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Career Progression as the Missing Link in Academic Productivity: A Systematic and Bibliometric Review of Human Capital, Workload, and Institutional Context

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ABSTRACT: Academic productivity is often modelled as the direct consequence of individual capability, research resources, workload, and institutional support. Such models are useful but incomplete because they understate the institutional process through which these inputs are converted into durable advantages. This study advances career progression as the missing linking mechanism between human capital, workload, institutional context, and academic productivity. A systematic evidence synthesis and bibliometric mapping were conducted on a curated corpus of 50 DOI-verified articles published between 2020 and 2025 in four SJR Q1 journals: *Scientometrics*, *Higher Education*, *Studies in Higher Education*, and *Research Policy*. The corpus contained 146 unique authors; 84% of the articles were multi-authored, with an average of 3.04 authors per article. Bibliometric mapping of normalized thematic keywords identified 20 recurrent terms connected through 75 co-occurrence links and five thematic communities. Productivity was the most frequent term, followed by institutional context, gender, funding, career progression, collaboration, and human capital. The temporal structure of the map indicates a shift from broad debates on funding and publication toward career progression, early-career conditions, research evaluation, authorship, and longitudinal trajectories. The systematic synthesis shows that human capital and prior research performance generate cumulative advantages, but these advantages are neither automatic nor institutionally neutral. Workload allocation, promotion criteria, research funding, mobility, prestige, collaboration, and gendered opportunity structures determine whether individual capabilities are translated into rank, autonomy, resources, and sustained output. The study therefore proposes a dynamic resource-conversion model in which career progression functions both as a mediator and a feedback mechanism: productivity improves advancement prospects, while advancement redistributes resources that can further amplify productivity. This interpretation integrates fragmented higher-education and science-of-science literatures and offers a testable agenda for longitudinal, multi-level, and cross-national research.

1. INTRODUCTION

Universities increasingly govern academic work through measurable outputs, promotion standards, competitive funding, and differentiated career tracks. Within this environment, research productivity is not merely an outcome of scholarly activity; it affects hiring, tenure, promotion, compensation, prestige, and access to future resources. Evidence from research-management studies shows that publication performance is shaped by organizational structures, research culture, task environments, and

resource allocation, while longitudinal studies indicate that productivity differences can persist across academic careers rather than disappear with seniority (Ryazanova & Jaskiene, 2022; Kwiek & Roszka, 2024; Fox & Nikivincze, 2021). The central analytical problem is therefore not only why some academics publish more than others, but how universities convert differences in capability and working conditions into durable differences in career position and subsequent productivity.

Human capital has traditionally provided the most intuitive explanation. Advanced education, accumulated research experience, methodological competence, disciplinary knowledge, and prior publication success increase the capacity to produce research. Empirical work in German political science, for example, links accumulated human capital and third-party funding to higher output, while broader higher-education research associates doctoral training and intellectual capital with academic performance and institutional capability (Habicht et al., 2021; Sarrico, 2022; Pedro et al., 2021). Yet human capital is not self-executing. Its value depends on whether institutions recognize it, reward it, and provide the time, infrastructure, networks, and career opportunities through which it can be mobilized.

Career progression is the institutional arena in which this conversion occurs. Academic job advertisements across countries reveal that qualifications and achievements matter throughout the career, while expectations concerning mobility, fundraising, teaching, outreach, and leadership become more salient as academics approach senior ranks (Mantai & Marrone, 2023). Research on internal mobility and career models similarly shows that promotion pathways are affected by institutional career scripts, international mobility, nationality, and the organization of academic roles (Seeber et al., 2023; Benz et al., 2021; Whitchurch et al., 2021). These studies imply that rank is not simply a demographic characteristic or control variable; it embodies accumulated institutional decisions about whose human capital, output, mobility, and service are converted into status.

Workload further complicates the relationship. Academic jobs combine research, teaching, administration, supervision, and service, but these activities do not carry equivalent value in promotion systems. Education-focused academics may perform institutionally essential work while facing weaker advancement opportunities, whereas research-intensive pathways can reward outputs produced under more favorable time allocations (Bull et al., 2025; Whitchurch et al., 2021; van Dalen, 2021). Disruptions such as the COVID-19 pandemic also demonstrated that productivity is sensitive to changes in available research time and domestic or organizational burdens, with effects that can accumulate differently across groups and career stages (Püttmann & Thomsen, 2025; Walters et al., 2022). Thus, workload is best understood not only as a direct determinant of output but also as a mechanism that alters the probability of career advancement.

Institutional context shapes these processes through funding, evaluation, prestige, and performance incentives. Funding may expand research capacity, but its association with productivity is heterogeneous and potentially endogenous; some studies report weak or context-dependent links, while others emphasize the importance of public funding and talent schemes for output, recognition, and innovation (Mariethoz et al., 2021; Heyard et al., 2021; Yu et al., 2022). Evaluation regimes can also change behavior by making publication strategies, rankings, and measurable performance more consequential for careers, particularly when institutional incentives are short-term or prestige-sensitive (Fry et al., 2023; Groen-Xu et al., 2023; Scheidegger et al., 2023). Consequently, the same level of human capital may produce very different career and productivity outcomes across institutional settings.

