INSIGHT INTO RESEARCH PRODUCTIVITY: CONCEPTUAL, THEORETICAL, META REVIEWS AND RESEARCH AGENDA

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Abstract

The significance of research productivity (RP) of an academic staff cannot be underrated. RP is one of the major responsibilities of academic staff. It is central to rewards, advancement and prestige of an individual academic staff. Besides, RP by academic staff is a way of showing accountability to the stakeholders of higher education institutions. The significance of RP to higher education stakeholders suggest a need to enhance RP of academic staff. One way to achieve this need is to have a holistic understanding of the concept and determinants, of RP. The first objective in this paper is to review literature on the concept of RP in order to bring out how the concept of RP has been defined and measured by previous scholars and the gaps they left for future researchers. The second objective is to review a theory (Mantikayan & Abdulgani's, 2018) that suggests predictors of RP. The third objective is to do a meta review, that is, to review literature reviews on predictors of RP as suggested by the theory in order to isolate gaps and propose hypotheses for future researchers.

Keywords: Higher Education; Literature Review; Research Productivity; Theoretical Review

Introduction

Research productivity (RP) is significant to academic staff, institutions and society. On the side of academic staff RP is strongly associated with the reputation, visibility, advancement, improved job security (Mantikayan & Abdulgani, 2018), rewards and motivation to engage in more research (Guraya et al., 2016) of an individual academic staff. Webber (2011) points out that research is one of the key responsibilities of an academic staff. According to Wills et al. (2013) RP by academic staff is a way of showing accountability to the stakeholders of higher education institutions. Academic staff who are productive as far as research is concerned bring prestige to the institutions to which they are affiliated. Guraya et al. (2016) point out that higher education institutions are often ranked based on their tangible research outputs that have been produced by the academic staff in their various departments. Besides, some scholars (e.g., Kosten, 2016; Webber, 2011) point out that higher education institutions have increasingly emphasized on information about productivity of academics where RP had been part of the criteria used to fund the sector.

Research carried out by academia is beneficial to society. According to Guraya et al. (2016) in publishing new knowledge, an academic staff provides the world with information and evidence-based innovations. Kosten (2016) points out that indicators of RP serve as a source of information about performance of higher education institutions thus helping the consumers make informed decisions on matters such as choosing an institution for further education. Nakanjako et al. (2017) observe that research by academic staff is relevant to influence national policies to improve delivery of social services.

In conclusion, the significance of RP to stakeholders in higher education suggests a need to enhance RP of academic staff. One way to achieve this need is to have a holistic understanding of the concept and determinants of RP of academic staff. The first objective in this paper is to review literature to bring out how the concept of RP has been defined and measured by previous scholars and the gaps they left for future researchers. The second objective is to review a theory (Mantikayan & Abdulgani, 2018) that suggests predictors of RP. The third objective is to do a meta review, that is, to review literature

reviews on predictors of RP as suggested by the theory in order to isolate gaps and propose hypotheses for future researchers.

Concept and Measurement of Research Productivity
The first objective in this paper is to review literature to bring out how the concept of research productivity (RP) has been defined and measured by previous scholars and the gaps they left for future researchers. To achieve this, we review conceptual papers and conceptual reviews on research productivity respectively.

Conceptual Papers on Research Productivity. This section contains a review of four conceptual papers, that is, papers whose authors take a position (Gilson & Goldberg, 2015) in this case on the concept of RP. Webber (2011) identifies several quantitative measures of RP of academic staff as given by different scholars in the literature including counts of: published and unpublished research documents, conference presentations, and citations. According to Webber, "the number of publications and/or citations is…the central indicator of productivity" (p. 112). However, Webber points out a limitation of using indicators such as publications as a primary measure of RP to the effect that it may disadvantage academic staff in disciplines that do not consider such indicators as key measures of RP.

