Academic Standardization Hinders Innovation

Abstract

This paper explores the relationship between academic standardization and innovation, focusing on the potential negative impact of standardization on innovative research. Academic standardization encompasses journal publication, degree requirement, recruitment and promotion, and research funding application standardization. While these processes are essential for maintaining research quality and rigor, they may inadvertently hinder creativity and risk-taking, thereby limiting the pursuit of innovative ideas. Despite the challenges posed by standardization, disruptive research persists, indicating the potential for a balanced approach. Future research should address gaps in the current literature, investigate alternative models of standardization, and examine the long-term effects of these practices on academia, innovation, and society. The paper emphasizes the need for ongoing dialogue and research to ensure a more dynamic research environment that fosters both rigor and originality.

Introduction

Academic standardization is a term proposed by the author of this paper to describe a concept that has emerged as a significant facet of the contemporary academic landscape and is characterized by the establishment and implementation of uniform criteria, guidelines, and expectations within the academic community (Marginson, 2016). This phenomenon includes journal publication standardization (Larivière & Gingras, 2010; Merton, 1968), degree requirement standardization (Bourdieu, 1988; Slaughter & Leslie, 1997), university and research institution recruitment and promotion standardization (Nelson & Winter, 1982; Petersen et al., 2014), and research funding application standardization (D'Este & Patel, 2007; Etzkowitz & Leydesdorff 2000). While academic standardization is essential for maintaining the quality and rigor of research (Knorr-Cetina, 1999; Rip, 2004), there is a growing concern that it may impede innovation and the development of disruptive research (Christensen, 2013; Kuhn, 1962).

The objective of this paper is to examine carefully the existing literature on academic standardization, with a particular emphasis on its potential negative impact on innovation. This paper seeks to synthesize the findings of several studies (e.g., Fochler et al., 2016; Sterling, 1959) and provide an overview of the discussions surrounding the relationship between standardization and innovation (Ioannidis, 2005; Mirowski & Sent, 2008).

Several studies suggest that academic standardization may unintentionally stifle creativity and risk-taking, thereby limiting the pursuit of innovative ideas and research (Anderson et al., 2007; Bloom et al., 2006). Publication biases in prestigious journals, for example, tend to favor research that conforms to established norms and expectations, discouraging researchers from pursuing innovative

or controversial projects (Larivière & Gingras, 2010). Moreover, the competitive pressures of academia may lead to increased stress levels and burnout among researchers, further impeding their creative abilities (Anderson et al., 2007; Fochler et al., 2016). This analysis will delve deeper into the existing literature to gain a better understanding of these concerns and their implications for the future of innovation in academia.

Academic Standardization's Emergence

Economic growth has had a significant impact on the global expansion of access to education (Bloom et al., 2006). As nations progress, they invest more resources in education, resulting in a rise in the number of individuals pursuing a higher education (Marginson, 2016). This increase in educated populations has contributed to the intensification of competition for academic positions and resources, which has led to the standardization of academic procedures.

Four distinct types of academic standardization exist: journal publication standardization, degree requirement standardization, university and research institution recruitment and promotion standardization, and research funding application standardization (Larivière & Gingras, 2010; Hicks et al., 2015; Merton, 1973). The purpose of these standardized practices is to ensure the quality, rigor, and uniformity of educational and research endeavors across academic disciplines.

The establishment of specific guidelines and criteria for manuscript submission, peer review, and acceptance (Larivière & Gingras, 2010) is referred to as journal publication standardization. While this standardization maintains the quality and rigor of published research, it may inadvertently limit the willingness of researchers to pursue disruptive innovations, as they prioritize aligning with the preferences and expectations of prestigious journals (Hicks et al., 2015).

Degree requirement standardization, which entails the uniformity of educational requirements for obtaining degrees, creates a consistent metric of academic performance. However, the rigidity of these requirements may impede students' ability to explore unorthodox research topics and develop innovative methodologies (Marginson, 2016).