The literature also shows that these conversion processes are socially stratified. Gender gaps appear in publishing, citations, co-authorship, compensation, funding opportunities, and career trajectories, even when differences in output are modest or discipline specific (Samaniego et al., 2023; Jamali & Abbasi, 2023; Kwiek & Roszka, 2022). Studies of funding systems and academic trajectories further suggest that small early inequalities can accumulate into substantial later differences because research opportunities, recognition, and seniority are recursively connected (Lawson et al., 2021; Sato et al., 2021; Aksnes et al., 2025). Treating career progression as a mediating institutional process therefore offers a way to connect individual, organizational, and inequality-focused explanations that are often studied separately.

Against this background, this study asks three questions. First, how has recent Q1 scholarship between 2020 and 2025 structured the relationship among academic productivity, human capital, workload, institutional context, and career progression? Second, which thematic clusters and emerging topics are visible in the bibliometric structure of this literature? Third, can career progression provide an integrative mechanism that explains how resources and constraints are transformed into sustained differences in academic productivity? The contribution is conceptual as well as empirical: rather than treating academic rank as an endpoint or control variable, the review positions career progression as a dynamic resource-conversion mechanism embedded in feedback loops of cumulative advantage.

2. METHODS

2.1 Review design and corpus construction

This study used a systematic evidence-synthesis design combined with bibliometric mapping. The substantive review corpus consisted of 50 journal articles published from 2020 through 2025 and stored in a DOI-verified RIS dataset. The corpus was deliberately restricted to four journals classified as SJR Q1 in the 2024 SCImago snapshot—*Scientometrics*, *Higher Education*, *Studies in Higher Education*, and *Research Policy*—to prioritize theoretically influential and methodologically visible research at the intersection of higher education, science studies, and research policy. The review therefore emphasizes analytical depth and thematic coherence rather than claiming exhaustive coverage of every journal in the field.

The search logic was organized around four conceptual blocks: academic productivity, career progression, human capital/workload, and institutional context. A reproducible Scopus-oriented query for final database replication is: TITLE-ABS-KEY(("academic productivity" OR "research productivity" OR "scholarly productivity" OR "faculty productivity") AND ("career progression" OR "academic career" OR tenure OR promotion OR rank OR "career advancement") AND ("human capital" OR workload OR funding OR mobility OR collaboration OR "institutional context" OR university OR faculty)) AND PUBYEAR > 2019 AND PUBYEAR < 2026 AND LIMIT-TO(LANGUAGE, "English"). Articles were retained when they addressed at least one causal or institutional link connecting academic work, career structure, resources, mobility, funding, evaluation, or productivity. Records without an active DOI, records outside 2020–2025, duplicates, and clearly off-topic studies were excluded during corpus construction.

A key transparency decision was not to reconstruct identification-stage PRISMA counts retrospectively. The working RIS file was curated before manuscript drafting and preserves the final included corpus but not a complete audit trail of all records initially retrieved from each database. Reporting invented identification, duplicate-removal, or screening counts would violate systematic-review reporting standards. Accordingly, the present manuscript reports the verified final sample ($n = 50$) and the explicit eligibility logic; before journal submission, the search should be rerun directly in Scopus and the exact PRISMA 2020 flow counts archived and inserted (Page et al., 2021). This limitation does not affect the descriptive statistics calculated from the final corpus, but it should be resolved for a definitive systematic-review submission.

Table 1. Eligibility criteria for the working review corpus

Criterion	Included	Excluded
Publication period	2020–2025	Before 2020 or after 2025
Outlet quality	Four journals classified SJR Q1 in the 2024 snapshot	Non-target journals for this curated corpus
Topical scope	Academic productivity, career progression, human capital, workload, funding, evaluation, mobility, collaboration, institutional context	No substantive connection to academic careers or productivity
Document integrity	Journal article/review with DOI	Duplicate, missing DOI, or clearly non-research item
Language	English	Non-English

2.2 Bibliometric and thematic analysis

For bibliometric analysis, bibliographic fields were parsed from the RIS dataset, including publication year, journal, authors, DOI, and normalized thematic keywords coded during screening from article titles and topic-level metadata. The analysis calculated annual publication counts, source concentration, unique authors, authors per article, single- versus multi-authorship, thematic-term frequency, term co-occurrence, total link strength, and average publication year. Terms occurring in at least two documents were retained for network mapping. Co-occurrence links were weighted by the number of documents in which each pair of terms appeared together. Community structure was detected using modularity-based network clustering. The network

was exported as VOSviewer-compatible map, network, and JSON files so that the structure can be opened and reclustered in VOSviewer (Van Eck & Waltman, 2010).