Wootton (2013) proposes a method of measuring research output, involving three indicators of research output namely: grants income, number of publications and number of doctoral students supervised. He suggests that to calculate a score of research output, the assessor has to convert to points the aforementioned indicators. Abramo and D'Angelo (2014) operationalise the, "economic concept of productivity for the specific context of research activity" (p. 1129). They hence operationalised RP in terms of tangible and intangible research outputs. The tangible research outputs include publications, patents registered and conference presentations. The intangible research outputs comprise of sharing tacit knowledge and involvement in consultancy work. Caminiti et al. (2015) suggest a method to measure research performance of an individual in a healthcare institution. They hence propose 12 indicators for the quantification of research activities and the weighting criterion of each indicator. According to Caminiti et al. the weighting criterion is expected to reflect the effort estimated by the assessor to perform each research activity. The indicators of research activities they proposed include; grants obtained,

peer reviewed articles published, PhD students supervised, patents registered and trainings attended in the field of research methodology.

In summary, the scholars above suggest a number of indicators that can be used by researchers to measure RP which include: number of publications, conference presentations (Abramo & D'Angelo ,2014; Webber, 2011), grants obtained, and number of doctoral students supervised (Caminiti et al., 2015; Wootton (2013). However, Webber points out that, "the number of publications and/or citations is…the central indicator of productivity" (p. 112). Nonetheless, Webber points out a limitation of using indicators such as publications as a primary measure of RP in that it may disadvantage academic staff in disciplines that do not consider such indicators as key measures of research productivity.

Conceptual Reviews on Research Productivity. Conceptual reviews, that is, "papers that compile, summarize, critique, and synthesize the available research information" (Bahishti, 2021) on a given concept on this case research productivity (RP) can be found. In this section, we examine four such reviews. Duffy et al. (2011) carried out a narrative review wherein they provided the, "history of the measurement of RP within psychology" (p. 208). They revealed that, "whereas some studies ha[d] used publication indexes to assess RP across several areas of psychology … other studies ha[d] assessed productivity within specific areas of psychology" (p. 208). They reported that, "over time, authors had began to adopt more sophisticated methods to measure productivity, most notably using… author-weighted publication formula" (p. 209). They pointed out that by the time of their publication, scholars were more interested in measuring RP of individuals within specific disciplines. Duffy et al. critiqued the studies they had reviewed by pointing out that, "the literature in this area [had been] limited in scope, clarity, and standardization" (p. 211).

Patel et al. (2011) did a meta-synthesis of 50 articles to identify indicators that had been used to measure RP of individuals in healthcare. They established that the indicators of RP widely used by researchers had been, "number of publications (n = 38), number of citations (n = 27), impact factor (n = 15), research funding (n = 10), degree of co-authorship (n = 9), and h index (n = 5)" (p. 251). Patel et al. critiqued the studies they had reviewed to the effect that most studies had used, "a single bibliometric database as the only information source" (p. 255). This gap calls for further studies to

either use other data sources such as questionnaires and personal documents, or multiple bibliometric databases to obtain information on RP. They noted that the assessment of feasibility, validity, reliability and acceptability of RP indicators had been poorly studied by scholars. This signifies the need for scholars to carry out psychometric tests on indicators of RP appropriately.

Guraya et al. (2016) reviewed 51 articles to explore the reasons and consequences of the pressure to publish on academic staff in the medical field. They reported that the reasons of pressure to publish had included: recruitment standards, scientific ranking of institutions and publications incentives from pharmaceutical companies. With regard to consequences, they reported that pressure to publish had increased the number of retractions and the incidence of plagiarism. Guraya et al. did not critique the articles they had reviewed. However, given that the articles they had reviewed had been from the medical field, their findings may not be generalised to other disciplines.

Aydin (2017) reviewed literature wherein he sought to present the concept and measurements of RP. Using narrative review Aydin found that scholars in the studies he had reviewed had largely defined RP as research output produced by the academic staff. On the aspect of measurements of RP, Aydin identified 20 variables as measures of RP. Such variables included: articles published, books published, citation count, number of edited books, patent registered, number of papers presented in conference, number of doctoral students supervised and research grants obtained. Aydin did not critique the articles they had reviewed. However, they suggested many indicators of RP making it difficult for scholars to determine the best indicators.

