

# EVALUATING SCHOLARSHIP AND RESEARCH IMPACT

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# EVALUATING SCHOLARSHIP AND RESEARCH IMPACT

History, Practices, and Policy  
Development

BY

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INVESTOR IN PEOPLE

# CONTENTS

<i>About the Authors</i>	vii
<i>Preface</i>	ix
1. A Primer on Policy and Research	1
2. History and Evolution of Scholarly Metrics and Impact Factors	21
3. Concerns and Problems	67
4. Benefits and Possibilities for Research Policy Improvements	87
5. Conclusion	125
<i>Appendix: San Francisco Declaration on Research Assessment</i>	133
<i>References</i>	139
<i>Author Index</i>	175
<i>Subject Index</i>	181

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## PREFACE

Academic research and scholarship are experiencing a paradigm shift. Research impact is the most recognizable manifestation of this shift made visible by the omnipresence of scholarly metrics. The “digitization of everything” can be lamented but it is now an everyday reality for people everywhere. If something can be measured, systematized, synthesized, and shared, it will be. Metrics, a proxy for research impact, represent this trend in the domain of academic scholarship. Articles that used to take years to be published in print now appear “online first” before volume, issue, and page numbers are even assigned. This is presumed to increase impact since work can be viewed, downloaded, and cited much more quickly than in the past. Yet, the pressure to make publications available more quickly may be missing a critical component: research quality.

Where should I present or publish my research? Is this a good journal to showcase my work? Will anybody read my article there, let alone cite it? How can I maximize the impact of my scholarly output? These are questions academics and other researchers all over the globe ask themselves and their peers every day. The answers to these and countless similar questions will affect their careers, their reputations, and, in many cases, their paychecks. At the same time, academic and research organizations are under more pressure than ever to create and implement policies that encourage quality,

high-impact research from their members through various evaluation and reward systems. Within this monograph, the authors attempt to provide some guidance to individual researchers and the institutions for which they work, as they struggle with these issues in their ongoing efforts to produce and disseminate valuable, high-quality scholarship.

Universities and research institutions are facing challenging and often conflicting influences from institutional stakeholders and the macro external environment. These forces are somewhat at odds with traditional concepts of scholarship and academic freedom. There is movement toward improved oversight of universities and research institutions along with increased internal accountability at the individual and institutional level. Another related strategic and operational influence affecting change is the nature of academic and scientific publishing in the twenty-first century. These developments suggest that entrenched scholarly traditions are facing very complex and nuanced dilemmas regarding the effective oversight of institutions while simultaneously striving to support creativity and innovation (Scott, 2018). The confluence of increased scrutiny along with easy information access have intensified debates within and outside academe; they have also manifested greater awareness and usage of quantitative analysis of research (e.g., bibliometrics, the statistical analysis of research) in policymaking.

The nature and extent of these changes need to be critically examined. The proliferation of academic research along with advances in information technology have given rise to the visibility and prominence of scholarly metrics, such as author or article citation counts, journal impact factors (JIFs), and related measures of institutional research output that are becoming more widely used (Walters, 2017). Such metrics are readily available on many websites (e.g., <http://guides.library.jhu.edu/metrics>), but can they be taken at face

value? Are scholarly metrics, such as citation counts and impact factors, useful? Are they reliable and valid indicators of research quality? Do these metrics effect faculty research development and career advancement? Can such metrics help to inform policy development regarding research funding, institutional evaluation, faculty/researcher recruitment, and promotion, as well as overall research strategy? These are some of the important questions that are addressed in this monograph.

The increasing recognition and publicity about scholarly metrics, whether for individuals, authors, articles, departments, or entire institutions, may seem to be just another “number” that needs to be achieved. Proper understanding of the history, recent developments, and possible future trends in scholarly metrics, citation analysis, and publication outlet quality is needed for policymakers to craft cautious yet informed use of these temptingly easy-to-use metrics. While librarians and information scientists have been evaluating journals for at least 75 years, the increasing convenience of automatically tabulated scholarship measurements is now being applied far beyond their original intention. Gross and Gross first conducted a classic study of citation patterns in the 1920s (Gross and Gross, 1927). Other developments followed, such as Estelle Brodman’s studies in the 1940s of physiology journals along with subsequent reviews of the process of journal evaluation (Brodman, 1944). The introduction of the Thomson Reuters citation indices then enabled computer-compiled statistical reports to not only do more than tabulate journal articles but also to calculate citation frequency.

Eugene Garfield first mentioned the idea of an impact factor in 1955 (Garfield, 1955). This led to the 1961 publication of the Science Citation Index<sup>®</sup> (SCI) (Garfield and Sher, 1963) and the JIF to help libraries select additional source

journals. This was conducted by re-sorting the author citation index into the journal citation index. The purpose was to determine highly cited journals that need to be covered in the new SCI®, nothing more. Following the in-house use of journal statistical data to compute the SCI, Thomson Reuters began to publish Journal Citation Reports® (JCR) in 1975 as part of the SCI and the Social Sciences Citation Index® (SSCI). Many other author, article, and journal-level metrics were subsequently developed and continue to evolve and be used today such as Google Scholar citation totals, the Hirsch (*h*) Index, Journal Citation Reports, SCImago Journal Rank, and others.