The bibliometric layer was interpreted jointly with a qualitative synthesis of the 50 studies. Coding focused on five recurring explanatory domains: human capital and prior performance; workload and time allocation; funding, evaluation, and institutional prestige; mobility and collaboration; and career progression, including tenure, rank, promotion, and career-stage transitions. A sixth cross-cutting domain—gendered and structural inequality—was coded because it repeatedly conditioned relationships among the five main domains. Rather than counting every positive or negative association as equivalent evidence, the synthesis distinguished descriptive, cross-sectional, longitudinal, quasi-experimental, and review-based findings where this was identifiable from article design and framing.

3. RESULTS

3.1 Corpus profile and publication trend

The final corpus comprised 50 Q1 journal articles published between 2020 and 2025. Publication activity was concentrated in 2021–2023: 3 articles appeared in 2020, 12 in 2021, 11 in 2022, 12 in 2023, 8 in 2024, and 4 in 2025. Because the sample was intentionally restricted to a curated set of journals and themes, these counts should not be interpreted as a field-wide growth or decline indicator. They instead show where the selected evidence base is temporally concentrated. The 2021–2023 concentration is consistent with the period in which the literature increasingly addressed pandemic disruption, research evaluation, funding, mobility, and career inequality alongside established questions about productivity.

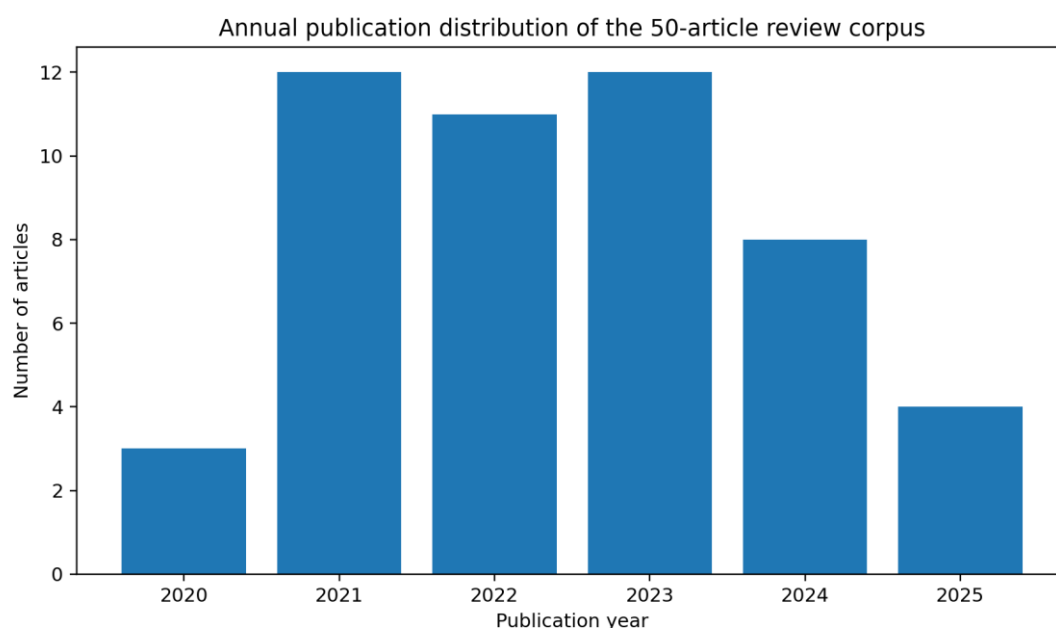


Figure 1. Annual publication distribution in the curated 50-article corpus.

3.2 Source and authorship structure

Scientometrics contributed 20 articles (40%), Higher Education 14 (28%), Research Policy 10 (20%), and Studies in Higher Education 6 (12%). This source structure gives the review a deliberately interdisciplinary character. Scientometrics contributes measurement, publication, funding, and inequality perspectives; Higher Education and Studies in Higher Education contribute career, mobility, role, and institutional analyses; and Research Policy contributes stronger attention to funding, evaluation regimes, incentives, and policy interventions. The corpus contained 146 unique authors, with an average of 3.04 authors per article. Eight papers were single-authored and 42 were multi-authored, meaning 84% of the corpus involved collaboration. Marek Kwiek was the most recurrent author in the selected set, appearing on six articles, while most authors appeared once, indicating low author concentration despite strong source concentration.