In summary, scholars have broadly defined RP as capacity by academic staff to produce research output (Aydin, 2017). Aydin identified 20 variables as measures of RP. However, Patel et al. (2011) reported that the most widely used indicators of RP by researchers have been a number of publications and citations. Based on the gaps raised by scholars (Duffy et al., 2011; Patel et al., 2011) and the gaps identified by us there is still room for future researchers to study the concept of RP.

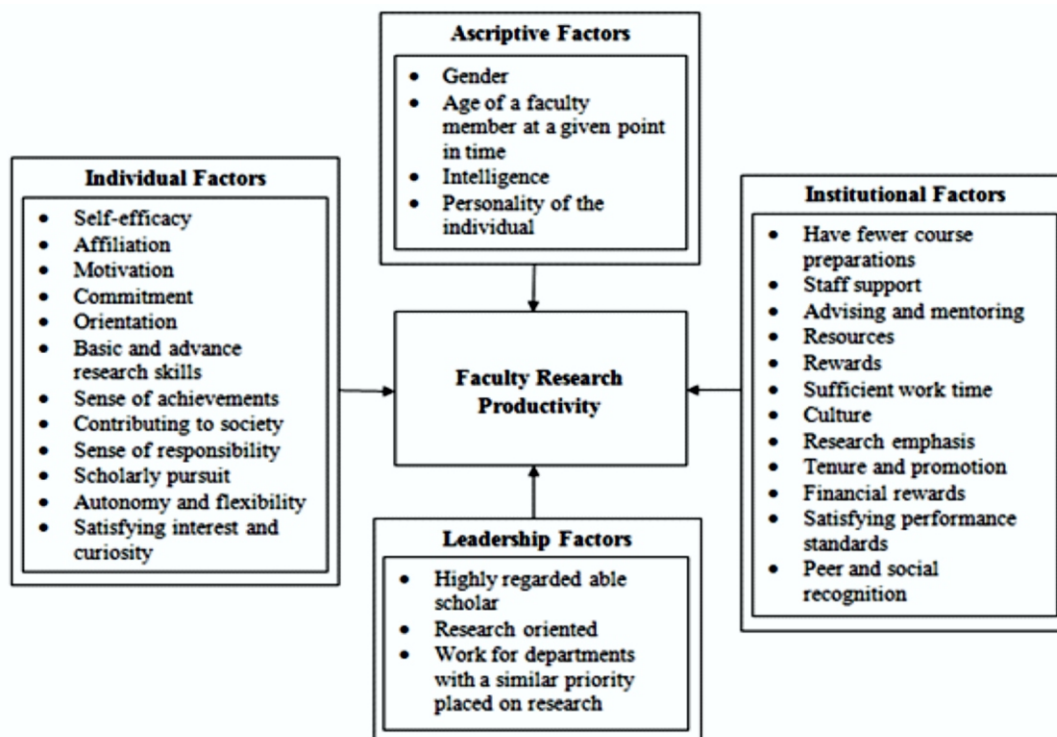**Mantikayan and Abdulgani's (2018) Model of Research Productivity**

Figure 1: Mantikayan and Abdulgani's (2018) Model of Research Productivity of Academic Staff
Note. Sourced from Mantikayan & Abdulgani, 2018, p. 12, Figure 1.

According to the theory or model (Figure 1), the main variable is RP. Mantikayan and Abdulgani (2018) neither gave the general definition nor the operational definition of RP. However, Aydin (2017) defined RP as ability by an academic staff to produce research outputs. Such outputs include: number of published research documents, number of citations, and amount of research grants obtained.