Standardization in recruitment and advancement within universities and research institutions requires the use of objective metrics and criteria for hiring, evaluation, and promotion (Anderson et al., 2010). Although this process aims to create a competitive and equitable environment, the resulting pressure may have a negative effect on researchers' creative and innovative abilities (Bloom et al., 2006).

Standardization of research funding application procedures is intended to ensure that funding decisions are based on merit and potential impact (Merton, 1973). However, this standardization may inadvertently favor conventional research projects over disruptive innovations because funding agencies may view the latter as riskier or less certain (Kuhn, 1962).

Innovation Impeded by Evidence of Academic Standardization

The globalization of higher education has increased competition for academic positions and resources, which has led to the standardization of academic practices (Bok, 2009). This standardization may inadvertently impede innovation by encouraging conformity to established norms (Cook & Frank, 2010). Four distinct aspects of academic standardization are journal publication, degree requirement, recruitment and promotion, and application for research funding (Larivière & Gingras, 2010; Hicks et al., 2015; Merton, 1973).

Journal publication standardization ensures the rigor of published research, but it may impede the pursuit of disruptive innovations (Larivière & Gingras, 2010; Hicks et al., 2015). The shift towards interdisciplinary and problem-oriented research (Limoges et al., 1994) further complicates these efforts, as researchers attempt to strike a balance between conformity and the exploration of novel research directions (Rafols & Meyer, 2010). Adler and Harzing (2009) contend that the pressure to conform to academic ranking systems may also hinder the potential for innovative research.

The standardization of degree requirements facilitates the comparison of academic accomplishments, but it may limit the availability of unconventional research topics and methodologies (Marginson, 2016). Amsden and Tschang (2003) demonstrate that technological complexity differs across R&D categories, suggesting that standardization may not adequately capture the nuances of diverse research methodologies.

By emphasizing objective metrics, standardization in recruitment and promotion fosters a competitive atmosphere (Anderson et al., 2010). This pressure to conform, however, can stifle creativity and innovation (Bloom et al., 2006). Azoulay, Fons-Rosen, and Graff Zivin (2019) provide evidence that scientific progress may be impeded by established norms, as breakthroughs frequently occur when researchers deviate from conventional approaches.

Research funding application standardization may be detrimental to disruptive innovations perceived as riskier investments (Merton, 1973; Kuhn, 1962). This problem is exacerbated by researchers' preference for projects with predictable outcomes and high citation potential (Hicks et al., 2015; Rip & Van Der Meulen, 1996). Stirling (2007) emphasizes the significance of diversity in science, technology, and society, highlighting the need for a broader comprehension of innovative research.

Academic standardization seeks to preserve quality, rigor, and uniformity, but may impede innovation by discouraging disruptive ideas and methodologies. Maintaining academic standards and fostering an environment conducive to innovative research must be balanced as universities adapt to market forces (Washburn, 2008; Stephan, 2012).

In fact, Park et al., (2023) used a novel metrics called CD5 index developed by Funk and Smith (2017) to measure the disruptive research outcomes. They have found a marked decline in disruptive science and technology over time. Our analyses show that this trend is unlikely to be driven by changes in citation practices or the quality of published work. Rather, the decline represents a substantive shift in science and technology, one that reinforces concerns about slowing innovative activity.

Possible advantages of standardization for preserving research quality and rigor

While academic standardization has been criticized for having the potential to stifle innovation, it is important to recognize its value in preserving research quality and rigor. Standardization processes, such as peer review and assessment criteria, serve to ensure that published research meets stringent criteria for precision, validity, and dependability (Larivière & Gingras, 2010). (Hicks et al., 2015) These processes contribute to the advancement of knowledge by establishing a framework that promotes transparency and reproducibility.

The contribution of competition to innovation and creativity

The competitive nature of academia may have negative repercussions, but it has the potential to foster creativity and innovation. In order to distinguish themselves from their peers, competition can motivate researchers to push the boundaries and develop novel ideas (Marginson, 2016). In this regard, competition can serve as an impetus for ground-breaking research and encourage researchers to pursue innovative approaches to solving complex problems (Bloom et al., 2006).