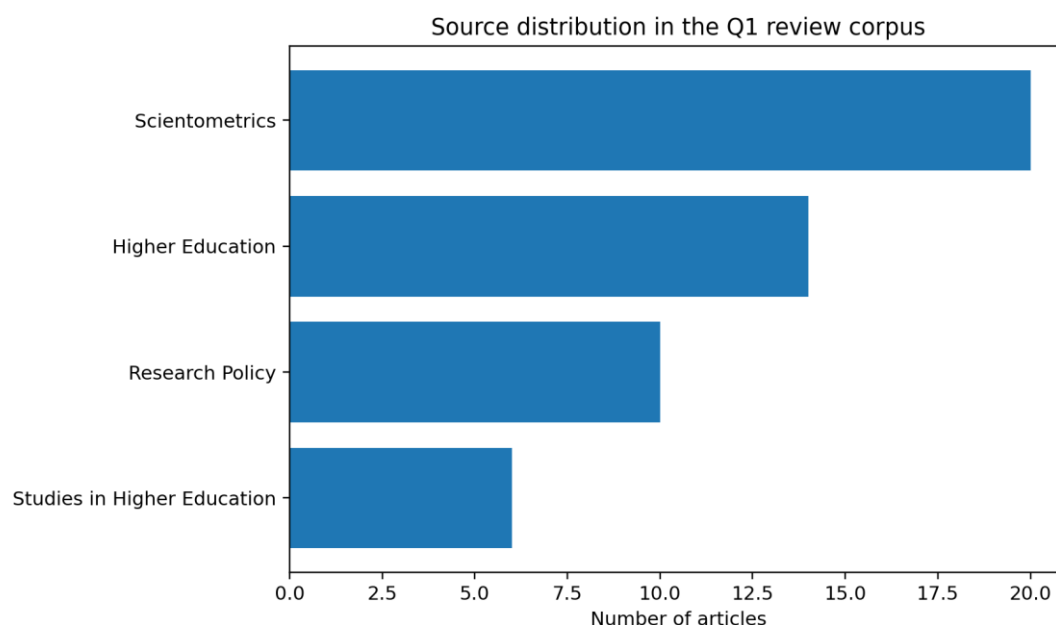


Figure 2. Distribution of articles across the four SJR Q1 journals.

Table 2. Descriptive bibliometric profile

Indicator	Value
Articles	50
Publication years	2020–2025
Unique authors	146
Mean authors per article	3.04
Single-authored papers	8 (16%)
Multi-authored papers	42 (84%)
Scientometrics	20 (40%)
Higher Education	14 (28%)
Research Policy	10 (20%)
Studies in Higher Education	6 (12%)
Thematic nodes retained	20
Co-occurrence links	75
Network clusters	5

3.3 Thematic co-occurrence structure

The thematic co-occurrence network retained 20 terms with at least two occurrences and generated 75 weighted links organized into five algorithmic communities. Productivity was the most frequent term (18 documents; total link strength = 31), followed by institutional context (14; 26), gender (12; 26), funding (10; 23), career progression (8; 13), academic careers (7; 14), collaboration (7; 13), human capital (6; 11), research productivity (6; 9), and mobility (5; 13). Workload appeared in four documents but was closely connected to the academic-career cluster, reflecting its role as a constraint that is often discussed inside career-pathway studies rather than as a stand-alone bibliometric theme.

Cluster 1 combined career progression, institutional context, gender, research productivity, academic careers, authorship, and longitudinal analysis. Its structure suggests that contemporary productivity research is increasingly embedded in questions about who advances, under what rules, and with what cumulative consequences. Cluster 2 grouped productivity, funding, incentives, research evaluation, and early-career conditions, capturing a policy-governance perspective in which resources and performance systems shape both output and future opportunity. Cluster 3 linked mobility, prestige, and career; Cluster 4 connected human capital, collaboration, and publication; and Cluster 5 linked workload directly with the academic career. Together, the five communities support a layered interpretation in which individual capability, organizational resources, career structures, and network position are interdependent rather than separable.

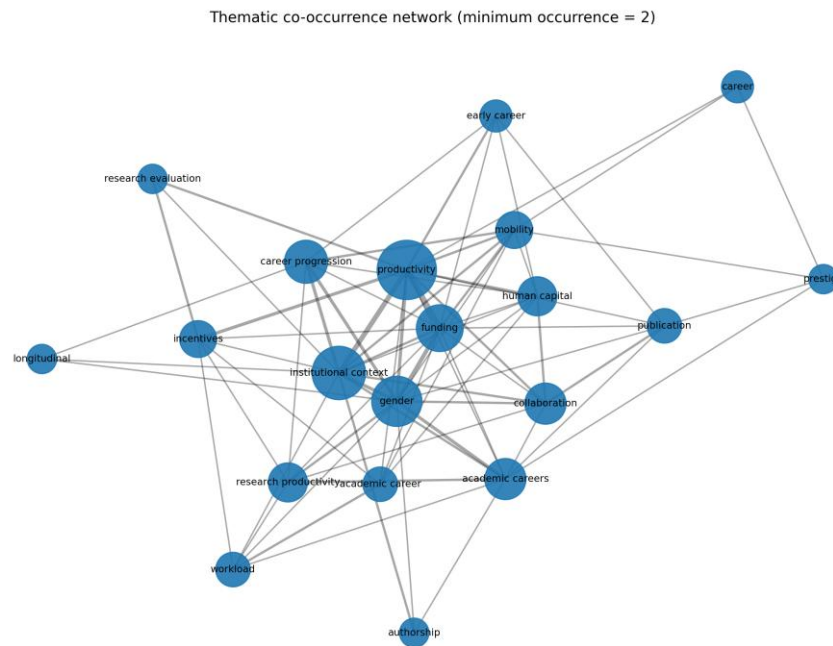


Figure 3. Thematic co-occurrence network based on normalized keywords (minimum occurrence = 2).