Thoughtful and cautious use of impact data is important to consider. However, because of their widespread availability, users may be tempted to jump to improper conclusions based on impact factor statistics unless several caveats are contemplated. The various metrics provide quantitative tools for ranking, evaluating, categorizing, and comparing journals and articles. The impact factor is one of these; it measures the frequency with which the “average article” in a journal has been cited in a particular year or period. However, it does not account for various common statistical and other sources of error (such as skewness, bias, self-citations, and other influences). Yet, the impact factor can be useful in clarifying the significance of absolute (or total) citation frequencies. It can be tabulated to remove some of the bias that may favor large journals over small ones, more frequently issued journals over those published less often, or even older journals over newer ones (Garfield, 2012).

There have been many innovative applications of JIFs. Traditional usages involve market research for publishers and as a tool for librarians in their attempts to manage library journal collections. More recently, however, JIFs have taken a different turn. They have quickly become a fast and

convenient metric for evaluating individuals, departments, and institutions. In fact, the founding father of scholarly metrics, Eugene Garfield, was concerned about these and other unintended consequences of his creation. Garfield believed that scholarly metrics might provide a gross approximation of the prestige of academic journals in which individuals have been published. He argued that metrics should be used in conjunction with peer review, overall productivity, and area of academic specialization. The authors of this monograph agree with this assessment.

With respect to faculty tenure and promotion decisions, it is not appropriate to rely solely on the reported metric impact of a journal as a proxy for quality and academic impact of the journal itself. This also applies to any individual articles published in the journal, as well as any authors of those articles. It would be more accurate, professional, and holistic to use the impact factor(s) combined with informed peer review. Furthermore, citation frequencies for specific articles are quite varied among individuals, fields of study, departments, and institutions as a function of their differing missions and institutional characteristics. Some important scholarly work may take many years to develop and publish, additional years to be recognized, and even longer to be cited by others (Kozak, 2013). Such factors should be considered in any tenure and promotion processes that are based in part on research productivity and impact. When rendering important academic and institutional decisions, metrics can and should be considered as contributing to the process; they are not sufficient at present, however, for use in isolation without expert input from human reviewers who understand their limitations, complicated nuances, and intended purposes.

Among additional issues that should give the academic community pause when considering the value of quantitative measures of research value is the fact that a journal's ranking

and an individual scholar's metrics can be affected by the inclusion of such items as review articles or letters. For example, review articles appear to be cited more frequently than typical research articles because they often serve as surrogates for earlier literature. Review journals have some of the highest impact factors when compared to other types of scholarly publications and journals that have a combination of original research articles, and review articles have an advantage in metric tabulation. Other complicating factors in raw article and journal citation numbers are redundant publications in journals, inaccurate tabulations based on similar names, and purposeful manipulation or "gaming" of the metric systems by authors and editors to inflate desirable metric numbers.

To further confound policymaking, it is believed that research method articles tend to attract more citations than other types of articles, yet this is not necessarily the case. In fact, many journals dedicated completely to methods research do not attain unusually high-impact numbers (Elliott, 2014; Seglen, 1997). This mistaken assumption may stem from the fact that some of the most highly cited articles are seminal classics that belie the reputation of the journal. Such journals may not necessarily contain more influential articles than other journals. Decisions about policy formulation and decision-making about hiring, promotion, tenure, reduced teaching loads for research and research funding that are based on scholarly metrics must account for and be aware of these important matters, else improper and unjust evaluations will occur. Readers and naïve users of scholarly metrics need to become more aware of the concerns and pitfalls of using metrics. For example, the chronological limitation of some impact calculations, such as 2- and 5-year rolling periods, is intended to remove the partiality that major breakthrough pieces might produce. Total citation frequencies are influenced in this way, and perhaps that may be important for

some policies and decisions but not necessarily for others. There are also variations between disciplines with different ranges of maximum impact, as well as metric influences affected by the number of item types in journals (original research, reviews, and letters), and certain specified-only journal measures such as the JCR that may involve suspended journals, superseded titles, or journals that have ceased publishing.

The ranking of journals and associated journal metrics are certainly controversial. Many papers written about the strengths and weakness of such metrics identify concerns about what metrics actually measure. The concerns are quite common and repeatedly stated and subsequently have become more urgent in light of current developments in the scholarly academic world. Until fairly recently, it was common practice for academic researchers to concentrate their reading on a limited number of high-quality publications. Subsequently, as the number of research outlets proliferated, researchers were given immediate access to a vast array of journals (print and online) such that less attention was paid to the quality of the outlets. This contributed to an increased reliance on metrics. Scholarly metrics are easy to retrieve and use, supposedly serving as a proxy for quality of content and outlet. Unfortunately, there are many cases of high-quality works that have low citation counts, are published in lower ranked journals, and may be completely overlooked or delayed with respect to advancing knowledge in the discipline (Kozak, 2013).

The current system of scholarly peer-reviewed journals has simultaneously grown, come under increased scrutiny and criticism (for reliability, fairness and validity), yet has also become increasingly relied on. It is an unusual time in higher education, academic scholarship, and funded research. However, a review of the research literature concludes that

journal peer review is valid and still does, in fact, function as a quality filter (Daniel, 2005). Yet, there is a lot of ambiguity in the literature as well. Prepublication peer review could be supplemented with postpublication evaluation to help determine which publications and scientists have contributed most to knowledge advancement in a given field and remove or identify inaccuracies.