The continuation of disruptive research in a standard environment.

Despite concerns about academic standardization, disruptive research continues to emerge in a number of fields. Kuhn (1962) asserts that researchers have demonstrated resiliency and adaptability in navigating the standard environment, producing innovative research that challenges dominant paradigms. This suggests that, despite the fact that standardization may impose restrictions, it does not completely stifle creativity and the potential for groundbreaking discoveries (Christensen, 2013).

It is crucial to acknowledge the potential benefits of academic standardization in maintaining research quality and rigor, as well as the role of competition in fostering creativity and innovation. In addition, the persistence of disruptive research in a standardized environment indicates that standardization, despite posing challenges, does not completely stifle the potential for innovative research. As the academic community continues to evolve, it is essential to strike a balance between maintaining quality standards and fostering an environment that encourages innovation.

Perspectives and Prospects for Research

Future research should focus on addressing gaps in the current literature and identifying potential areas for further investigation. This includes evaluating alternative models of academic standardization that foster innovation and preserve the quality and rigor of research.

Identifying gaps in the current literature and exploratory opportunities

Existing studies provide valuable insights into the complex relationship between academic standardization and innovation (Ziman, 2001), but additional research is required to advance our knowledge of this topic. For instance, more empirical research is required to investigate the specific mechanisms by which standardization processes may hinder or facilitate innovation across diverse disciplines, institutional settings, and national contexts (Bornmann & Daniel, 2008; Lee, Sugimoto, Zhang, & Cronin, 2013).

Investigating alternative academic standardization models that encourage innovation

Future research should also investigate alternative academic standardization models that strike a balance between fostering innovation and maintaining research quality and rigor. This may involve exploring the potential of interdisciplinary collaborations, open access publication models, and

alternative metrics for assessing the impact and quality of research (Nosek et al., 2015; Wouters et al., 2015).

Examining the effects of standardization on academia, innovation, and society over the long term

Lastly, research should investigate the long-term impacts of standardization on academia, innovation, and society as a whole. This includes evaluating the potential effects of an overemphasis on standardized research practices on the development of human capital, the production of disruptive ideas, and the broader socioeconomic implications of innovation (Moed, 2006; Ziman, 2001).

By addressing literature gaps, investigating alternative models of standardization, and studying the long-term effects of these practices, researchers can contribute to a more nuanced understanding of the complex relationship between standardization and innovation in the academic context.

Conclusion

Academic standardization poses a potential barrier to innovation, which must be acknowledged and addressed. (Bloom et al., 2006) have demonstrated that the various forms of standardization in academia can have both positive and negative effects on research quality and innovation. Given the importance of innovation to scientific progress and societal development, it is crucial to strike a balance between the need for standardization and the encouragement of creativity and ground-breaking research (Christensen, 2013; Kuhn, 1962; Ziman, 2001).

As competition for research positions, career advancing and promotion opportunities has become much more fierece in the recent decades, academic standardization serves as a pivotal way for universities and research institutes to evaluate the researchers. However, there is no way to overstate the significance of ongoing research and dialogue on the subject of balancing standardization and innovation. As new models and approaches to academic standardization emerge, researchers, policymakers, and stakeholders must engage in open and constructive conversations to evaluate their potential effects on innovation and adapt to the changing academic landscape (Marginson, 2016; Merton, 1973; Nosek et al., 2015).

This paper serves as a call for a more balanced approach to ensure the growth of innovative research in the modern academic landscape. By considering the potential advantages and disadvantages of academic standardization, researchers and policymakers can develop strategies that foster innovation while preserving the integrity and quality of academic research (Hicks et al., 2015; Larivière & Gingras, 2010; Wouters et al., 2015).

In conclusion, the interplay between academic standardization and innovation merits ongoing focus and analysis. By recognizing the potential obstacles posed by standardization and exploring alternative models that foster innovation, the academic community can work toward a more vibrant and dynamic research environment that fosters both rigor and originality.

