Academic Dishonesty and Research Productivity in a Changing Higher Education Environment
The Case of India's Engineering Institutions

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Abstract

The Indian academic system is in a period of rapid transition, evidenced by the increasing number of higher education institutions, students and academics. However, very few studies have explored academics' research productivity and the various factors influencing it. Even those few studies have largely ignored the influences of indigenous factors and academic dishonesty on research productivity. Using a mixed-method approach, this research explores how the changing academic environment influences academics' research productivity in South Indian engineering institutions established after 1990. Important demographic factors influencing research productivity have been identified. The results show that indigenous factors play a major role in motivating the academics to conduct research, whereas corruption/academic dishonesty, thought to be prevalent at all levels in the higher educational system, tend to reduce their research motivation. The research shows the complex interconnections between the changing academic environment, indigenous factors and academic dishonesty, and their influence on academics' research. The results of this work can be used for informing future higher education policy-making in terms of increasing research productivity and decreasing a range of academic dishonesty in the context of a rapidly changing academic system.

Keywords

research productivity, changing landscape of higher education, Indian engineering institutions, motivation, academic dishonesty, corruption, indigenous factors.

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1. Introduction

Conducting research, advancing knowledge and publishing are at the heart of any Higher Education Institution (HEI), with academics being the crux of HEIs' Research Productivity (RP) [Machado-Taylor et al., 2017]. Publication has become an important indicator of productivity in academic institutions and has now become essential for the academics' carrier progression, measuring a department's performance, individual academic distinction, evidencing institutional excellence, acquiring grants and securing funding [Carayol, Matt 2006]. Thus, academics have to conduct and publish research for both personal and professional reasons. Consequently, HEIs must identify the factors influencing academics' RP to invest in those that increase it and to eliminate those that impede it.

The Indian Higher Educational System (HES) is rapidly evolving and, over the last 17 years, the number of HEIs has increased by 205%, the number of enrolled students by 311% and staff by 269%[1]. Furthermore, there has been a range of structural and policy changes in the HES. A few of these include decreasing governmental funding, increasing privatisation, the introduction of the institutional ranking system and an increasing emphasis on academics to conduct research publish, even though most of the academics and institutions are teaching-oriented. However, only a few studies have been carried out so far to investigate the influence of various factors on academics' RP and how these factors are interconnected with the rapidly changing HES. This study intends to bridge that gap in the literature and contributes to Sustainable Development Goal.

2. Literature review

2.1. Determinants of Research Productivity

RP is a measure of conducting and publishing research [Abramo, D'Angelo 2014; Altbach 2015]. It is an accumulation of different activities, including publishing papers, books, chapters, securing grants, supervising research students, serving as a peer reviewer, contributing to national, international committees, and filing patents, among others [Bakthavatchaalam et al., 2019; Horodnic, Zait 2015]. An academic's motivation to conduct research and their RP is an effect whose determinants are several and complex [Horodnic, Zait 2015; Aksnes 2012]. The literature looks at the various factors influencing RP in India and similar developing countries.

[1] UGC (2018) Statistics about Indian Educational system. https://www.ugc.ac.in/stats.aspx

Exploring the demographic factors, position in the institution, age group, educational attainment, experience and the type of institutions are seen to influence RP [Sahoo et al., 2017; Aksnes 2012; Smeby, Try, 2005; Bakthavatchaalam 2018]. Vuong et al. [2017], show that RP increases with age, with early-career academics having lower RP compared to their counterparts in Viet Nam. Hunter and Leahey [2010], and Aksnes et al. [2011] report that female academics, due to their substantial lack of research network and caring duties, produce comparatively less research than their male colleagues. Whereas interestingly, Bakthavatchaalam et al. [2020] found no difference in the RP of genders. Personal factors such as self-efficacy, research skills, interest in research and confidence are shown to be important predictors of RP [Horodnic, Zait 2015; Eam 2017; Snowball, Shackleton 2018].Smilarly, institutional factors such as support for research, funding, having a large faculty size and international collaboration, desire for promotion, and higher pay motivated academics' research, whereas poor research and writing skills contributed as barriers [Sanmugam, Rajanthran 2014; Baloch et al. 2020]. Exploring the institutional factors further, Tien [2007] and Vuong et al. [2019] identified the time allocated for different duties, pay scale, institutional policies and promotion opportunities as determinants of RP.

Nguyen [2015] comments that the collegial factors, the department they work in and national cultural factors influence RP. Tien [2016], further comments on the influence of socio-economic, and the cultural factors, including the culture of respect, and hierarchy on the academics' perception of research. The cultural systems are shown to be particularly influential in developing countries [Welch 2020; Altbach 2003]. Governing bodies, changes in the national and international education policies [Amaral et al. 2009; Frolich, Caspersen 2017; Tilak 2012], along with the changing academic environment [Arimoto et al. 2013; Rani 2010] are also seen to influence RP.

Most of the studies cited above were conducted in an international setting. Thus, it is critical to empirically test the applicability of the factors identified in the Indian HE setting. More importantly, it is essential to identify any indigenous factors particular to the Indian HE system so as to develop new models.

2.2. The Changing Academic Environment in India

This section discusses the various changes Indian HE is undergoing. Between 2000 and 2017, there has been a huge increase in the number of students, institutions and academics [UGC-Report 2017]. The report further shows that the Indian HES produces 2.5 million graduates per year, with more than 35.7 million students enrolled in HE. Yet, this represents merely a 24.5% gross enrolment ratio for 18 to 23-year-olds. By 2035, the Government intends to increase the enrollment ratio to 50%, which demands more institutions and faculty [Varghese, Malik 2016]. So, it becomes essential that proper policies are put in place to improve the institutional quality and the research conducted in them.

Along with massification, heavy privatisation of HE is another major change in India, with more than 75% of the newly established institutions being privately managed [AISHE2017] and commented to be of poor quality [Altbach. Mathews2020]. Privatisation is a result of the Government cutting its HE funding and expecting private players to bridge the gap [Rani 2010], with Altbach & Mathews [2020], and Varghese & Malik [2016] commenting that India's public spending on HE is less than most other BRICS (Brazil, Russia, India, China and South Africa) countries. Looking at the engineering institutions, there is a steep increase in the number of private HEIs in India[2]. For instance, of Tamil Nadu's engineering HEIs, more than 87% are privately managed[3]. The growth in private HEIs has raised huge concerns about the quality of education they provide [Jayaram 2007; Rani 2010]. Furthermore, Madheswari and Mageswari [2020] comment that the Indian engineering education as being volatile, complex, ambiguous and uncertain, and that despite the increase in numbers, it lags in impactful research.