The legitimacy of publications and metrics must also be scrutinized carefully and then only be considered as one aspect of quality when implementing policies involving recognition and funding. Holistic policy development is recommended because it is crucial to know what quantitative research analysis can provide to researchers and policymakers and what such measures are unable to deliver. The consensus among many analysts, users, agencies, and faculty researchers is that even the most well-developed scholarly metrics that attempt to account for differences in discipline, age of publication, and other factors are unlikely to be a substitute for human judgment (Reuters, 2016).

In this monograph, a conceptual framework is proposed for using research evaluation methods for developing policies to promote and reward quality research that includes consideration of: research purpose, outputs, forms, funding, and institutional type. Colleges, universities, research institutions, and external funding agencies are currently struggling with questions surrounding how to consider scholarly performance evaluation accurately and fairly. There appears to be a rational understanding that publishing in highly ranked journals, such as those included on various lists of “quality” journals or those that have high-impact factors, does not necessarily equate to true value of the underlying research. Furthermore, when considering fundamental issues such as academic freedom, policymakers should identify the objectives of research publication based on their goals and institution type.



If the goal of the institution and its researchers is to supply new knowledge to the core and foundation of theories in academic disciplines, the policy might seek, encourage, and acknowledge only research contributions accepted in a select group of high-quality publications. Yet, if the goal is practical understanding of a field or maintaining knowledge currency by faculty members, then policies may encourage and acknowledge research contributions accepted in a broader number and type of publications as opposed to only “A-list” journals. In these latter cases, it may also be suitable to recognize publications outside the faculty member’s core discipline or traditional field of research. Finally, it is understood that influential stakeholders, including tenure and promotion committees, academic policymakers, funding agencies, libraries, and so on, are not likely to diminish their use of various journal lists and research metrics.

The trend in research evaluation is toward a balanced, hybrid approach that recognizes the value of different publications by examining whether an author, a particular piece of research output (e.g., published article), or an institution as a whole, meets appropriate standards for authors, articles, and journals in their specific research field and type of institution as measured, in part, by certain metric numbers. Further, consideration is also given to whether the work is being cited both within and beyond one’s core discipline, by practitioners as well as other academics, bridge media such as professional magazines, and other outlets.

This monograph supports the general philosophy behind the use of hybrid approaches to research evaluation. Organizational policies must be developed with thoughtful examination of the policy objectives, limitations of the measurement systems, differences in disciplines, and institutional types. The use of scholarly metrics has moved beyond philosophical debates about their appropriateness. Scholarly

metrics are already widely used in policy formation and implementation of operational decisions. It is argued that some combination of metrics, perhaps involving citation tabulations, metrics such as *h*-indices and others described later in this monograph, JIFs, and other measures should be combined and used to aid and supplement individual expert analysis (i.e., peer review). In this way, scholarly work can be properly acknowledged, recognized, evaluated, and rewarded in a more holistic manner. There is a need to evaluate such combinations of factors along with a continually evolving approach that considers newly developing metrics. Based on the many concerns about the validity of bibliometric analysis and the use of such tools for evaluating people and research, policies should be developed in light of the agreed upon goals of different organizational processes (e.g., hiring, promotion, tenure, allocation of teaching loads, research grant funding) as well as institutional type.

The aforementioned variable of institutional category is a major consideration in the use of scholarly metrics in policy formulation. For institutions such as 2-year community colleges, the important elements of research geared toward student skill development as identified by Fisher (2009) may be appropriate. For many traditional 4-year institutions, a more holistic and hybrid analysis of intellectual contributions may be more effective. This analysis could include citation counts, scholarly metrics (such as the popular *h*-index, or *h*-index, and its many variants), altmetrics (nontraditional metrics) involving social media, as well as input beyond pure publication and citation activity including impact-generating events that scholarly writers have conducted for constituencies such as undergraduate students, graduate students, faculty, the college or university-at-large, professional societies, the external communities, and others. For large prominently research-oriented universities and research institutions, it may

be more appropriate to place a stronger emphasis on established metrics to quantitatively assess impact of intellectual activities along with expert reviews to establish overall impact.

A common theme synthesized from the literature and current policy practices is that academia and research institution policies should respect and encourage more than publications in certain top journals (Lee, 2014). There should be broader respect for, and acknowledgment of, different types of scholarship such as practice-oriented papers, research-in-progress, book and media reviews, responses to previously published articles, book chapters, conference proceedings, and other intellectual contributions that are often not tabulated in many of the commonly used scholarly metrics. The goals of policies governing intellectual contributions should depend on the institution type, mission, and researcher capabilities so as to open new frontiers of knowledge generation, as well as improvements in teaching, learning, and recognizes the application or integration of knowledge. Therefore, hybrid evaluation approaches that combine quantitative scholarly metrics with more qualitative individual expert analysis are often suggested as the most fair and accurate method to gauge the true impact of scholarly output and measure the ultimate value of the underlying research activity. It is with this goal in mind that this monograph is presented as a guide for the development of more holistic approaches to the measurement and evaluation of scholarship production and research impact.