Declaration of Interest

The author declares no competing interests, financial or non-financial, related to this study.

References

1. Adler, N. J., & Harzing, A. W. (2009). When knowledge wins: Transcending the sense and nonsense of academic rankings. Academy of Management Learning & Education, 8(1), 72-95.
2. Amsden, A. H., & Tschang, F. T. (2003). A new approach to assessing the technological complexity of different categories of R&D (with examples from Singapore). Research Policy, 32(4), 553-572.
3. Anderson, M. S., Ronning, E. A., De Vries, R., & Martinson, B. C. (2007). The perverse effects of competition on scientists' work and relationships. Science and engineering ethics, 13, 437-461.
4. Anderson, M. S., Ronning, E. A., Vries, R. D., & Martinson, B. C. (2010). Extending the Mertonian norms: Scientists' subscription to norms of research. The Journal of higher education, 81(3), 366-393.
5. Azoulay, P., Fons-Rosen, C., & Zivin, J. S. G. (2019). Does science advance one funeral at a time?. American Economic Review, 109(8), 2889-2920.
6. Bloom, D. E., Canning, D., & Chan, K. (2006). Higher education and economic development in Africa (Vol. 102). Washington, DC: World Bank.
7. Bloom, D. E., Hartley, M., & Rosovsky, H. (2006). Beyond private gain: The public benefits of higher education. In International handbook of higher education (pp. 293-308). Dordrecht: Springer Netherlands.
8. Bok, D. (2009). Universities in the Marketplace. In Universities in the Marketplace. Princeton university press.
9. Bornmann, L., & Daniel, H. D. (2008). What do citation counts measure? A review of studies on citing behavior. Journal of documentation.
10. Bourdieu, P. (1988). Homo academicus. Stanford University Press.
11. Christensen, C. M. (2013). The innovator's dilemma: when new technologies cause great firms to fail. Harvard Business Review Press.
12. Cook, P. J., & Frank, R. H. (2010). The winner-take-all society: Why the few at the top get so much more than the rest of us. Random House.
13. D'Este, P., & Patel, P. (2007). University–industry linkages in the UK: What are the factors underlying the variety of interactions with industry?. Research policy, 36(9), 1295-1313.
14. Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. Research policy, 29(2), 109-123.
15. Fochler, M., Felt, U., & Müller, R. (2016). Unsustainable growth, hyper-competition, and worth in life science research: Narrowing evaluative repertoires in doctoral and postdoctoral scientists' work and lives. Minerva, 54, 175-200.
16. Funk, R. J., & Owen-Smith, J. (2017). A dynamic network measure of technological change. Management science, 63(3), 791-817.
17. Hargreaves, D. H. (2006). A new shape for schooling?. London: Specialist Schools and Academies Trust.
18. Hicks, D., Wouters, P., Waltman, L., De Rijcke, S., & Rafols, I. (2015). Bibliometrics: the Leiden Manifesto for research metrics. Nature, 520(7548), 429-431.