Major policy changes in India, a prime example being the economic liberalisation in the 1990s, have resulted in the founding of a large number of HEIs. But most of these HEIs are teaching-focused and not research-based. However, currently, there is a shift towards research [Altbach, Mathews 2020]. This is seen, for example, from the Government introducing 'National Institutional Ranking Framework' and the 'Academic Performance Indicators' scores[4], in which research is given considerable importance, thus, hugely influencing academics' RP. The performance indicators quantify academics' research, such as publications, supervision patents filed, etc., by ascribing each of them a score. This can be used as a basis for pay rise and promotion. The ranking framework standardises and ranks the HEIs by quantifying criteria, such as research outputs, teaching and learning, student pass percentage, etc. As a result, even though poorly equipped, these institutions demand that their academics produce research to boost institutional ranking. Such pressures have resulted in academic dishonesty and corruption in the HE system [Bakthavatchaalam 2018].

Academic dishonesty includes manipulation of research data, buying research, paying bribes for promotion, accreditation, procurements, plagiarism, etc. Bakthavatchaalam et al. 2019; Hallak, Poisson 2007; Yang 2005]. Even though dishonest practices are seen to be prevalent in developing countries, studying their influence on academic research

[2] UGC (2018) Statistics about Indian Educational system. https://www.ugc.ac.in/stats.aspx

[3] All India Council for Technical Education (2017) List of AICTE approved institutions having NBA accredited courses (Status as on 10–04–2017). https://www.facilities.aicte-india.org/dashboard/pages/aicte_nba.php

[4] NIRF (2015) National Institutional Ranking Framework (Engineering). https://www.nirfindia.org/Home

is new in India, with only a few empirical investigations on this topic (see Bakthavatchaalam [2018] and Tierney & Sabharwal [2017; 2016]).

A range of other changes has influenced Indian HE, including the changing socio-cultural system, an increasingly educated population, and increasing support for the attainment of women [AISHE2017; Bakthavatchaalam et al. 2020], to name a few. Even within the HE system, there has been an increase in accountability, quality audits, paperwork, and decreasing regard for the academic profession in general ([Altbach 2011; Rani 2010]. The complete list of all the changes in the Indian academic environment would be long and their analysis considerable. Therefore, this section has provided a brief introduction to just a few of them. This rapidly changing academic environment has presented researchers with a lot of opportunities to study policy formation, RP, management of HEIs and job satisfaction, among other topics.

3. Need for this study

A review of the studies on Indian academics' RP and research motivation conducted by Bakthavatchaalam [2018] found that only 35 empirical papers were written from 1990 to 2017.Most of these papers focused on job satisfaction, followed by employee retention. Only four papers explored academics' motivation, but they focused on teaching motivation, rather than on research motivation or their RP. Also, none of the identified papers explored the influence of the changing academic environment and the indigenous factors/Elements of Cultural Identities (EoCI) on academics' RP. Even though there are a few newspaper articles and opinion pieces, there is a thorough lack of empirical studies in this area. With India wanting to become a knowledge hub in Asia, Bakthavatchaalam [2018] sustains the need to identify and empirically analyse the various factors influencing RP as an important aspect.

This study gains more relevance with the Government introducing various ranking frameworks in which RP plays a prominent role. To the best of the authors' knowledge, this is one of the first pieces of research exploring the various factors influencing academics' research motivation and RP, with reference to the changing academic environment in the increasing number of engineering institutions in South India.

The following research questions have geared this study:

1. What are the major factors influencing academics' RP in South Indian engineering institutions?
2. How does the rapidly changing academic environment influence academics' RP?

4. Methodology

This study used a mixed-method approach. Engineering institutions in Coimbatore city were chosen as a case study, as the city has the second-highest number of engineering HEIs in Tamilnadu, South India.

Collecting data from different disciplines, such as humanities, law and medicine, though tempting. However, only engineering institutions were chosen for the following reasons: Engineering is one of the rapidly expanding HE sectors compared with most other disciplines[5], with Madheswari & Mageswari [2020] commenting that India has around 25% of the world's engineers. Collecting cross-disciplinary data would have been a masive undertaking and would reduce the study's focus. In addition, comparing research between disciplines [Brew et al. 2015; Heng et al. 2020; Singh 2018] is difficult, one reason being the varied emphasis they place on different RP indicators. However, we do presume that the other disciplines and institutions might also face similar issues to the ones identified here.

A total of 643 questionnaires were distributed to academics working in 57 HEIs, of which 446 were returned, and 324 were usable. Overall, the usable response rate was 50.38%. The questionnaire was used to collect demographic details, measure the academics' perception of the influence of different factors on their research and quantify the various indicators of their RP. The various indicators include journal papers, conferences, books, chapters, research supervision and patents over the last five years.

RP was quantified by ascribing each of the indicators pre-determined scores, as seen in sub-section 4.1. A modified version of the 'Academic Performance Indicators' scores suggested by the University Grants Commission of India was used. Tests of differences and associations were used to identify the influence of demographic differences on RP. Factor analysis was used to identify the latent factors and Weighted Least Square regression was used to form models to measure RP from a combination of the latent and demographic factors. Quantitative results were used to inform the qualitative data collection through semi-structured interviews. A total of 16 interviews were conducted to identify and understand the interconnections between the changing academic environment and the factors identified.

4.1. Measuring research productivity

Important considerations for quantifying RP include which research outputs are to be used as indicators, the weighting for these indicators and the period of measurement. In this research, the total research productivity was calculated as:

$$RP \text{ over five years} = \sum s + \sum p + \sum pt$$

where 'RP' is the research productivity score, which was measured over a period of five years, '$\sum s$' is the sum of scores for supervising research students, '$\sum p$' is the sum of scores for publications and '$\sum pt$' is the sum of scores for patents awarded. The supervision score was meas-

[5] UGC (2018) Statistics about Indian Educational system. https://www.ugc.ac.in/stats.aspx

ured as a composite score for supervision at undergraduate, graduate and PhD levels. The publication score was calculated as a composite of the number of papers published in national and international journals, conferences, as well as the number of chapters and books authored. Although there are several schemes for weighing the indicators, such as the ones proposed by Horodnic & Zait [2015], Murray [2014], Rorstad & Aksnes [2015], and Sahoo et al. [2017], the academics in India use the University Grants Commission of India's Academic Performance Indicator framework[6] as a weighing scheme. This scoring system announced by the Government is being nationalised to create a common standard. This research uses a modified version of this performance indicator framework for weighing the indicators. For instance, a score of 8 was allotted for supervising a PhD, a score of 20 was allotted for publishing in an international level journal, and a score of 25 was allotted for registering a patent.