The theory or model (Figure 1) by Mantikayan and Abdulgani (2018) suggests that RP is dependent on four ascriptive factors, 12 individual factors, three leadership factors, and 12 institutional factors. Mantikayan and Abdulgani (2018) did not give the general definition of ascriptive factors. According to Teodorescu (2000), ascriptive factors are the characteristics (e.g., age, gender) of an individual that cannot be controlled by the individual. While Mantikayan and Abdulgani did not give the general definition of individual factors, Wills et al. (2013) defined individual factors (e.g., communication and writing skills, research skills, time management skills) as personal qualities of an individual that the individual can control. Whereas Mantikayan and Abdulgani (2018) did not give the general definition of leadership factors Haizam and Tarmizi (2018) defined leadership factors to denote perception of followers of their leader as being a role model (e.g., possessing research-oriented culture) to them in order for the followers to be research productive. Still Mantikayan and Abdulgani did not give the general definition of leadership factors, but Bland and Schmitz (1986) defined institutional factors as elements relating to the work environment (e.g., resources, rewards, work load, autonomy) that are controlled by the management of the organization.

To develop the model of RP, Mantikayan and Abdulgani had carried out a systematic review of published qualitative and quantitative empirical articles on factors that affected RP of academic staff. Using narrative synthesis, they had summarised 46 articles from the Google Scholar e-database. They hence proposed the RP theory or model (Figure 1). Whereas Mantikayan and Abdulgani (2018) did not critique their own theory or model they asked researchers to validate the theory or model. To find out if scholars responded to their request, we carried out a search in e-databases which included Emerald, ERIC, Journal STORage, Google Scholar, Springer and Taylor and Francis using key phrases, "Mantikayan and Abdulgani (2018)" and "Mantikayan and Abdulgani (2018) theory or model of RP." We did not find any scholar who had tested the theory or model. We can therefore then agree

with Turner et al. (2018) and classify Mantikayan and Abdulgani's (2018) theory or model (Figure 1) as an informal theory meaning a theory that has either not been tested or has only been used in a few studies. Henceforth the need for Mantikayan and Abdulgani's (2018) theory or model to be verified in different academic contexts over time before it becomes a supporting theory for specific academic contexts. It is on the basis of this background that Mantikayan and Abdulgani's (2018) theory or model can be used by scholars to test its validity.

Meta Review

The third objective in this paper is to review literature reviews, that is, "papers that compile, summarize, critique, and synthesize the available research information" (Bahishti, 2021, p.1) in this case predictors of research productivity (RP) as suggested by the theory or model (Figure 1) in order to isolate gaps and propose hypotheses. We have chosen to evaluate reviews because each paper contains several empirical studies and thus in doing so, we are reporting findings of several studies. Guided by the theory or model (Figure 1) in this section we present such reviews in four categories of factors namely: ascriptive, individual, leadership and institutional factors respectively as predictors of RP.

Ascriptive Factors as Predictors of Research Productivity. The first predictor of research productivity (RP) according to the theory or model (Figure 1) is/are ascriptive factors. Reviews on ascriptive factors (e.g., gender, age) and RP are available. We chronologically review two such reviews. Mairesse and Pezzoni (2015) carried out a critical review of 14 empirical studies wherein they studied, "the issue of the gender gap in scientific productivity" (p. 65). They established that, gender (related to gender in Figure 1) to be an important ascriptive factor of RP. Their analysis identified gaps from the studies they had reviewed to the effect that the studies often reported, "heterogeneous and unrelated and sometimes contradictory [results], from which no clear-cut evidence emerges on the main sources of the gender productivity gap" (p. 97). This gap suggests that studies on gender and RP produced inconclusive findings hence need for further studies.