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# CHAPTER 1

## A PRIMER ON POLICY AND RESEARCH

Policies are an institution's way to guide decision-making and conduct operational practices. Proper development and implementation of effective policies is especially challenging in times of rapid technological development, changing societal expectations, and other turbulent internal and external environmental forces. Different types of institutions implement policies that reflect varying levels of importance on learning activities, research endeavors, and service commitments. Historically, colleges and universities educated a small, elite portion of the population using a specified curriculum. Other endeavors such as faculty research and service activities had a very limited role until relatively recently (Rudolph, 1990; Thelin, 2004; Veysey, 1965). The ancient Greek education system involved students researching their own information and debating it, while instructors directed students to develop critical-thinking skills. Many people today see career preparation as the primary or only goal of

higher education, while various external and governmental agencies see research as the fundamental purpose (Altbach et al., 1999).

There have been, and still are, vastly different perspectives on developing clear foundations for policies in higher education (Brubacher, 1965; Christensen and Eyring, 2011; Zemsky et al., 2005). For those who understand that crafting and executing organizational strategy is an important priority, it is often stated or implied that internal and external policies should support postsecondary institutions in the aforementioned vocational endeavors as well as practical or applied research, without question, even by people in academe. It is interesting to note that concerns and conflicts about the appropriateness of policies to support this perspective have been going on for well over a century, from a time when only a small portion of the population attended college at all, and the exclusive institutions serving this elite group largely followed the English model to provide broad liberal education.

Classic literature such as the essays by Cardinal Newman in the *Idea of a University* (first published in 1852) praised this model of pursuing knowledge for its own sake and uplifting the soul (Newman, 1947). However, the early nineteenth-century Germanic models with a strong research emphasis also made headway into the realm. Other visible higher education scholars such as Veblen and Flexner noted that important changes were occurring (Flexner, 1930; Veblen, 1918). These leaders and writers urged that American universities end obligations to extraneous pursuits, such as service to the community and vocational education. In their view, postsecondary education should be devoted exclusively to the pursuit of knowledge and research endeavors.

In *The Academic Revolution* (Jencks and Reisman, 1968), the authors boldly identified the increasing prominence of

professional scholars and scientists in top universities and examined some of the revolution's results. They perceived the changes as intensifying generational and class conflicts, as well as delicately transforming the types of pursuits to which capable people aspire, while unfortunately contributing to the decline of entrepreneurship and the rise of professionalism. They concluded that mass higher education, which has now become universal (Trow, 1973), despite its benefits, has had no considerable influence on the amount of social progress or equality in society. Jencks and Riesman believed that the revolutionary movement into academic professionalism was an advance over nineteenth-century higher learning, yet warned of its hazards and drawbacks such as the elitism and haughtiness inherent in meritocracy. Further, they argued against the shortsightedness that originates from a harshly academic assessment of human experience and understanding, as well as the complacency that may present methodological capability as an end rather than a means. This thought echoed Newman's earlier beliefs that knowledge and research endeavors have an end in themselves, the pursuit of which should seek to make better people who love learning.

There were counter-revolutionaries as well (Harris, 1970). Notable critics of twentieth-century higher education such as Irving Babbitt, Albert Jay Nock, Abraham Flexner, Robert Maynard Hutchings, and Alexander Meikelfohn "opposed the new general and professional education; they disliked research of operational utility; and they believed education through extension services (is) wrong" (p. 15). These individuals had a common belief that practicality, whether in regard to teaching, research, or service, had no proper place in institutions of higher learning. The rightful purpose of the collegiate instruction should be studying for character development. Research activities should not focus on responding

to immediate needs of society. Universities were seen as instruments for promoting the general welfare of the nation through:

- The conservation of knowledge.
- The interpretation of knowledge and ideas.
- The search for truth.
- The training of students who will appreciate knowledge and become the scholars of tomorrow (Flexner, 1911).

If these counter-revolutionaries and like-minded thinkers from that era could see the current state of colleges and university strategies, funding, philosophy, and faculty scholarship measurements, it is doubtful they would recognize the institutions and their stated missions.

Nevertheless, the multiple purposes of institutions continued to evolve and grow. The developments were aptly labeled as a creation of the “multiversity” that combines liberal general education, research, as well as a variety of services to society (Kerr, 1963). All of these different models exist today, continuing to confound internal and external policy-makers. A somewhat less familiar yet prescient book on *Bases for Policy in Higher Education* examines the various expectations of higher education institutions and states that there are philosophical, practical, and policy considerations that should be noted (Brubacher, 1965). Brubacher further proposed that higher education policies must first question whom should we seek to serve and what is our purpose? Should we seek to educate citizens to be knowledgeable members of an enlightened republic? Or merely provide a “consumatory good” (p. 18) that is something to be used up



or appreciated by itself? Or offer something that provides material wealth and goods as a resultant benefit?

Therefore, the ensuing development in higher education policies, from teaching general education to increased specialization, combined with rapid enrollment increases, and greater emphasis on research in the post-Sputnik era have greatly complicated these matters because of the different institutional histories and varied opportunities that persist today. The three primary elements of higher education strategies identified by Brubacher are fundamentally philosophical, practical, and policy-related. Therefore, questions arise as to how disparate institutional goals and policy development schemas can be reconciled for modern higher education with very diverse institutional types. Is measurement of research scholarship activities appropriate? Can research output be accurately measured across a wide array of disciplines? Can scholarly metrics be used to guide policy development?