5. Results and discussion

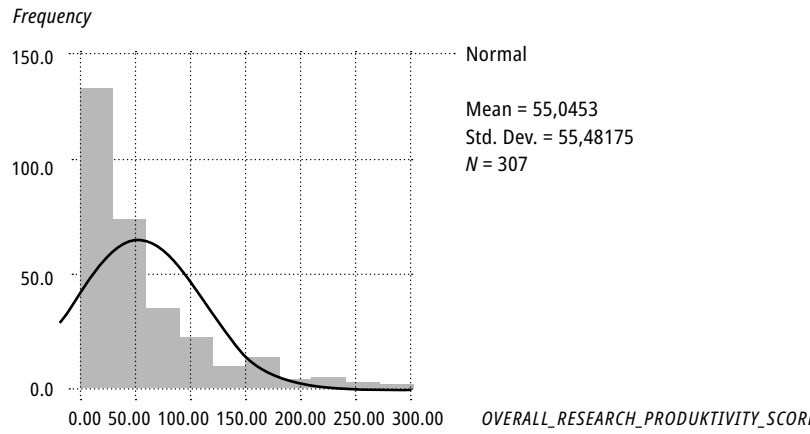
The respondents were 65% male and 35% female. 95% of the respondents were below 45 years old and 84.7% had less than 10 years of teaching experience. 75.9% of the respondents earned Rs.35K or less/month (eqv. 400 GBP), which is the recommended University Grants Commission's pay for assistant professors. The demography of the institution's age was well spread, considering that the target institutions were founded after 1990. 45.6% of the responses were from institutions less than 10 years old and 91.2% from institutions less than 20 years old. 91% of the respondents had a Post-Graduate degree and only 9% had already achieved a Ph D. 36.2% of them were pursuing a Ph D. This clearly shows that the bulk of the respondents were new lecturers who had started their lecturing profession after completing their PG and, among them, just over a third were pursuing their Ph D. The respondents' demographics were typical of Coimbatore's engineering academics [AnnaUniv 2017].

5.1. Academics' Research Productivity

The quantitative results worryingly confirm the academics' overall low RP (Figure 1), showing that most of the academics conduct little to no research, and a very few conduct a significant amount of research, similar to Lotka's law [Pao 1985]. Whilst several academics had a RP score of less than 50, there was one respondent who had a score of 300. That respondent was seen to have several co-authored papers. The academics' low RP is in contrast with the country's motivations of competing to be a world power and a research hub.

[6] The International Institute for Population Sciences India (2010) Proposed scores for academic performance indicators (APIs) in recruitments and career advancement scheme (CAS) promotions of University/College teachers. https://www.dei.ac.in/dei/files/IQAC/Guidelines.pdf; NIRF (2015) National Institutional Ranking Framework (Engineering). https://www.nirfindia.org/Home

Figure 1. **Academics' Research Productivity**



Reasons for the low RP, as commented by the respondents, include the lack of research skills, academic dishonesty (AD)/corruption at various levels of the HES, and a lack of research focus and institutional facilities. The interviews reveal that the academics and the institutions have mostly been focusing on teaching, with conducting research being something relatively new and enforced. They further commented that newly founded privatey managed HEIs have a short term and economically motivated focus, this being a main reason for the low RP.

Principle Component Analysis was conducted to reduce the number of variables and identify the latent factors. After iterations, a six-factor simple structured model was formed, which showed a sampling adequacy of 0.773 based on KMO and Bartletts Test, and the total variance explained was found to be 48.501%. Cronbach's alpha was 0.737, which is considered to be within the 'Good' range. Based on the rotated component matrix (Table 1), the six latent factors were renamed to better reflect their components (Figure 2).

Regression was conducted with the factor scores of each of the six latent variables from the principal component analysis, dummy variables and the RP score. The Durbin-Watson statistic for regression gave a value of 2.047, very close to 2, indicating good independence of residuals. The R-value was 78.2%, the R^2 value of 61.4% and the adjusted R^2 value of 54.8% ($p<0.0005$) of variance being explained. Table 2 shows the regression results with both the significant and non-significant variables.

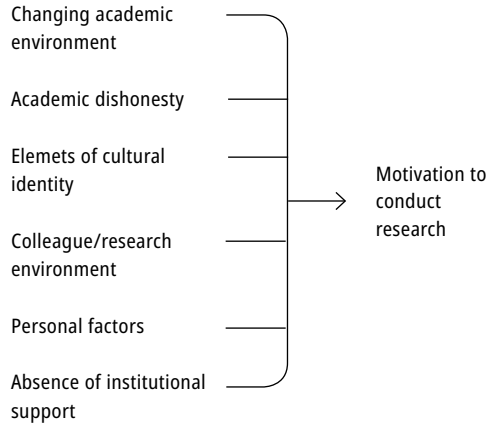
Looking at the regression analysis (Table 2), the demographic variables show that the position in the institution, institutional age, teaching experience, pay scale, degrees achieved, degrees working towards and the distance of the academics' residence from the campus influenced RP to varying degrees. Regardless of the position in the institution,