Obuku et al. (2018) carried out a narrative synthesis of 14 articles, "to assess the determinants of post-graduate students' RP" (p. 1) in low- and middle-income countries. They hence found age (related to age in Figure 1) to be a significant

ascriptive factor of RP in that younger students were likely to publish than older students. In their critique, they pointed out that there had been lack of empirical evidence to effectively examine interventions to improve RP and use of research done by post-graduate students in low- and middle-income countries. They noted that the cohort studies they reviewed had not analysed data in a way that would have allowed comparison of groups exposed to specific approaches that improve RP. They noted that, they could hardly draw strong conclusions with only one study reporting the determinants of RP. This is an empirical gap that suggest inadequate studies that examine determinants of RP of post-graduate students in low- and middle-income countries.

Basing on the gaps raised by the above reviews there is still room to test the hypothesis as suggested by the theory or model (Figure 1) to the effect that:
H1: Ascriptive factors positively predict RP of academic staff.

Individual Factors as Predictors of Research Productivity. The second predictor of research productivity (RP) according to the theory or model (Figure 1) is/are individual factors. Reviews on individual factors and RP exist. We review one review (Cerasoli et al., 2014) on 154 such reviews. Cerasoli et al. (2014) carried out a meta-analysis of 154 articles to examine the "interrelationship among intrinsic motivation, extrinsic incentives, and performance" (p. 1). They established, "the joint and relative contribution of intrinsic motivation and extrinsic incentives to performance" (p. 17). They hence found motivation (related to motivation in Figure 1) to be an important individual factor of RP. When critiquing their review they pointed out that most of the studies they had reviewed examined relationship between variables. This is a methodological gap which suggests that most of the studies did not explain the causal relationship (if any) between variables. Thus, need for studies that examine the causal relationship between factors of RP. We can also see empirical gaps in that individual factor of motivation seem to have got most attention of researchers. All the other 11 factors (self-efficacy, affiliation, commitment, orientation, research skills, sense of achievement, contributing to society, sense of responsibility, scholarly pursuit, autonomy and flexibility, satisfying interest, curiosity) seem to have been disregarded by scholars. Thus, need for studies to test whether individual factors more especially the 11 factors are predictors of RP. These gaps warrant further studies to test the hypothesis

suggested by the theory or model (Figure 1) to the effect that:

H2: Individual factors positively predict RP of academic staff.

Leadership Factors as Predictors of Research Productivity. The third predictor of research productivity (RP) according to the theory or model (Figure 1) is/are leadership factors. Studies on leadership factors as predictors of RP can be found. We are citing reviewers (Heng et al., 2020) who in a meta-synthesis of 65 articles found that participative leadership style to be among the factors that positively affecting research engagement and productivity of academic staff. Heng et al. critiqued the studies they had reviewed to the effect that they had been limited to developed countries context. They identified empirical gaps to the effect that studies reported contradictory findings on factors determining RP. We can see an empirical gap in that Heng et al. did not find leadership factors as suggested by the model or theory (Figure 1) to be related to RP. Hence, a need to find out whether leadership factors (highly regarded able scholar, research oriented) predict RP. Basing on the gap Heng et al. advanced and the gaps we raised there is a need for further studies to test the hypothesis suggested by the theory or model (Figure 1) to the effect that:

H3: Leadership factors positively predict RP of academic staff.

Institutional Factors as Predictors of Research Productivity. The third predictor of research productivity (RP) according to the theory or model (Figure 1) is/are institutional factors. Reviews on institutional factors and RP are available. We chronologically review three reviews. Ahmed et al. (2015) carried out a qualitative synthesis of 30 articles to identify, "interventions aimed at building capacity for education research among health professions clinical educators and… outcomes of these interventions" (p. 1). They identified seven groups of interventions whereby the most frequent interventions were, "teaching scholars programs…, [and] health professions education fellowships… or master's programs" (p. 1). With regard to outcome of intervention they reported that the most commonly measured outcome of post-intervention was change in terms of enhanced scholarly outputs such as grants obtained, papers published, and research presentations. They hence found interventions aimed at building capacity for education research (related to advising and mentoring in Figure 1) to be

significant institutional factors of RP. Ahmed et al. raised gaps from the studies they had reviewed which they categorised into four groups namely: "(1) provision of inadequate intervention detail, (2) lack of theoretical underpinning, (3) use of, outcomes with questionable validity and/or meaning, and (4) lack of suitable study design for the research questions posed" (p. 10).