The purpose of this monograph is to conduct a comprehensive analysis of scholarly metrics, research impact, and research evaluation. Strategies will be proposed to support, acknowledge, and encourage scholarship for different academic disciplines and types of institutions. In order to achieve these goals, the literature on bibliometrics, citation analysis, research impact, and policy development will be reviewed guided by the tenets of qualitative research methodology (Miles and Huberman, 1994). This involves a few broad constructs that incorporate a large number of particulars that are categorized in bins of discrete perspectives, events, and actions, overlaid with narrative framework to study the key ideas, paradigms, and variables. In this work, the bins or categories will be subsequent chapters that first examine the history of scholarly metrics and research impact, criticisms of metrics and scholarly impact practices, benefits of using quantitative and qualitative evaluation methodologies, and

finally, concluding with policy recommendations for institution leaders to consider.

It is commonly believed that the purpose of conducting research in colleges and universities is the generation, processing, preservation, and dissemination of knowledge (Allen, 1988; Bess and Dee, 2010; Bok, 2006; Bonewits and Soley, 2004; Boyer, 1990; R. F. Fisher, 2009; Geiger, 2004; Gibbons, 2003; Humbolt, 1970; Lipset, 1994; Neave, 2006; Newman, 1947; Rowley, 1999; Tuckman and Hageman, 1976; UNESCO, 2006; Whitehead, 1929). The pursuit of truth and intellectual honesty has also been identified (Turk, 2000) as one of the goals in seeking to create at research universities a metaphorical “city of intellect” (Brint, 2002). Yet, this goal is challenged by some criticisms regarding intellectual quality and the often counteracting pressures for practicality (Collins, 2002). However, even these criticisms have been theoretically reconciled by some thinkers, such as Fisher (2009, 2010) who states that “the primary *research purpose* is to enhance and extend the core college mission by enriching the student experience and the quality of college graduates, keeping faculty current and engaged, and contributing to the social and economic communities that colleges serve” (R. Fisher, 2009; Fisher, 2010; R. F. Fisher, 2009, p. iii). This “research-for-student-skill-development” concept is both old and new. It may be seen as a desire to prepare a new generation of researchers and innovators, as well as prepare students for participation in a knowledge-based economy and society. Equally or perhaps more importantly is examining and understanding the tremendous increase in the number of scholarly journals and the spread of the research culture in academe that have contributed to the wider usage of research evaluation methods.

## FORMS OF RESEARCH AND MEASURES

Medieval universities were institutions that largely focused not only on operational utility by preserving and teaching classical knowledge, but also functioned as professional schools for clergy, medical doctors, and lawyers (Rashdall, 2012; Rudolph, 1977; Veysey, 1965). Universities began to assume an important role in the latest scientific and social knowledge in early nineteenth-century Germany (Fallon, 1980). German universities started to require that all faculty conduct research as well as teach in order to deliver the latest knowledge to students. The research university model was then emulated by some institutions in the United States and elsewhere, either initiated in this model or replacing and overlapping with the traditional English collegiate model into the various types of institutions operating today (Kerr, 1963). A fundamental and ongoing concern is the differing opinions on the proper goals of research, types of research that are appropriate, and whether such research should be done for practical utility to respond to immediate societal needs or the broader expansion of knowledge in seeking truth. Faculty and institutions were criticized by factions on both sides of the issue and continued with the previously mentioned revolutionary and counter-revolutionary ideas as higher education further evolved in the twentieth century.

Therefore, it is important to understand that the changing perspectives on research policy have a long history that might be overshadowed by the extensive scrutiny of faculty scholarship today. The entire higher education system, from student admission policies, to hiring practices, to graduate success, and other aspects are continually assessed by internal and external forces. Various conceptual frameworks for theories in higher education research and overall expectations have been identified and generally include:

- Outcomes or the products and results of the activities of institutions.
- Institutions or the structures that perform higher educational activities.
- Goals or the purposes, intentions, and objectives of higher education.
- Activities of institutions of higher education.
- The people or the individuals and groups of individuals involved in the activities of higher education.
- Activities or the characteristic goal-seeking functions of people in institutions of higher education.
- Environments and the settings wherein institutions of higher education pursue their goals (Williams, 1973).

These ideas are still timely for the purpose of exploring research measurement activities, systems, problems, and suggestions for effective policy development. It has long been understood that colleges and universities are places that pursue goals leading to the creation of new knowledge for its own sake as well as the betterment of society at large. This is particularly true in the sciences, economics, and social sciences, as well as the arts and humanities. People in organizations are logically grouped or self-organize into these various disciplines of study where research activity is conducted and around which the public recognition originated (Neave, 2002). The traditional structure of basic or pure curiosity-driven scholarship represents the production of knowledge in the framework of academic preferences for fixed hierarchical structures represented by the departments we commonly see today (Allen, 1988; Boyer, 1990; Dewey, 1938; R. Fisher, 2009; Kaplan, 1964; Lipset, 1994; Neave, 2002;

Rowley, 1999; Tuckman and Hageman, 1976; Whitehead, 1929).