Table 1. **Final rotated component matrix with all co-efficient**

No	F	Rotated Component Matrix[a]	Component					
			1	2	3	4	5	6
1	F1.1	Increase in faculty workload	**.740**	.136	.126	–.135	.057	.103
2	F1.2	A drop in student quality	**.605**	.229	–.146	.051	.080	.177
3	F1.3	Faculties have more administrative duties	**.600**	.296	.084	–.098	.053	–.072
4	F1.4	Academia is becoming a less attractive career	**.582**	.302	–.188	.055	–.037	.203
5	F1.5	Teaching workload preventing me conducting research	**.564**	–.250	.272	–.166	–.071	–.068
6	F1.6	The colleges' focus on results, negatively impact faculty's research	**.520**	.073	.064	–.338	–.029	.294
7	F2.1	Some of the Coimbatore's engineering HEIs should not have been accredite	–.061	**.659**	.102	–.071	.125	.039
8	F2.2	Ineffective checks to counteract the malpractices	.076	**.659**	.077	–.153	–.011	.095
9	F2.3	Corruption has found its way into academic research	.282	**.654**	–.025	.025	.002	–.056
10	F2.4	Academics are buying research,	.364	**.594**	–.025	.115	.079	.072
11	F2.5	HEIs are less driven by social and moral responsibilities	.318	**.559**	–.060	–.206	–.055	.257
12	F2.6	Governing bodies have less concern on the research quality from the affiliated institutions	.049	**.531**	.192	–.180	.020	–.013
13	F3.1	Conducting research will earn me divine merit (Punniyam)	–.098	–.038	**.757**	.093	–.013	.150
14	F3.2	It is my moral duty to conduct research	.093	.041	**.739**	.127	.109	–.073
15	F3.3	Being of service to the society is my prime research motivator	.055	.097	**.678**	.156	.227	–.085
16	F3.4	It is a God given duty to teach and conduct research.	–.095	.161	**.517**	.265	.184	.002
17	F3.5	Being a role model to the society	.097	.070	**.500**	.074	.078	.141
18	F4.1	Stimulated by colleauge's resarch	.035	–.069	.075	**.677**	–.120	–.028
19	F4.2	Recognition as a motivator	.091	–.074	.138	**.581**	.134	–.106
20	F4.3	Job security	–.241	–.049	.214	**.580**	.111	.103
21	F4.4	Encouragement from the institution	–.199	–.227	.104	**.570**	.048	–.145
22	F4.5	Discussing colleauge's research	–.177	–.050	.159	**.536**	.156	–.028
23	F5.1	Interest in research	.000	.003	.068	.147	**.762**	–.025
24	F5.2	Enjoy conducting research	–.041	.046	.083	–.067	**.753**	.083
25	F5.3	My career progression	.063	.036	–.025	.312	**.527**	–.045
26	F5.4	Confidence in research skills	.012	.062	.176	.113	**.518**	.038
27	F5.5	Personal curiosity	.065	–.005	.256	–.248	**.494**	–.099
28	F6.1	No institutional support to improve research skills	.058	.006	.038	–.123	.101	**.770**
29	F6.2	No flexible teaching hours to support research	.068	.019	.127	–.008	–.006	**.761**
30	F6.3	Institutions' lack of research vision	.272	.248	–.044	–.052	–.133	**.589**

[a] Rotation converged in 9 iterations.
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Source: Produced by the authors.

Figure 2. **Factors influencing academics' RP**



everyone was being pressured to either become active researchers or increase their research outputs. This is in addition to their teaching duties, which are seen to be their primary job. As expected, academics with a PhD or working towards it are seen to have higher RP than their counterparts. Similarly, experienced academics have higher RP.

It is very interesting that 'gender' is not seen to influence RP, contradicting the works of Rorstad and Aksnes [2015], and Smeby and Try [2005], who report female academics being less research productive than their male counterparts. However, this research finds no such differences.

Bakthavatchaalam et al. [2020] identified that, even though females in India have a range of barriers to conduct research, they were still resilient and produced the same amount of research as their male counterparts. The barriers they found include sociocultural expectations; family-oriented issues; professional and institutional factors; limited professional contacts; and not being able to travel far for data collection, among other factors. Bakthavatchaalam et al. [2020] further identified the factors aiding female researchers' resilience in managing to produce the same amount of research as their male counterparts. These include increasing family support before and after marriage; focus and dedication to work; the changing social system; increasing education for women; and the types of research chosen by women.

The regression analysis (see Table 2) reveals that AD (Academic Dishonesty) influences RP negatively. Conversely, Elements of Cultural Identities (EoCIs) are seen to increase RP. Even though statistically not significant, the interviews showed the importance of the changing academic environment and its influence on RP.

EoCIs include academics considering that teaching and conducting research is a God-given duty, perceiving research as a moral duty,

Table 2. **Regression coefficients for WLS regression:**

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	90.783	16.132		5.627	.000
REGR factor score for Changing Academic Environment	–2.166	1.727	–.060	–1.254	.211
REGR factor score for Academic Dishonesty	4.577**	1.553	.133	2.946	.004
REGR factor score for Indigenous Factors	–3.611**	1.741	–.091	–2.074	.039
REGR factor score for Colleague/Research Environment	1.265	1.609	.038	.787	.432
REGR factor score for Personal Factor	1.528	1.575	.043	.970	.333
REGR factor score for Absence of Institutional Support	–1.679	1.573	–.048	–1.067	.287
Age (CG: < 25 years old)					
25 to 35 years old	2.475	4.470	.034	.554	.580
36–45 years old	1.001	8.437	.007	.119	.906
46–55 years old	–24.264	17.169	–.072	–1.413	.159
> 55 years old	–56.545	54.268	–.098	–1.042	.298
Age of the institution (CG: 5–10 years)					
<5 years	–24.309***	4.684	–.310	–5.190	.000
11–15 years	8.592	5.506	.077	1.560	.120
16–20 years	–8.175*	4.228	–.125	–1.933	.054
> 20 years	–26.093	23.682	–.140	–1.102	.272
Position in the institution (CG: Associate Professor)					
Assistant Professor[†]	–17.653*	10.406	–.130	–1.696	.091
Professor	–55.399	37.374	–.116	–1.482	.139
Head of the department	–34.586*	18.293	–.105	–1.891	.060
Other positions	–19.987	16.650	–.086	–1.200	.231
Teaching experience (CG: 5–10 years)					
<5 years	–26.211***	4.641	–.328	–5.648	.000
11–15 years	34.406**	13.168	.131	2.613	.010
15–20 years	51.793*	29.561	.078	1.752	.081
> 20 years	79.687***	25.705	.231	3.100	.002
Pay range/month (CG: <25K / month)					
25–35K / month	–1.180	4.104	–.015	–.288	.774
35–45K / month	–18.610*	10.470	–.095	–1.777	.077
45–55K / month	45.707	26.236	.132	1.742	.083
55–65K / month	24.094	23.690	.121	1.017	.310
> 65K / month	7.355	26.148	.025	.281	.779
Degrees achieved (CG: PG / Masters)					
Achieved UG	–7.255	9.155	–.050	–.792	.429
Achieved Mphil	–43.358***	7.098	–.295	–6.108	.000
Achieved PhD	52.420***	16.570	.229	3.164	.002
Working hours/day (CG: <6 hours / day)					