Hafsteinsdóttir et al. (2017) did a systematic review of 15 articles, "to synthesise the published evidence on the e ectiveness of… mentorship on the research productivity…. of postdoctoral nurses" (p. 22). They found that mentoring (related to mentoring in Figure 1) enhances RP of postdoctoral nurses. Hafsteinsdóttir et al. critiqued the studies they had reviewed to the effect that they obtained only two studies that investigated mentoring and RP. This gap suggests that studies on mentoring and RP are limited hence, need for more studies in this area. Hafsteinsdóttir et al. pointed out that the studies they had reviewed lacked strong designs. They went on to point out that studies on mentoring for postdoctoral nurses were limited to the US, UK, Jordan and Australia. Hafsteinsdóttir et al. as well critiqued their own review. However, the gaps they had raised suggest gaps from the studies they had reviewed. For example, they noted that the quantitative studies they reviewed did not randomize respondents and had mainly use descriptive designs.

Wood et al. (2018) carried out a meta-analysis of 32 articles to identify initiatives used by Graduate Medical Education programs to increase scholarly activity of intern, resident, or fellow of graduate medical education discipline. They established that the three most used interventions were mentoring, research curricula, and protected time. They hence found initiatives such as mentoring (related to related advising and mentoring in Figure 1) to be an important institutional factor of RP. Wood et al. critiqued the studies they had reviewed by noting that many of the articles failed to specify whether or not the improvements in RP had been statistically significant. This implied that the extent to which the identified initiatives had determined RP remained uncertain. They noted that the authors of the studies used small sample sizes. They pointed out that the design of the studies they had reviewed have been varied, hence they noted that changes in the publication rate may had been due to factors outside of the implementation of an initiative. Basing on the gaps identified by the above scholars there is need for further studies to test the hypothesis suggested

by the theory or model (Figure 1) to the effect that:

H4: Institutional factors positively predict RP of academic staff.

Conclusion

The first objective in this paper was to bring out how the concept of research productivity (RP) has been defined and measured by previous scholars and the gaps they left for future researchers. RP had been broadly defined as capacity by academic staff to produce research output (Aydin, 2017). Despite several indicators that can be used to measure RP the scholars (Patel et al., 2011; Webber, 2011) report that most widely used indicators of RP by researchers have been a number of publications and citations. Hence, need for future studies to use more measures of RP such as: grants obtained, and number of doctoral students supervised, conference presentations and patents registered). Duffy et al. (2011) pointed out that, "the literature in this area [measures of RP] is limited in scope, clarity, and standardization" (p. 211). Thus, need for studies in RP in wider scope, clarity and standardization. The second objective, in this paper was to review a theory or model (Mantikayan and Abdulgani's, 2018) that suggests predictors of RP. Mantikayan and Abdulgani (2018) suggests that RP is dependent on four ascriptive factors, 12 individual factors, three leadership factors, and 12 institutional factors. We did not find any scholar who tested the theory or model to find out its relevance. It is on the basis of this background that Mantikayan and Abdulgani's (2018) theory or model can be used by scholars to test its validity. The third objective in this paper was to review literature reviews, on predictors of RP as suggested by the theory or model (Figure 1) in order to isolate gaps and propose hypotheses. This review revealed that there is evidence some aspects such as gender (Mairesse & Pezzoni, 2015), motivation (Cerasoli et al., 2014) and mentoring (Wood et al., 2018) are important factors of research productivity. However, the gaps raised in the reviews including contradictory results (Mairesse & Pezzoni, 2015), small sample (Wood et al., 2018) and the gaps identified by us warrant further studies to test the four-hypothesis suggested by the theory or model (Figure 1).

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