Table 3. Leading terms in the thematic co-occurrence network

Term	Occurrences	Total link strength	Average publication year
productivity	18	31	2022.17
institutional context	14	26	2022.50
gender	12	26	2022.42
funding	10	23	2021.50
career progression	8	13	2023.00
academic careers	7	14	2022.71
collaboration	7	13	2022.86
human capital	6	11	2022.50
research productivity	6	9	2022.83
mobility	5	13	2022.20
incentives	5	10	2022.20

workload	4	7	2022.25
early career	3	6	2023.00
research evaluation	2	5	2023.00
longitudinal	2	3	2025.00

Table 4. Interpretation of the five thematic clusters

Cluster	Interpretive label	Core terms	Interpretation
Cluster 1	Structural career pathways and inequality	career progression; institutional context; gender; research productivity; academic careers; authorship; longitudinal	Promotion structures and institutional rules shape unequal career-to-productivity pathways.
Cluster 2	Productivity incentives and evaluation	productivity; funding; incentives; research evaluation; early career	Resources and performance regimes influence both immediate output and future career opportunities.
Cluster 3	Mobility and prestige capital	mobility; prestige; career	Mobility can alter access to status, networks, and institutional resources, but its returns are context dependent.
Cluster 4	Human and collaborative capital	human capital; collaboration; publication	Knowledge, experience, and research networks operate jointly rather than as independent productivity inputs.
Cluster 5	Workload and academic career	workload; academic career	Time allocation is a binding constraint that links teaching/service obligations to career and research outcomes.

3.4 Temporal overlay and emerging themes

The temporal overlay reinforces this interpretation. Funding and publication were, on average, associated with earlier papers in the review period, whereas career progression, early-career conditions, research evaluation, authorship, and especially longitudinal analysis had more recent average publication years. The term longitudinal had an average publication year of 2025, while career progression and early career averaged 2023. This shift is analytically important because it moves the field away from static correlations and toward temporal mechanisms. If productivity both influences and is influenced by promotion, funding, mobility, and institutional prestige, cross-sectional models can misattribute cumulative career processes to individual traits.

3.5 Integrated evidence synthesis

The qualitative synthesis produced a consistent higher-order pattern. Human capital and prior achievement create capacity, but capacity is filtered through workload, resource access, institutional evaluation, and opportunities for advancement. Promotion and seniority can then change access to research time, networks, funding, autonomy, and recognition, potentially feeding back into later productivity. Conversely, stalled progression can lock academics into heavier teaching or service roles, weaker access to prestige resources, or lower expected returns from research investment. This recursive pattern is visible across studies of long-run productivity, career models, mobility, funding, tenure systems, and gendered inequality (Kwiek & Roszka, 2024; Mantai & Marrone, 2023; Seeber et al., 2023).

4. DISCUSSION

The results support a shift from a static determinants model toward a dynamic career-process model. Seven themes are discussed below to explain how individual resources, work organization, institutional rules, and social stratification interact through career progression.

4.1 Human capital and cumulative advantage

The first theme concerns human capital, but the synthesis suggests that conventional human-capital models require a temporal extension. Education, research experience, prior publication, and accumulated methodological competence are valuable because they lower the marginal cost of producing subsequent research and increase the probability of entering higher-opportunity networks. Habicht et al. (2021) show that accumulated human capital and third-party funding are associated with higher productivity, while studies of early publication and long-run research trajectories suggest that initial success can predict later scholarly advantage (Hou et al., 2022; Goyanes et al., 2022). Longitudinal evidence on full professors likewise indicates that productivity is path dependent rather than randomly redistributed across the career (Kwiek & Roszka, 2024).

However, the review cautions against interpreting path dependence as evidence of fixed individual ability. Productivity is highly skewed across scientists, and observed differences can reflect organizational placement, resource access, collaboration opportunities, and cumulative recognition as much as stable personal traits (Bornmann, 2024; Fox & Nikivincze, 2021; Schneijderberg et al., 2022). Human capital therefore creates potential rather than deterministic output. The key institutional question is whether universities convert that potential into promotion, protected research time, funded projects, and network access. In this sense, career progression is the institutional return on accumulated human capital, and unequal advancement can amplify initially modest differences.

This interpretation also clarifies why doctoral education and intellectual capital matter beyond credentials. Doctoral expansion changes the supply and role expectations of highly trained researchers, while intellectual-capital perspectives emphasize that knowledge assets generate institutional value only when they are organized, mobilized, and supported (Sarrico, 2022; Pedro et al., 2021). A productive research career is therefore not adequately represented by the linear equation human capital → publications. A more realistic sequence is human capital → recognized performance → career advancement → enhanced resources → subsequent productivity, with feedback from each stage to the next.