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
6–7.5 hours/day	–7.327	4.947	–.110	–1.481	.140
7.5–8 hours/day	3.787	4.951	.059	.765	.445
> 8 hours/day	3.436	6.189	.037	.555	.579
Teaching related hours/Week (CG: < 7 hours / week)					
7–14 hours/week	–.265	7.531	–.003	–.035	.972
15–23 hours/week	–11.705	7.153	–.181	–1.636	.103
> 23 hours/week	–4.692	7.563	–.059	–.620	.536
Residence from campus (CG: In the campus)					
Residing within 5 Km of the campus	–12.467**	5.971	–.172	–2.088	.038
Residing within 20 Km of the campus	–5.948	6.134	–.081	–.970	.333
Residing more than 20 Km of the campus	–9.802*	5.921	–.153	–1.655	.099
Industrial experience (GC: Yes)					
No	.655	3.772	.009	.174	.862
Gender (CG: Female)					
Male	–5.305	3.461	–.084	–1.533	.127
Degree working towards (CG: PostGraduation/Masters)					
PhD	10.364**	3.715	.142	2.790	.006

Dependent variable: ORP. Weighted Least Squares Regression — Weighted by wts1. CG: control variable
*** <0.005, **<0.05, *>0.1
† Please note that the entry position of an academic is an 'Asst. Prof.' and not a lecturer.
Source: Produced by the authors.

wanting to be of service to the society and a role model, and a thought that conducting proper research will give them divine merit for their next life. Furthermore, the psychological satisfaction of conducting research was reported as a prime motivator. It can be seen that EoCIs are composed of internal motivators and reflective of women's personal beliefs. EoCIs were commented to influence an individual's mind-set on how to conduct research ethically. Despite academics agreeing to the importance of EoCIs, they did not offer a detailed view of how EoCIs impact RP.

Even though India is a rapidly developing country, it is still conservative. The data reveal the positive influence of EoCIs on RP, indicating the importance of localising the research practices, as pointed out by Khatri et al. [2012], and not just to borrow practices as a quick fix. Especially, the importance of having strong role models who inspire ethical research was commented to be important. As one of the respondents commented,

> "Having a role model and wanting to be one is very important" (New female).

In light of this, HEIs should promote positive research role models. Creating an ethical research environment that appreciates and rewards ethical research behaviour could be used to reduce academic dishonesty.

In terms of academic dishonesty, the interviews revealed a plethora of dishonest practices/corruption at three different levels: staff/academic, institutional and governing body levels. As an experienced male academic commented,

"There is 100% dishonesty".

This is also supported by the questionnaire, which showed that 72.2% of the academics agree or strongly agree that corruption has found its way into academic research. They commented that academics are buying research rather than conducting it themselves. The list of dishonest practices reported at different levels would be long and is not included in this paper. The main reasons for academic dishonesty were varied. At the staff/academic level, dishonesty was ascribed to survival, promotion, pay rise and the lack of research skills, time and research facilities. At the institutional level, survival, increasing recruitment, quickly moving up the institutional ranking and money-making were reported as the main reasons. At the governing body level, an inability to control dishonest practices, improper planning in allowing the increase of institutions and money-making were mentioned. These reasons are reflective of the works of Mohamedbhai [2016], Daniel [2016] and Eckstein [2003]. Corruption is not particular to academia but is an overflow into academia, from the corruption that goes on in government offices and in society at large.

In theory, written codes and laws do punish corruption and dishonest practices, and the Indian culture deems it immoral. Yet, as Rothstein [2017] comments, there is a distinction between moral and social norms. Whilst moral norms entail the principles, social norms are the presumed social practice. People might believe that academic dishonesty is morally wrong, but if that is the social norm/practice, they find little point in doing otherwise.

The changing academic environment included the rapid increase in the number of institutions and seats, the new HE ranking systems announced by the Government, an increasing workload, with the academics having to take on more administrative/paperwork, and a drop in the quality of the students recruited. The policy changes, the increasing number of HEIs and the number of student seats in the last few years were indicated as being some of the most influential changes in the Indian HE system.

One of the major changes in academia recently is how the worth of an academic is measured. Traditionally, their efficiency would be measured based on their teaching prowess. Along with teaching, if they conducted research, they would be even more respected. However, currently, with the recent changes in the ranking system[7], even

[7] NIRF (2015) National Institutional Ranking Framework (Engineering). https://www.nirfindia.org/Home

in teaching-oriented HEIs, an academic's worth is measured by how research-productive they are. So, just to quantify for a pay rise or promotion, the academics commented to be conducting research. As a respondent stated,

> "If you tell them [academics] that there is no need to conduct research for promotion or pay rise, very few will do research" (Experienced male).

Rather than looking at the influence of the changing academic environment and the other factors separately, the next section addresses the various interconnections between the factors and how they influence the quantity and quality of academics' research.

5.2. Interconnected nature of Academic Dishonesty, Elements of Cultural Identities and the Changing Academic Environment

At the outset, the changing academic environment, academic dishonesty and EoCIs might appear to be individual elements influencing RP. However, the interviews revealed the interconnections between them and how their interplay influences academics' RP.

The interviews clearly show how academic dishonesty and the changing academic environment, in terms of the increase in the number of engineering HEIs, are connected. For instance, the institutions are reported to be paying bribes and being involved in corruption for getting approvals, setting up of the institution, and securing affiliation and accreditation from various governing bodies. The data also suggest that the accrediting bodies poorly planned the explosive growth in the number of institutions and seats available, which should have been better managed.

Due to the increasing number of seats being made available in each of the HEIs, the more established institutions take in more students who otherwise might have joined the newly founded ones. Target institutions' enrolment data showed that a lot of the newly founded institutions had more than half of their available seats unfilled. Even more surprising was to see a few institutions in which, even though there were 60 places available, only seven students were enrolled. As an experienced male academic commented,

> "A few years ago, institution 'x' would have only 60 seats available, in Mechanical Engineering. But now, since 'X' has been allowed to recruit 120 or 180 students, this takes away the quality and quantity of students who would have selected the other institutions. This has created a situation in which the top institutions take twice or thrice the number of students than before, leaving all the new institutions to fight for students".

