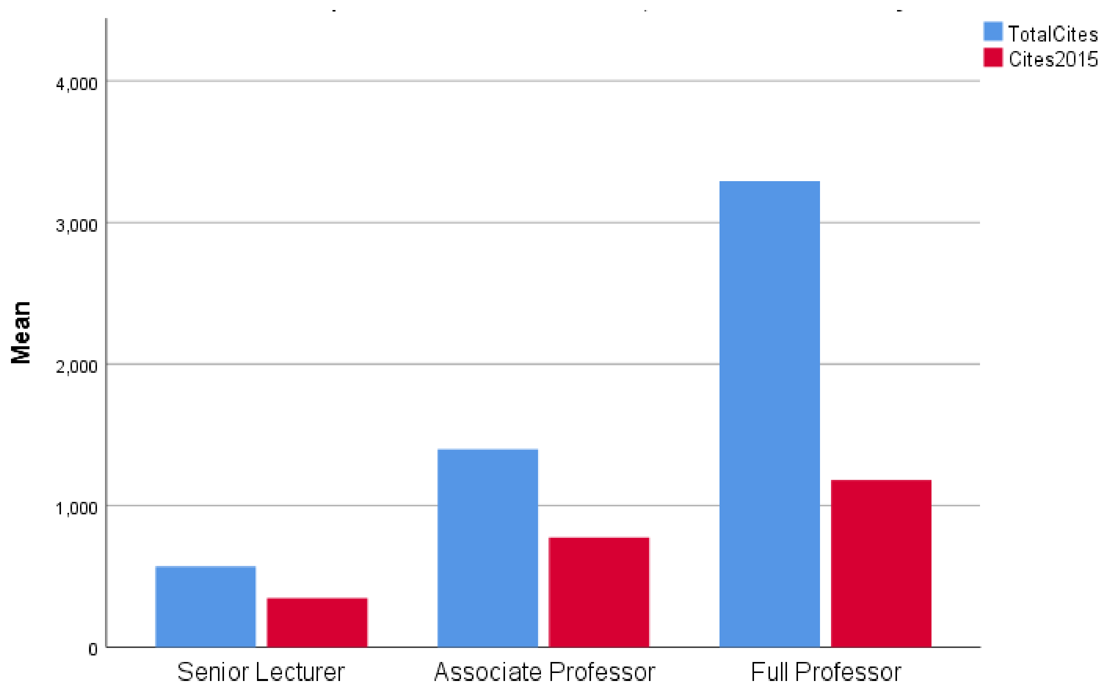

Figure 3. Total cites and cites from 2015 mean differences.

Figure 4 illustrates the differences between the three ranks, showed earlier, based on the general H-Index variable, and the 2015 H-Index. The higher the rank, the greater the number of citations.