4.2 Workload, time scarcity, and the productivity paradox

The second theme concerns workload. Academic productivity is produced under a fixed time budget, yet universities distribute teaching, administration, service, supervision, and research unevenly. The literature on academic career models shows that role configurations can become hybrid and accelerated, increasing the number of simultaneous expectations placed on academics (Benz et al., 2021; Whitchurch et al., 2021). Publish-or-perish environments further intensify these pressures by making research output consequential for career security even when teaching and service remain operationally indispensable (van Dalen, 2021; Scheidegger et al., 2023).

The important insight is that workload can affect productivity indirectly through promotion opportunities. Bull et al. (2025) document the career-progression difficulties experienced by education-focused academics in research-intensive universities, illustrating how institutionally valued teaching may not translate into equivalent promotional capital. Pandemic research similarly shows that disruptions to research time can produce uneven productivity shocks, particularly when professional and personal demands interact (Püttmann & Thomsen, 2025; Walters et al., 2022). Thus, a heavy teaching or service load is not only an

immediate time constraint; it can alter the probability of entering a higher rank that might later provide greater autonomy, authority, or resource access.

This produces a productivity paradox. Institutions require teaching and service for organizational functioning, but when promotion systems disproportionately reward research outputs, academics who perform more collective labor may accumulate less career capital. Over time, the consequence can be endogenous stratification: research-intensive academics receive promotions and resources that facilitate further research, while teaching-intensive academics remain in roles that continually restrict research time. Future work should therefore model workload allocation and career progression jointly rather than treating workload as an exogenous independent variable.

4.3 Career progression as a resource-conversion mechanism

The third and central theme is career progression itself. Existing studies show that academic advancement depends on different combinations of qualifications, publication records, mobility, teaching, fundraising, outreach, and institutional fit across career stages (Mantai & Marrone, 2023; Seeber et al., 2023; Bojica et al., 2023). Tenure-track systems likewise influence research behavior by changing incentives, time horizons, collaboration strategies, and the perceived returns to publication (Yang et al., 2024). Career progression should therefore be conceptualized as an organizational mechanism that converts multiple forms of capital into formal rank and associated resources.

This mechanism is more than symbolic. Promotion can modify salary, job security, decision authority, access to research assistance, eligibility for grants, supervision capacity, and visibility in collaboration networks. Mobility studies show that career transitions and institutional moves alter the opportunity structure surrounding researchers, although the returns to mobility vary by destination prestige, career stage, and national context (Holding et al., 2024; Baruffaldi et al., 2020; Shen et al., 2022). The implication is that rank and mobility are not merely outcomes of productivity; they change the production function that generates subsequent output.

The missing-link argument therefore has a reciprocal form. Productivity can improve advancement prospects, but advancement can also improve the conditions for productivity. Conventional cross-sectional regressions that place rank on the right-hand side of a productivity equation risk controlling away part of the mechanism they seek to explain. Longitudinal and event-history designs are better suited to separating selection into promotion from post-promotion changes in output. The recent shift toward longitudinal career analysis in the reviewed corpus is consequently not a methodological detail; it is necessary for identifying the direction of causality.

4.4 Institutional context, funding, evaluation, and prestige

The fourth theme concerns institutional context. Funding is one of the most connected terms in the bibliometric network, but the literature does not support a simple assumption that more funding automatically causes more output. Studies have questioned direct funding-productivity correlations and emphasized selection, reverse causality, disciplinary differences, and measurement choices (Mariethoz et al., 2021; Heyard et al., 2021; Lawson et al., 2021). Other work shows that public research funding, talent funding, and institutional resource environments can affect academic output and innovation, especially where baseline resources are scarce or where funding carries prestige as well as money (Yu et al., 2022; Li et al., 2024; Thelwall et al., 2023).

Evaluation systems add another layer because they change the expected returns to different academic behaviors. Evidence from Indonesia and the UK shows how researcher rankings and evaluation frameworks can create incentives that influence strategic publication behavior and short-term performance responses (Fry et al., 2023; Groen-Xu et al., 2023). Journal prestige itself functions as a form of academic currency, potentially shaping both career opportunities and the perceived value of research outputs (Kwiek, 2021a; Scheidegger et al., 2023). These mechanisms connect institutional policy directly to career progression: evaluation rules determine which outputs are convertible into rank.

Institutional context is therefore not a background variable. It is the rules-of-conversion system through which human capital, workload, publications, funding, and collaboration acquire career value. The same publication portfolio may yield different advancement prospects across universities, disciplines, countries, and contract types. This interpretation explains why organizational studies consistently identify culture, structure, task environment, and resource allocation as manageable drivers of research productivity (Ryazanova & Jaskiene, 2022; Fox & Nikivincze, 2021). It also implies that productivity policy should

focus less on generic incentives and more on the alignment between workload, evaluation criteria, resource allocation, and transparent career pathways.