Most of these new institutions are for-profit and privately managed, depending on students' tuition fee to run. With low enrolment, these institutions are unable to sustain operating, pay their staff properly or

invest in research facilities, which negatively affects their academics' research. As an experienced (male) academic commented,

> "Imagine if you own one of the bottom institutions in which there is a total of 120 seats available, but you get only 22 students in the classroom. As a college owner, realistically, how can you focus on research, recruit high calibre staff, set up research facilities?"

These institutions were reported to be in a 'survival mode' and get involved in various systemic academic dishonesty to cut cost and survive. These include the institutions paying their staff less than what they are supposed to receive, as well as recruiting under-qualified and fewer staff than stipulated by the Government.

Academics getting paid less than what they should be was seen to be becoming a common practice in the privately-owned HEIs, which is similar to the results of Kumar [2014]. This creates a group of academics who have to work for lower pay and have a higher workload than properly paid academics. In such circumstances, it would be difficult for them to conduct meaningful research. The respondents also commented that, during inspections, HEIs recruit 'ghost lecturers' who exist only during inspections and only in paper. As an academic commented,

> "During an inspection, they [HEIs] hire a PhD holder just for the inspection, create fake records as if he/she [Ghost lecturer] has been working at the institution for a year or so. When the inspection is over, he/she gets paid and leaves" (Experienced male).

One way or the other, academics become a part of these range of institutional dishonest practices, which again negatively influence their research, the way they conduct it and their moral standing. Such academic dishonesty, along with the changing academic environment, notably the declining quality and quantity of students (as the newly founded institutions have to take students with very low grades just to fill the seats), has significantly increased academics' workload and administration/paperwork. These conditions have led them to comment that academia is becoming a less attractive career.

Traditionally, the academic profession has enjoyed considerable autonomy and has commanded respect within the community. But now, the academics comment that the decline in their status of being a 'guru' has negatively influenced them in wanting to be an academic. This is directly linked to the changing academic environment and the EoCIs. Culturally, a guru is considered an irreplaceable person in a community. However, with the recent changes in academia, with little job security, academics see themselves as easily replaced. Along with this, the institutions not paying them according to the norms, or pay-

ing in arrears has collectively affected not only their RP but also their perception of the academic profession on the whole.

> "[...] A lot of academics in the lower strata of institutions are losing their sense of being an academic, and few of them have left the academic profession and started a food business, milk vending, etc., and usually they get paid more" (Experienced male).

Linking this comment with the cultural perspective, it entails a huge change, as most of the academics traditionally retired as one. However, the results show the extent to which their sense of being an academic has changed.

Academics commented that, along with the already loaded duties, their role now mandatorily includes that they personally canvass and recruit a certain number of students to their institutions. They are also required to canvass the local industries requesting them to recruit their students after graduation. As a young female academic commented,

> "Until a few years ago, if a staff member recruited a student, they would be monetarily rewarded. But now, staff 'should' recruit a certain number of students or else they do not get paid for the summer vacation month! So, now the staff go canvassing to peoples' homes often exaggerating the institutional facilities".

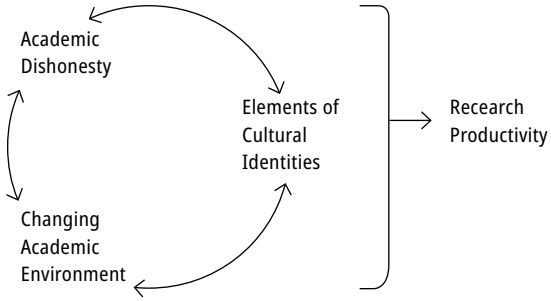
On this, Bakthavatchaalam et al. [2020] comment that female academics find it more difficult to recruit students and to network with the local industries due to existing social norms. In such a pressurised environment, research becomes an afterthought. Yet, for academics to get higher pay or promotion, they have to conduct research and, to accomplish it, they, in turn, indulge in dishonest practices.

> "When people must do something [research] they are not trained for under the pretext of job security, academic dishonesty will prevail. It has become a job security issue now [...]" (Young male academic).

The academics in these institutions are reportedly under-qualified and not skilled in research. When they are expected to conduct research, they partially or fully buy research from the so-called "research agencies"/paper mills. These agencies write papers/theses with fake data and also help academics publish quickly through predatory journals. These journals are not bothered about the research quality [Saroja et al., 2016] but just about the payment. Interviews with these agencies revealed that they fabricated the data based on their customer's (academic) requirements.

As one of the agencies commented,

Figure 3. **Interaction between the factors and their influence on RP**



> "[…] Who collects real data? I would definitely say that 95% of the data 'collected' by the agencies are just made up based on what the researcher wants the results to be".

This puts into question the results of such research and the papers that use these works as reference material. The fact that agencies use plagiarism-detecting software and their increasing sophistication adds to the difficulty in detecting fake research.

Especially in engineering, such fake research could be dangerous and decreases the confidence of funding bodies and industries in the research conducted. The points identified from the interviews on academic dishonesty are reflective of the works of Daniel [2016], Poisson [2010], and Tierney & Sabharwal [2017].

It is critical to note an important link between EoCIs and dishonest research practices: academics who perceive EoCIs as important for RP are less involved in dishonest practices and vice-versa. Worryingly, the interviews suggest that when an honest academic sees their peer getting a promotion or pay rise by dishonest publication, it negatively affects their integrity, tempting them to choose dishonest means as well.

It should be noted that the academics' involvement in dishonest research practices is a self-inflicted fall from their traditionally held high moral standards. This is a result of the changing academic environment and the pressures it has placed on the academics. The data show 'survival' and 'lack of research skills' as two of the main reasons for academics to be involved in dishonest research practices. So, HEIs could form policies to increase academics' research capabilities and provide them with more opportunities to conduct research. This would not only reduce academic dishonesty but also motivate them to conduct research on their own.

This section sought to shed light on the complex interconnections between academic dishonesty, EoCIs and the changing academic en-

vironment, and their influence on academics' RP. Figure 3 models the interaction between the three and their influence on academics' RP.