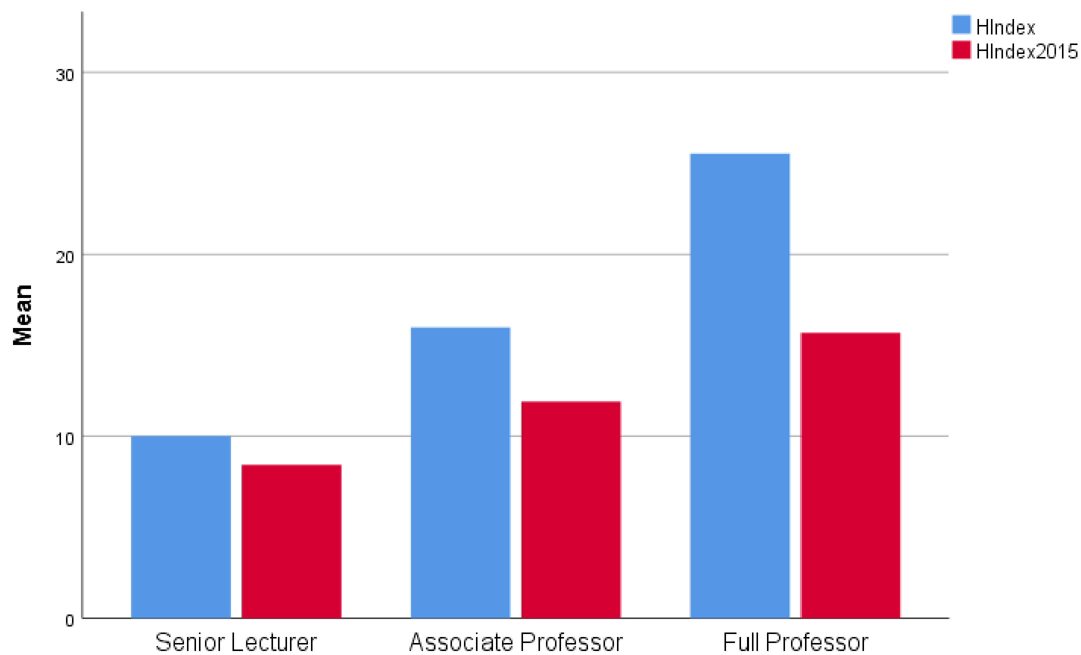

Figure 4. The mean of hindex and hindex, by academic rank.

4. Discussion

Results show a statistical significant difference in the number of citations for senior faculty members at Ariel University, by affiliation. Therefore, we controlled for affiliation in the model. As hypothesized, full and associate professor ranks show a positive effect on research productivity, measured as the number of citations. The fact that senior lecturer rank only affects hIndex and hIndex2015, but not the total number of citations, shows that these faculty members still lag behind professors in terms of citations. Still, as senior lecturer rank does affect hIndex and hIndex2015, it shows that these academics are on the right track.

This study presents a model with a large group of variables, therefore the entry of additional variables will detract from the accuracy of the examination of each additional variable. A follow-up study that expands the current findings by focusing on the effects of demographic variables may add clarity. For example, as the results show, further research is required to study the age variable in an in-depth manner, in order to analyze the effects of age groups on academic output.

Results support findings by Bonzi (1992), who conducted a case study in Syracuse University, using publication rates as a measure of productivity, and found that rank positively affects productivity, and that affiliation with humanities and science/mathematics faculties increase productivity to a greater extent than does affiliation with social sciences. Bonzi argues that citation analysis is not a good measure of quality. Journal articles are cited much more often than are book chapters, so researchers who concentrate on authoring books will have fewer citations. In addition, citation counts are biased toward older works, since they have had greater exposure. Overall, the possibilities of expanding citation analysis research studies are limitless (Currie & Monroe-Gulick, 2013).

The findings of this study indicate that professional factors affect faculty members' citations. The higher the academic rank — on the progression from senior lecturer, to associate professor, and full professor — the greater the number of citations. Findings also show that faculty members who also fill an administrative role have significantly fewer citations than other faculty members. Affiliation also appears to affect research output, as measured by journal citations, and a statistically significant difference was found between the mean citations in the different faculties.

Findings show that citation output of senior faculty members at Ariel University after 2015, shortly after the institution was granted university status, is almost identical to the total number of citations. This finding shows that research output is not only associated with institutional status, but rather with institutional policy and support for research.

The current study also finds no association between the number of academic personnel and the number of citations of a faculty. The Faculty of Medicine has only five faculty members yet has the highest mean citations value of all faculties. In contrast, the Faculty of Social Sciences has the largest faculty yet the lowest mean citations value.

These findings, and the association between faculty and number of citations, and the association between faculty members' administrative assignments and the number of faculty members per faculty, have significant implications for the institution's promotion policy and shed insights on the "price" that faculty members pay for assuming administrative roles, especially in the early phase of their academic career. Furthermore, the home unit (the faculty) plays an important role in academic outputs, and the faculty's organizational climate can cultivate or hinder research-oriented academic careers.

We have investigated a case study of one university. Future studies may extend the results of this study by exploring other academic instidutions, and examine if there is a difference among types of institutions, such as colledges and universities. Futue studies may also extend these research findings by exploring differences in academic institutions in differenct cultures. Finally, we did not account for other observed variables in the model, since the model is already quite complex, and inclusion of too many variables leads to downward bias of regression coefficients and decreases precision (Hardt et al., 2012). Future studies may extend this research by focusing on other factors that influence the increase in the ranking of each faculty.

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