4.5 Gendered pathways and unequal returns to productivity

The fifth theme concerns gendered inequality. Gender appears among the most frequent and most connected terms in the network, indicating that productivity research is inseparable from questions of unequal opportunity and reward. Studies report gender differences in solo publishing, publication and citation patterns, authorship representation, and predicted impact, although the magnitude and direction vary across disciplines and contexts (Kwiek & Roszka, 2022; Jamali & Abbasi, 2023; Kuppler, 2022). Authorship itself can also become a contested institutional resource, with cross-disciplinary evidence showing that credit allocation and authorship conflict are part of the organizational conditions surrounding academic production (Molwitz et al., 2023; Savchenko & Rosenfeld, 2024). Such heterogeneity is important because it argues against a single universal “gender productivity gap” and toward analysis of the institutional processes that generate different returns from similar achievements.

Compensation provides a clear example. Samaniego et al. (2023) show that the relationship between cumulative research productivity and pay can differ by gender and disciplinary context. Funding systems and peer-review pipelines may also produce unequal opportunities even when formal criteria appear neutral, while topic choice and mission-oriented funding can embed gendered patterns into resource allocation (Sato et al., 2021; Lawson et al., 2021; Mancuso et al., 2023). When career progression depends on outputs generated under unequal access to resources, apparently meritocratic promotion systems can reproduce structural inequalities.

The review also points to policy interventions and career-stage evidence. Gender-equality evaluation, affirmative-action programs, and longitudinal studies of PhD recipients illustrate that inequalities can arise at different points in the career pipeline and may respond differently to institutional interventions (Bührer et al., 2020; Fernandes et al., 2023; Aksnes et al., 2025). The missing-link model helps organize these findings: gender can affect workload, funding, authorship opportunities, mobility, and recognition; these in turn affect career progression; and career position subsequently influences access to the resources required for sustained productivity. The relevant unit of analysis is therefore the career process, not merely annual publication counts.

4.6 Mobility, collaboration, and network capital

The sixth theme concerns mobility and collaboration. International collaboration can expand access to complementary expertise, infrastructure, reputational signals, and publication opportunities, but the returns depend strongly on institutional and national context. Evidence from resource-poor systems and large-scale European publication data shows that internationally oriented researchers often occupy different productivity and prestige positions than locally oriented peers (Kwiek, 2020; Kwiek, 2021b; Marginson, 2022). Collaboration is thus both a production strategy and a form of social capital that can affect visibility and career opportunity.

Mobility is similarly ambiguous. International mobility can improve access to prestigious environments and broader networks, yet its benefits are heterogeneous and may depend on whether the move changes institutional resources or merely geographical location (Holding et al., 2024; Bojica et al., 2023; Seeber et al., 2023). Mobility grants can alter researchers’ trajectories by lowering the cost of entering new networks, while doctoral collaboration patterns show that network formation begins well before senior academic rank (Baruffaldi et al., 2020; Cugmas et al., 2024). These findings support the idea that mobility and collaboration are forms of career capital whose productivity effects are partly mediated through subsequent positions and affiliations.

At the micro level, the determinants of international collaboration include both individual and collective conditions, reinforcing the need for multi-level models (de Frutos-Belizón et al., 2024). At the institutional level, collaboration can be encouraged or constrained by evaluation systems, funding programs, and prestige hierarchies. Future studies should therefore distinguish mobility that changes career opportunity from mobility that merely changes location, and collaboration that redistributes intellectual work from collaboration that mainly adds reputational signals. Such distinctions are essential for testing whether network capital raises productivity directly or primarily by improving career progression.

4.7 An integrated dynamic model and future research agenda

The seventh theme integrates the preceding evidence into a dynamic model. The bibliometric network shows that productivity is centrally connected to institutional context, gender, funding, career progression, collaboration, human capital, mobility, incentives, and workload. The systematic synthesis suggests that these variables are linked through a sequence of resource conversion and feedback rather than through independent additive effects. Human capital increases productive capacity; workload determines the time available to activate that capacity; institutional context determines which outputs are recognized; career progression converts recognized performance into rank and resources; and the new resource position influences later productivity. Gender, discipline, and national systems condition each conversion point.

This framework helps reconcile apparently inconsistent findings. Funding may appear weakly associated with productivity when high-productivity researchers select into funding, but funding may still influence promotion, network access, and future opportunity. Mobility may not consistently raise immediate publication counts, yet it can alter prestige and career pathways. Heavy teaching may not always reduce short-run output, but it can limit the accumulation of career capital over longer periods. Similarly, highly productive professors may remain productive not because productivity is an immutable personal trait but because prior success has already changed their institutional position and opportunity structure (Mariethoz et al., 2021; Holding et al., 2024; Kwiek & Roszka, 2024).