6. Conclusion

This is a timely study that reveals the current state of RP in this area and offers a few thoughts on which future policy formations could be based to increase the quantity and quality of academics' RP. Even though there are already policies in place at various levels (academic, institutional and governing bodies) to increase RP and to reduce dishonest practices, they seem to be ineffective. So, it is critical to assess these policies and changes made. The research suggests that bespoke policies should be formed based on EoCIs, as they could well counter academic dishonesty due to their inverse relationship. The importance of EoCIs in conducting research shows that the policies formed should be more localised and based on the cultural elements. Future HE policies should consider the various interconnections between the changing academic environment, EoCIs and academic dishonesty, and their influence on academics' research. The policies should also look into decreasing or ideally eliminating the negative impacts of the changing academic environment and academic dishonesty.

7. Limitations

One of the limitations of this study is the lack of empirical research in this field in India, limiting the potential to compare the results with similar studies. Academics' RP was measured solely based on the quantity of different publications, and, thus, future research could consider both the quantity and quality of the publications. This research was conducted in South Indian engineering institutions and, so, generalising it to other cultures and countries should be done with caution. Finally, future studies should look into assessing the quantitative and qualitative impact of the various policies on RP. Studies should also explore how the broader social changes that are happening in the country, COVID-19 and its effects influence the HE system and academics' research.

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References

Abramo G., D'Angelo C.A. (2014) How Do You Define and Measure Research Productivity? *Scientometrics,* vol. 101, no 2, pp. 1129–1144.

All India Survey on Higher Education (2017) *All India Survey on Higher Education 2016–2017*. Available at: http://aishe.nic.in/aishe/viewDocument.action?documentId=236 (accessed 20 April 2021).

Aksnes D.W. (2012) Review of Literature on Scientists' Research Productivity: En Studie inom IVAs Projekt Agenda för Forskning. Available at: https://www.iva.

se/globalassets/rapporter/agenda-for-forskning/review20of20literature20on-20scientistse2809920research20productivity1.pdf (accessed 20 April 2021).
Aksnes D. W., Rorstad K., Piro F., Sivertsen G. (2011) Are Female Researchers Less Cited? A Large-Scale Study of Norwegian Scientists. *Journal of the Association for Information Science and Technology,* vol. 62, no 4, pp. 628–636.
Altbach P. (2015) What Counts for Academic Productivity in Research Universities? *International Higher Education,* vol. 79, January, pp. 6–7.
Altbach P. (2011) The Past, Present, and Future of the Research University. *Economic and Political Weekly,* vol. 46, no 16, pp. 65–73.
Altbach P. (2003) *The Decline of the Guru: The Academic Profession in Developing and Middle-Income Countries*. NY: Palgrave.
Altbach P., Mathews E. (2020) Is Indian Higher Education Finally Waking Up? *Change: The Magazine of Higher Learning,* vol. 52, no 3, pp. 54–60.
Amaral A., Neave G., Musselin C., Maassen P. (2009) *European Integration and the Governance of Higher Education and Research*. Dordrecht: Springer.
Arimoto A., Teichler U., Cummings W. (2013) The Changing Academic Profession: Major Findings of a Comparative Survey. Dordrecht: Springer.
Bakthavatchaalam V. P. (2018) *Motivation to Conduct Research in a Rapidly Evolving Academic Environment: Study of Coimbatore's Engineering Institutions* (PhD Thesis). Plymouth, UK: University of Plymouth.
Bakthavatchaalam V. P., Miles M., Sa M. J., Machado-Taylor M.L., Gingele J. (2019) Gender and Research Productivity of Academics in South India's HEIs. Proceedings of the *2nd International Conference on Gender Research* (Rome, Italy, April 11–12, 2019) (eds P. Paolini, M. Paolini, S. Arduini), pp. 685–692.
Bakthavatchaalam V. P., Sa M. J., Baburaj E., Miles M. (2020) Are Female Academics More Research Resilient? Evidence from South India's Engineering Institutions. *STEM Education for Girls and Women: Breaking Barriers and Exploring Gender Inequality in Asia*. Bangkok: UNESCO, pp. 148–188.
Baloch N., Siming L., Abraha A., Hong S. (2020) Faculty Research Productivity: Differences between Foreign and Local Doctoral Degree Holders in Pakistan. *Higher Education*, October, pp. 1–23. https://doi.org/10.1007/s10734–020–00630–2.
Brew A., Boud D., Namgung S. U., Lucas L., Crawford K. (2015) Research Productivity and Academics' Conceptions of Research. *Higher Education,* vol. 71, no 5, pp. 681–697.
Carayol N., Matt M. (2006) Individual and Collective Determinants of Academic Scientists' Productivity. *Information Economics and Policy,* vol. 18, no 1, pp. 55–72.
Daniel J. (2016) Council for Higher Education Accreditation (2016) *Advisory Statement for Effective International Practice Combatting Corruption and Enhancing Integrity: A Contemporary Challenge for the Quality and Credibility of Higher Education*. Available at: http://unesdoc.unesco.org/images/0024/002494/249460E.pdf (accessed 20 April 2021).
Eam P. (2017) Factors Differentiating Research Involvement among Faculty Members: A Perspective from Cambodia. *Excellence in Higher Education,* vol. 6, no 1, pp. 1–11.
Eckstein M. A. (2003) *Combating Academic Fraud: Towards a Culture of Integrity*. Paris: UNESCO-IIEP.
Forest J. J., Altbach P. G. (2006) *International Handbook of Higher Education.* Vol. 1. Dordrecht: Springer.
Frolich N., Caspersen J. (2017) How Does Policy Change Universities? Outlook on the Global Research Agenda. *State of Higher Education — 2015–16* (eds C. Sarrico, A. McQueen, S. Samuelson), Paris: OECD, pp. 127–132.
Gibson J. (2000) Research Productivity in New Zealand University Economics Departments: Comment and Update. *New Zealand Economic Papers,* vol. 34, no 1, pp. 73–87.
Hallak J., Poisson M. (2007) *Corrupt Schools, Corrupt Universities: What Can Be Done?* Paris: IIEP.

Heng K., Hamid O., Khan A. (2020) Factors Influencing Academics' Research Engagement and Productivity: A Developing Countries Perspective. *Issues in Educational Research,* vol. 30, no 3, pp. 965–987.