These structures provide guidelines about what the important research problems are; they also create a social dimension for knowledge sharing. As the literature evolved, alternatives to traditionally recognized forms of research were identified. Scholars such as Boyer proposed a well-known typology of four priorities that seek to bring additional authenticity to the full range of academic work. This more inclusive framework specifies the following forms of scholarship:

1. The scholarship of discovery. This includes basic and subject area/discipline-based research, as well as a commitment to knowledge for its own sake.
2. The scholarship of teaching. This is central to the mission of colleges, renews and revitalizes institutions, while also identifying scholars as learners.
3. The scholarship of application. Involves applied research that is related to the larger society outside academe, where theory and practice connect.
4. The scholarship of integration. This makes connections across the traditional academic research disciplines; therefore, it is interdisciplinary, integrative, and interpretive (Boyer, 1990).

While these forms of scholarship have become widely recognized, they are often still clumped together under the general function of research when considering higher education and research institution policies. An additional model of research classification is offered by Gibbons (2003), who identified modes of knowledge production (Gibbons, 2003). The concept is that there are two forms of research: Mode One and Mode Two. Traditional research is Mode One, which is no

longer sufficient to describe the complete variety and intricacy of research activities in modern higher education and in other research institutions. Gibbons' Mode Two states the idea that there is a distributed knowledge production, not hierarchical or fixed, with heterogeneous transdisciplinary skill sets instead of homogeneity. Furthermore and related to the upcoming examination of scholarly metrics and policy development is that:

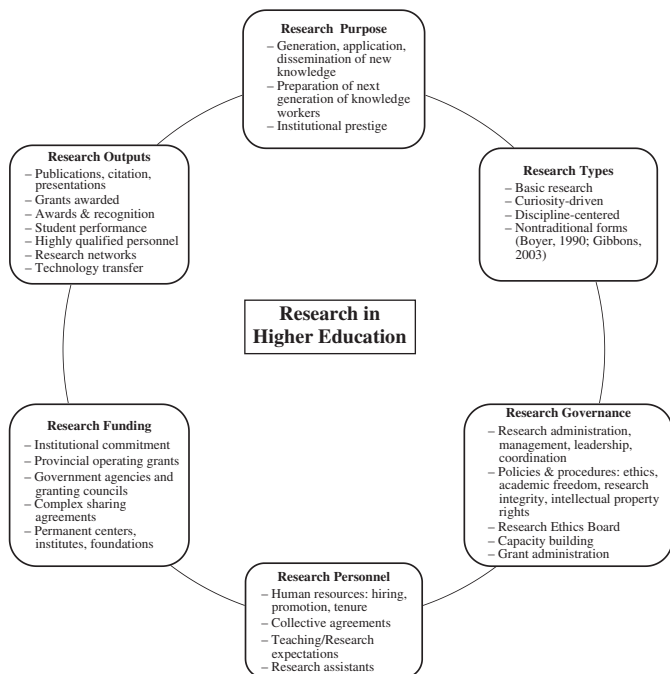
- There are an increasing number of places where recognizably competent research is being carried out.
- These sites communicate with one another and thereby broaden the base of effective interaction; knowledge is thus derived from an increasing number of tidal flows that both contribute to and draw from the stock of knowledge.
- The dynamics of socially distributed knowledge lie in the flows of knowledge and in the shifting patterns of connectivity.
- The number of interconnections is accelerating; the ebb and flow of connections follow the paths of problem interest; which are no longer determined by the disciplinary structure of research.
- Knowledge production exhibits heterogeneous rather than homogenous growth, providing new points of intellectual departure for further combinations and configurations of researchers (Gibbons, 2003, pp. 111–112).

It should be added that multi-, inter-, and sub-disciplinary research activities conducted by individuals, departments, and institutions ought to also be considered when constructing a framework for understanding, tabulating, and evaluating researchers and research output. Quality assurance is therefore increasingly complex because of the ways in which

disciplinary research structures are shifting, and knowledge networks are connecting, interacting, and generating new research configurations.

In the general schema of research activities at colleges and universities, the paradigm of research policies denotes the methods and people who are involved in planning, financing, organizing, and capability building, in addition to the moral/ethical, freedom of thought, and intellectual property aspects of creating and administering the said policies (Birnbaum, 1988; Bonewits and Soley, 2004; Clark, 1983; Kyvik and Skodvin, 2003; Neave, 2002; Powers, 2003; Richardson and Martinez, 2009; Rowley, 1999; UNESCO, 2006). Institutions, people, and organizational processes need to examine how and with whose input decisions about research are made. Fisher (2009) conceived a broad framework for research in higher education that places the aforementioned research forms together with purpose, outputs, funding, personnel, and governance (i.e., policy) as shown in [Figure 1.1](#).

The conceptual model illustrates a schematic representation of a suitable working standard to examine policy development and implementation for different purposes, forms, and forces. This concept has expanded and developed in recent decades in both higher education, as well as private and publicly funded research institutions. It can serve as a structure to analyze the consequences of developing an effective research evaluation policy and as a comparator for the policy developments to be examined and proposed. Governance and policies of research administration that are now using metrics are important aspects in the framework and is evident by its relationship to academic capitalism (which includes the development, marketing, and selling of research products), increased calls for accountability, changes in funding, corporate-style decision-making, and allocation of resources. These different internal and external forces are

**Figure 1.1. Framework of Research.**

Adapted from Fisher (2009, p. 53), used with permission.

complicated and inter-related and require a proper understanding of the current states, recent changes, and original purposes that have evolved yet retain some of the terminology and the options for further development.