19. Ioannidis, J. P. (2005). Why most published research findings are false. PLoS medicine, 2(8), e124.
20. Jones, B. F. (2009). The burden of knowledge and the “death of the renaissance man”: Is innovation getting harder?. The Review of Economic Studies, 76(1), 283-317.
21. Knorr Cetina, K. (1999). Epistemic cultures: How the sciences make knowledge. harvard university press.
22. Kuhn, T. S. (1962). The Structure of Scientific Revolutions. Chicago (University of Chicago Press) 1962.
23. Larivière, V., & Gingras, Y. (2010). The impact factor's Matthew Effect: A natural experiment in bibliometrics. Journal of the American Society for Information Science and Technology, 61(2), 424-427.
24. Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. PloS one, 10(6), e0127502.
25. Lee, C. J., Sugimoto, C. R., Zhang, G., & Cronin, B. (2013). Bias in peer review. Journal of the American Society for Information Science and Technology, 64(1), 2-17.
26. Limoges, C., Scott, P., Schwartzman, S., Nowotny, H., & Gibbons, M. (1994). The new production of knowledge: The dynamics of science and research in contemporary societies. The New Production of Knowledge, 1-192.
27. Marginson, S. (2016). High participation systems of higher education. The Journal of Higher Education, 87(2), 243-271.
28. Marginson, S. (2016). The worldwide trend to high participation higher education: Dynamics of social stratification in inclusive systems. Higher education, 72, 413-434.
29. Merton, R. K. (1968). The Matthew effect in science: The reward and communication systems of science are considered. Science, 159(3810), 56-63.
30. Merton, R. K. (1973). The sociology of science: Theoretical and empirical investigations. University of Chicago press.
31. Mirowski, P., & Sent, E. M. (2008). The commercialization of science and the response of STS.
32. Moed, H. F. (2006). Citation analysis in research evaluation (Vol. 9). Springer Science & Business Media.
33. Nelson, R. R., & Winter, S. G. (1982). An evolutionary theory of economic change (Belknap, Cambridge, MA). NelsonAn Evolutionary Theory of Economic Change1982.
34. Nielsen, Mathias Wullum, Sharla Alegria, Love Börjeson, Henry Etzkowitz, Holly J. Falk-Krzesinski, Aparna Joshi, Erin Leahey, Laurel Smith-Doerr, Anita Williams Woolley, and Londa Schiebinger. "Gender diversity leads to better science." Proceedings of the National Academy of Sciences 114, no. 8 (2017): 1740-1742.
35. Nosek, B. A., Alter, G., Banks, G. C., Borsboom, D., Bowman, S. D., Breckler, S. J., ... & Yarkoni, T. S. C. I. E. N. T. I. F. I. C. S. T. A. N. D. A. R. D. S. (2015). Promoting an open research culture. Science, 348(6242), 1422-1425.
36. Nosek, B. A., Spies, J. R., & Motyl, M. (2012). Scientific utopia: II. Restructuring incentives and practices to promote truth over publishability. Perspectives on Psychological Science, 7(6), 615-631.
37. Nowotny, H., Scott, P., & Gibbons, M. (2003). Introduction:'Mode 2'revisited: The new production of knowledge. Minerva, 41(3), 179-194.
38. Park, M., Leahey, E., & Funk, R. J. (2023). Papers and patents are becoming less disruptive over time. Nature, 613(7942), 138-144.

39. Petersen, A. M., Fortunato, S., Pan, R. K., Kaski, K., Penner, O., Rungi, A., ... & Pammolli, F. (2014). Reputation and impact in academic careers. Proceedings of the National Academy of Sciences, 111(43), 15316-15321.
40. Rafols, I., & Meyer, M. (2010). Diversity and network coherence as indicators of interdisciplinarity: case studies in bionanoscience. Scientometrics, 82(2), 263-287.
41. Rip, A. (2004). Strategic research, post-modern universities and research training. Higher Education Policy, 17, 153-166.
42. Rip, A., & Van der Meulen, B. J. (1996). The post-modern research system. Science and public policy, 23(6), 343-352.
43. Slaughter, S., & Leslie, L. L. (1997). Academic capitalism: Politics, policies, and the entrepreneurial university.
44. Stephan, P. (2012). How Economics Shapes Science.
45. Sterling, T. D. (1959). Publication decisions and their possible effects on inferences drawn from tests of significance—or vice versa. Journal of the American statistical association, 54(285), 30-34.
46. Stirling, A. (2007). A general framework for analysing diversity in science, technology and society. Journal of the Royal Society interface, 4(15), 707-719.
47. Washburn, J. (2008). University, Inc.: The corporate corruption of higher education. basic books.
48. Wouters, PF., Thelwall, M., Kousha, K., Waltman, LR., De Rijcke, S., Rushforth, A., & Franssen, T. (2015). The Metric Tide: Literature Review. https://doi.org/10.13140/RG.2.1.5066.3520
49. Ziman, J. (2001). Real science: What it is, and what it means.