Horodnic I. A., Zait A. (2015) Motivation and Research Productivity in a University System Undergoing Transition. *Research Evaluation,* vol. 24, no 3, pp. 282–292.

Hunter L. A., Leahey E. (2010) Parenting and Research Productivity: New Evidence and Methods. *Social Studies of Science,* vol. 40, no 3, pp. 433–451.

Jayaram N. (2007) Beyond Retailing Knowledge: Prospects of Research-Oriented Universities in India. *World Class Worldwide: Transforming Research Universities in Asia and Latin America* (eds P. G. Altbach, J. Balan), Baltimore: Johns Hopkins University, pp. 70–94.

Khatri N., Ojha A. K., Budhwar P., Srinivasan V., Varma A. (2012) Management Research in India: Current State and Future Directions. *IIMB Management Review,* vol. 24, no 2, pp. 104–115.

Kumar S. (2014) Privatisation of Higher Education in India: Hopes and Despairs. *Social Change,* vol. 44, no 3, pp. 451–458.

Machado-Taylor M.L., Soares V. M., Teichler U. (2017) *Challenges and Options: The Academic Profession in Europe.* Vol. 18. Cham: Springer.

Madheswari S. P., Mageswari S. D. (2020) Changing Paradigms of Engineering Education — An Indian Perspective. *Procedia Computer Science,* vol. 172, pp. 215–224.

Mohamedbhai G. (2016) The Scourge of Fraud and Corruption in Higher Education. *International Higher Education*, no 84, pp. 12–14.

Murray M. (2014) Predicting Scientific Research Output at the University of KwaZulu-Natal. *South African Journal of Science,* vol. 110, no 3–4, pp. 1–4.

Nguyen Q. H. (2015) *Factors Influencing the Research Productivity of Academics at the Research-Oriented University in Vietnam* (PhD Thesis). Brisbane, Australia: Griffith University.

Pao M. L. (1985) Lotka's Law: A Testing Procedure. *Information Processing & Management,* vol. 21, no 4, pp. 305–320.

Poisson M. (2010) *Corruption and Education.* Vol. 11. Paris: UNESCO-IIEP & IAE.

Rani G. (2010) *Changing Landscape of Higher Education in India: The Case of Engineering Education in Tamil Nadu.* Vol. 36. New Delhi, India: NUEPA.

Rothstein B. (2017) Four myths about corruption. *World Economic Forum.* Available at: https://www.weforum.org/agenda/2017/12/four-myths-about-corruption/ (accessed 20 April 2021).

Rorstad K., Aksnes D. W. (2015) Publication Rate Expressed by Age, Gender and Academic Position — A Large-Scale Analysis of Norwegian Academic Staff. *Journal of Informetrics,* vol. 9, no 2, pp. 317–333.

Sahoo B. K., Singh R., Mishra B., Sankaran K. (2017) Research Productivity in Management Schools of India During 1968–2015: A Directional Benefit-of-Doubt Model Analysis. *Omega,* no 66, pp. 118–139.

Sanmugam T. S., Rajanthran N. (2014) Exploring Malaysian Polytechnic Lecturers' Perceptions towards Research: An Institutional Case Study. *Procedia — Social and Behavioral Sciences,* vol. 123, March, pp. 398–405.

Saroja G. S., Santhosh Kumar J., Hareesha A. (2016) India's Scientific Publication in Predatory Journals: Need for Regulating Quality of Indian Science and Education. *Current Science,* vol. 111, no 11, pp. 1759–1764.

Singh V. (2018) Comparing Research Productivity of Returnee-PhDs in Science, Engineering, and the Social Sciences. *Scientometrics,* vol. 115, no 3, pp. 1241–1252.

Smeby J. C., Try S. (2005) Departmental Contexts and Faculty Research Activity in Norway. *Research in Higher Education,* vol. 46, no 6, pp. 593–619.

Snowball J. D., Shackleton C. M. (2018) Factors Enabling and Constraining Research in a Small, Research-Intensive South African University. *Research Evaluation,* vol. 27, no 2, pp. 119–131.

Tien F. F. (2007) Faculty Research Behaviour and Career Incentives: The Case of Taiwan. *International Journal of Educational Development,* vol. 27, no 1, pp. 4–17.

Tien H. (2016) *Vietnamese Academics' Research Capacity in Tertiary Contexts* (PhD Thesis). Wellington, New Zealand: Victoria University of Wellington.

Tierney W., Sabharwal N. (2017) Academic Corruption: Culture and Trust in Indian Higher Education. *International Journal of Educational Development,* vol. 55, July, pp. 30–40.

Tierney W. G., Sabharwal N. S. (2016) Analyzing the Culture of Corruption in Indian Higher Education. *International Higher Education,* vol. 87, October, pp. 6–7.

Tilak J. B.G. (2012) Higher Education Policy in India in Transition. *Economic and Political Weekly,* vol. 47, no 13, pp. 36–40.

University Grants Commission (2017) *UGC Annual Report 2016–2017*. Available at: https://www.ugc.ac.in/pdfnews/9764381_Complete-AR-2016–17-English.pdf (accessed 20 April 2021).

Varghese N. V., Malik G. (2016) *India Higher Education Report 2015*. Oxon: Routledge.

Vuong Q.-H., Napier N. K., Ho T. M., Nguyen V. H., Vuong T.-T., Pham H., Nguyen H. K.T. (2019) Effects of Work Environment and Collaboration on Research Productivity in Vietnamese Social Sciences: Evidence from 2008 to 2017 Scopus data. *Studies in Higher Education, vol. 44*, no 12, pp. 2132–2147.

Vuong Q. H., Ho T. M., Vuong T. T., Napier N. K., Pham H. H., Nguyen H. V. (2017) Gender, Age, Research Experience, Leading Role and Academic Productivity of Vietnamese Researchers in the Social Sciences and Humanities: Exploring a 2008–2017 Scopus Dataset. *European Science Editing, 43*, 51–55.

Welch A. (2020) Of Worms and Woodpeckers: Governance & Corruption in East and Southeast Asian Higher Education. *Studies in Higher Education, vol. 45*, no 10, pp. 2073–2081.

Yang R. (2015) Corruption in China's Higher Education System: A Malignant Tumor. *International Higher Education,* vol. 39, March, pp. 18–20.