The most important research implication is methodological. Future studies should use longitudinal person-year data, event-history models for promotion, fixed-effects or correlated-random-effects models for productivity, and mediation or dynamic structural-equation approaches that allow reciprocal relationships between productivity and career progression. Cross-national designs should explicitly model differences in tenure systems, promotion criteria, public versus private governance, and funding regimes. Research should also separate quantity, quality, visibility, and societal impact rather than using a single publication count, because publication diversity and prestige can generate different career returns (Goyanes et al., 2022; Kwiek, 2021a; Bornmann, 2024).

A second implication concerns organizational design. Universities seeking higher productivity should not treat academics as isolated production units. Policies need to align workload allocation, mentoring, research infrastructure, transparent promotion criteria, funding access, mobility support, and recognition of teaching and service. The model predicts that interventions will have stronger long-term effects when they improve both immediate research conditions and the probability that productive effort is converted into career advancement. This proposition is testable and provides a direct bridge between human-resource management in universities and the science-of-science literature.

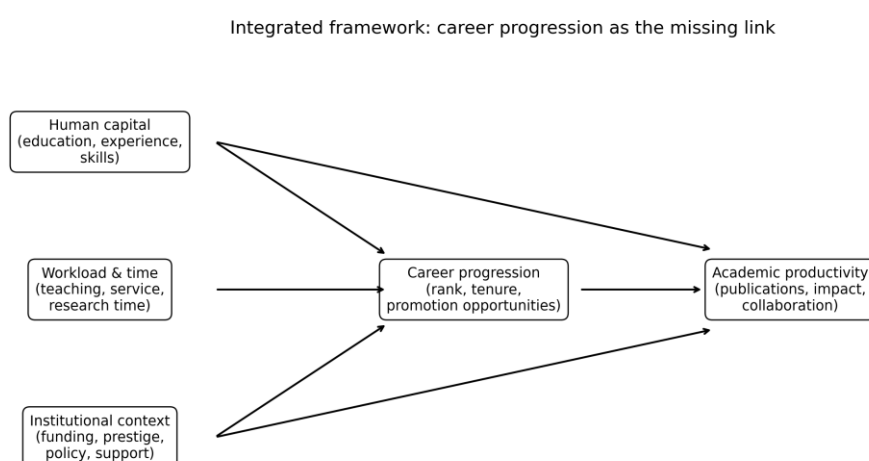


Figure 4. Integrated resource-conversion framework: career progression as the missing link.

5. CONCLUSION

This systematic and bibliometric review reframes academic productivity as a career-process outcome rather than a simple function of individual ability or institutional resources. Across the 50 Q1 articles, productivity is closely connected to institutional context, gender, funding, collaboration, human capital, mobility, workload, and evaluation. The bibliometric structure is especially revealing because career progression appears within the same network as these determinants and shows a relatively recent temporal profile, consistent with a broader shift toward longitudinal and career-stage explanations.

The central conclusion is that career progression operates as a missing institutional link. Human capital and prior performance create productive capacity, but workload and institutional rules determine whether that capacity can be exercised and recognized. Promotion, tenure, rank, and mobility then convert recognized performance into new combinations of autonomy, status, funding access, networks, and research time. Because these resources shape subsequent output, the relationship between productivity and career progression is recursive. Models that treat academic rank only as a control variable can therefore obscure an important part of the causal process.

For higher-education policy, the implication is practical: productivity strategies should be designed around career systems, not only publication targets. Transparent promotion criteria, equitable workload allocation, access to research resources, mobility and collaboration opportunities, and recognition of teaching and service are not separate human-resource issues; they determine how scholarly capability becomes sustained academic output. For research, the next step is to test the proposed resource-conversion model with longitudinal multi-level data across institutional types and national systems.

The study has limitations. The bibliometric corpus was intentionally restricted to 50 DOI-verified articles from four SJR Q1 journals, which improves thematic coherence but limits field-wide generalizability. The working RIS file preserved normalized thematic keywords rather than a complete direct Scopus export with author keywords, abstracts, cited references, and full identification-stage PRISMA counts. The generated VOSviewer-compatible network should therefore be treated as a reproducible thematic map of this curated corpus, not as a substitute for a final Scopus co-citation or bibliographic-coupling analysis. Before submission, the search should be rerun in Scopus, the PRISMA flow finalized, and co-citation/bibliographic-coupling maps generated from the native export. These steps would strengthen reproducibility without altering the conceptual contribution developed here.

5.1 Practical implications for higher-education management

For university leaders, the review suggests that productivity policies should be aligned with promotion architecture. Increasing publication targets without changing workload allocation, research support, mentoring, and recognition rules may intensify competition without improving the institutional conversion of effort into sustainable research capacity. Promotion criteria should make explicit how research, teaching, service, collaboration, and societal contribution are weighted, and these criteria should be matched by realistic time allocations.

For policy makers and funding agencies, the findings caution against using short-term publication indicators as the sole evidence of productivity. Funding and evaluation can alter career opportunities and may therefore generate delayed or uneven effects. Monitoring should distinguish immediate output from longer-term outcomes such as retention, promotion, collaboration, leadership, and research independence.

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