It is widely known that the growing influence of *Academic Capitalism* is manifest in the framework of research purpose and policy. Slaughter and Rhoades (2004) recognized a revolution in corporate management style at higher education institutions that is affecting research topics selected and other policy aspects. Other scholars have also



recognized a movement toward commercialization that is bringing in an entrepreneurial management culture (Breton, 2003), with a new batch of corporate leaders that are insistent in guiding university research so that it will generate new revenue in the short term (Alstete, 2014; Bonewits and Soley, 2004; Neave, 2002; Slaughter and Rhoades, 2004). A related matter involves the responsibility and range of faculty or researcher participation in research governance and policy formulation decisions. The basic questions ask who should have control and what measures should shape academic work by professionals (R. Fisher, 2009; Slaughter and Rhoades, 2004). Professional responsibilities and expectations are changing in regard to behaviors that transfer faculty members away from the center of important academic policy formulation and implementation, while at the same time diminishing the participation of traditional full-time faculty members (Burgan, 2009; Cummings and Finkelstein, 2013).

One of the goals of this monograph is to examine the purpose of different types of research at various kinds of institutions as well as the evolving expectations and roles of faculty members and scholars. This monograph proposes to synthesize philosophies of policy development that encourage faculty researchers to better understand the background, history, and use of scholarly metrics more holistically. Otherwise, in the absence of this background knowledge, these new metrics may be imposed on faculty by internal and external forces, with potentially harmful and adverse consequences.

## DISRUPTIVE TECHNOLOGY AND OTHER FORCES AFFECTING RESEARCH POLICIES

When an industry is faced with change to such degree and at such speed that the foundations of that industry are forever

altered, the term “disruptive” is often the most apt description. While the inertia of the status quo and the entrenchment of the old guard may make higher education an unlikely candidate for foundational disruption, it might finally be just a matter of “when” and not “if” such change will come. There have been numerous disruptions and changes in higher education noted so far. The above-mentioned classic literature in the late nineteenth and early twentieth century examined important changes in the fundamental structure of institutions and their purposes during that time period. Yet, in the past 50 years, there has been a seemingly ever more rapid increase in the amount and pace of change. Generally speaking, the changes that have come about in recent times include, but are not limited to:

- A decrease in confidence that the money spent on higher education is a good investment, for tuition as well as research activities.
- More use of contingent faculty not in traditional tenure-track positions.
- The rise and fall of government spending on research and sciences.
- An increasing shift toward more institutional academic capitalism, where strategies and decisions are based on financial matters and revenue and less on education and research priorities.
- Increasing requirements for regulatory compliance and legalism.
- An increasing need to prove our worth (McMillen, 2016).

Therefore, it is understandable that the calls for accountability as well as measuring outputs such as scholarly

research — specifically, citation analysis and other research metrics — have intensified. Even if there is debate in regard to their accuracy and appropriateness, institutions should lead the way with thoughtful strategic planning of research policy development rather than simply consent to rapid internal acceptance of such metrics. Such a proactive position can deter external stakeholders from forcing inappropriate usage on them.

Nevertheless, these forces are already having a degree of negative impact in the form of disapproval about the quality and direction of research in higher education. There is a failure of some institutional approaches to resonate with public policy-makers and educational practitioners (Hillman et al., 2015). Calls for accountability continue. As a result, proxies for quality and economic competitiveness have arisen at the individual author, research outlet (article and journal), departmental, and institutional levels of analysis. These changes are occurring on a global basis.

The global university ranking systems in large regions, such as Europe, have consequences resulting from the symbolic value of various measures that are not related to the reality of university practices and missions (Kehm, 2014). Japan and other countries have also placed increased importance on rankings that, like scholarly metrics, have questionable validity, rigor, and meaningful value, yet universities are driven to use the systems that the state authorizes (Ishikawa, 2014). Brazil's system has faced similar disruptions that are influencing their distribution of funding and departmental fellowships. Additionally, professors in Brazil are authorized to act as thesis advisors only if they publish at least one paper over a given time period in a journal classified as being of a certain level of quality according to journal impact factors (JIFs) (Ferreira et al., 2013).

This is another example of an international phenomenon effectuated as a disruptive force of using journal-based metrics to evaluate individual scholars that can have catastrophic consequences if improperly used. Furthermore, these disruptions may be considered an evolution or development of the longstanding and well-known tradition of the “publish or perish” expectation for faculty contract renewal, tenure, and promotion (Lee, 2014). This is a tradition that is now increasingly being connected to the topic of this monograph: policies and usage of scholarly metrics to measure, tabulate, and evaluate research performance.

## ORGANIZATION OF THE MONOGRAPH

As exploration continues of scholarly research evaluation and metrics, the second chapter of the monograph examines the origin of impact factors (Garfield, 1955, 1996; West et al., 2013), provides an origin timeline, looks at recent developments such as the San Francisco Declaration on Research Assessment, and specialized accreditation expectations (Cagan, 2013; Casey et al., 2014). The changing nature of academic publishing is also examined further (Howard, 2010, 2011; Jacsó, 2010b; Morrison, 2015). The second chapter also connects scholarly metrics, research funding, and external institution rankings to better understand the nuances of important issues and practices (Butler, 2003; Elliott, 2014; Gallo et al., 2014; Van Balen et al., 2012).

The third chapter analyzes criticisms of impact factors, citation analysis, and the inherent flaws of these measurement systems. The literature contains many strong condemnations of the methodologies, as well as the fundamental philosophy of measuring (or attempting to measure) research quality with quantitative systems (Adler and Harzing, 2009; Li et al., 2010;

Seglen, 1997). It is widely believed that JIFs are an inappropriate tool for assessing the quality of papers or authors. Such systems may, in fact, represent convenient attempts to assign easily computable numbers that supposedly represent the relative quality and impact of those papers and authors. In effect, impact factors are a shortcut in lieu of using expert analyses of their impact which can be more time-intensive, qualitative, and subjective.

Scholars have suggested that the true goal behind the movement toward quantitative-based accountability is to further erode academic freedom and even to attack the tenure system (Gruber, 2014; Labi, 2014; Lincoln, 2011; Pitney and Gilson, 2012). However, the theme of the third chapter is to identify and synthesize numerous denunciations of these methodologies because of their inaccuracy, the misplaced notion that citations equate to quality, and the tremendous variation in publication and citation patterns and expectations across disciplines. The numerous problems with quantitative research quality assessment must be considered by policy-makers and institutional leaders (Benati and Stefani, 2011; Brembs et al., 2013; Lee et al., 2010; Mayor, 2010; Pitney and Gilson, 2012; Wexler, 2015; Wright and Armstrong, 2008).

The fourth chapter, in contrast, examines the benefits of measuring scholarship. What do different systems offer researchers, scholarship in general, internal and external stakeholders, government funding agencies, and society at large? Extant research has revealed how metric indicators are being used as proxies for research quality, accuracy, and impact (Harzing, 2016a,c; Jarwal et al., 2009). The current practices regarding the use of measurement systems are obtained from reviewing the voluminous literature of articles and books (Ding et al., 2014; Jarwal et al., 2009), tapping into online discussions and blogs on the relevant topics

(Connor, 2011; Lin and Fenner, 2013; Priem and Hemminger, 2010; Read, 2012), assessing currently used programs (Gallo et al., 2014; ImpactStory, 2015; Jipa et al., 2013; Lin and Fenner, 2013), and conducting primary research by contacting scholars directly. This secondary and primary research will provide important material regarding different methods of, and perspectives on, research evaluation to help produce conceptual yet practical guidance for readers to understand the possible positive uses of these somewhat controversial, intricate, and interwoven approaches.

The fifth and final chapter contains a synthesis of the many issues examined. The analysis is concluded with suggestions for new policies and for the improvement of existing programs. There are many new ideas for enhancing research metrics, as well as important factors that academic leaders and policies makers should consider. Some of these notions include field-normalized citation rates, alternative metrics or altmetrics, accommodations for English-language bias, unique researcher identification numbers to help mitigate name ambiguity, collocation, and alternatives to numerical scoring (Ahlgren et al., 2012; Casey et al., 2014; Roemer and Borchardt, 2015; West et al., 2013). Specific administrative and managerial decision procedures are outlined for choosing the best ideas based on our proposed model to effectively measure scholarship with an understanding of established higher education administration and management principles. Recommendations for taking the first steps, implementing programs, and monitoring outcomes for continuous improvement and refinement will also be presented.

Audiences that may find this monograph helpful include college and university administrators (e.g., presidents, provosts/academic vice-presidents, deans, department chairs, directors of specialized academic programs, faculty research leaders) as well as faculty themselves and other

individuals interested in understanding scholarly research policies. This topic is useful to readers because of the timeliness of the issue in today's academic environment and the likelihood that citation analysis, research metrics, and faculty scholarship are going to continue their rapid development in coming years.

For a long time, critics of operational utility and the more practical aspects of higher education have sought to remind the public that colleges and universities can and should have higher or broader intellectual goals for individuals and society (Harris, 1970). However, the purpose of this volume is not to propose replacing the existing scholarship systems or undermine the practical aspects of academic programs nor is the purpose to diminish the stated missions of existing colleges and universities that seem to increasingly include career preparation. Instead, the monograph is intended to help ensure the academic integrity and ongoing success of scholarly research policies in higher education and research institutions by clarifying and synthesizing the rapidly changing aspects of these endeavors.

Many of the proposed ideas contained in the following chapters are associated with and can be integrated into traditional academic programs. They can encourage additional research activities of academics by increasing their awareness of new Internet-based research, publication, and impact-measuring systems, as well as highlighting any internal institutional offerings and capabilities that support the quality research efforts of its scholars. In addition, it has been stated that it is possible to engage faculty in updating their activities and institutionalize the importance of developing and implementing programs that can help ensure institutional survival in today's challenging competitive global environment (Altbach et al., 2001; Toma, 2010). Some of the internal and external challenges for establishing bases for developing

existing policy, formulating new policy, gaining approval of that policy, and successfully implementing the resulting programs in higher education institutions will also be addressed for intended readers so that organizational support can be obtained for those initiatives (Brubacher, 1965; Hughes and Mills, 1975).