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SOCIO-ECONOMIC ASPECTS AFFECTING ARCHITECTURAL EDUCATION AND PROFESSION: STRATEGIES AND TACTICS

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Abstract. India had four architectural institutes after independence in 1947. However, the number has recently risen to 480. Although this is an optimistic scenario, the school vacancy rate has risen to 40%. Fresh graduates frequently complain of lower pay packages and lowered employability. There is inequality among Indian states and union territories in the number of architectural institutes and registered architects. A region's population, economy, and living standards influence architectural expressions and employability, which may have an impact on the density of architectural institutes and registered architects there. This study depicts those aspects in order to aid the inevitable reformation of architecture education and practice. This study adopts an explanatory mixed-method approach, where the first two tasks adopt quantitative analysis, followed by task three, which adopts qualitative analysis. The first two tasks are regarding the demographic and co-relational studies. The last task is to comprehend trends and challenges in architectural education and practice, done through expert interviews (n = 40) and a questionnaire survey (n = 215). It is established that the societal aspects influencing architectural education and profession are geographic location, the construction market, real estate indicators, the economic development trend of the place, a stable political situation, demand vs. supply, proximity to employment, growth in urbanization and infrastructure, standard of living, research, and infrastructure facilities.

Keywords: *Employability skills, Industry-worthiness, construction market, investment, economy, explanatory mixed method.*

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1. Introduction

India is ethnically and geographically diverse; 28 states and eight union territories, with the world's second-largest population and third-largest higher education system (AICTE, 2021; Ministry of Education, 2020; NEP, 2020; Panda & Garg, 2019). A panacea approach to architecture education in India is beyond reach. University *Grants Commission* (UGC) oversees the coordination, determination, and maintenance of minimum standards in university education; however, *Council of Architecture* (CoA) is the statutory body responsible for regulating architectural education and profession. In the post-independence and post-liberalization periods of technical education in India, architecture as a profession commanded higher public acceptance and status. Students pursued architecture as a noble career, resulting in the emergence of new institutions. There were only four architectural institutions in 1947, 12 in 1972, 50 in 1991, and 177

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in 2010, and number of schools has increased to 480 in 2021 (CoA, 2020b, 2021)**.** Today's architectural education has a depleting quality, which is the subject of intense debate among the fraternity (Khan & Khan, 2019; Shah, 2019). Since the education imparted has to be relevant to the time, context, societal challenges, both locally and globally (Ghom & George, 2021b, 2020). The research paper comprehends societal aspects influencing architectural education and profession.

2. Growth in Architectural Institutes

University Grand Commission (UGC) categorizes Indian universities into autonomous higher education institutes, central universities, state universities, deemed universities, and state private universities of which 480 institutions with 213 curricula for B. Arch program (UGC, 2020). CoA Minimum Regulation 2020 specifies 75% of curriculum content for the B. Arch program, with remaining 25% left to institutes to accommodate regional diversities (CoA, 2022b). Although there is an increase in the number of architectural institutes and available seats in the earlier phase, it is paradoxical that there is an increase in vacant seats, leading to a decline in the number of institutes in the later phase. In 2008–09, *5.29% of seats were vacant, and as of now, 36.24% are vacant.* Growth in architectural institutions in India is expressed through absolute change, % change, average annual absolute change, and average annual % change (Table 1).

Table 1. Growth in India's' Architectural Institutions Size, Seats Available (Source: Authors)

Institutions in India	2008-2009	2020-2021	Absolution change	Percentage change	Average annual absolute change	Average annual percentage change
Architectural Institutions	133	480	480 – 133 = 347	347/133*100 = 261%	347/13 = 27	10.37%
Total Seats Available	6359	23184	23184 - 6359 = 16825	16825/6359*100= 264%	16825/13 = 1294	10.46%

Although the average annual percentage change is 10.37% (Table 1), there is uneven growth in many architectural institutes and total seats. Out of 480 institutes, 120 are in metro areas, and in 2022–23, 56 institutes will close due to a paucity of admissions (CoA, 2021, 2022a). Most of these institutes, founded in 2005–20, are in rural or suburban areas. State-wise categorization of institutes under closure is 12 from Maharashtra, 11 from Gujarat, *seven* from Haryana, *nine* from Tamil Nadu, *nine* from Uttar Pradesh, *two* each from Rajasthan and Odisha, and *one* each from Kerala, Jharkhand, Punjab, and Himachal Pradesh (Table 3).

Institutional student intake is different, *ranging from 20 to 160 seats.* The year-wise growth from 2008-09 to 2020-21 of admissions taken and available student- intake are shown in Figure 1.

Further, year-wise growth in architecture institutes and year-wise vacancy rates (%) in architectural institutes from 2008 to 2020 are shown in Table 2. It is a paradox that the 'vacancy rate is also increasing with the increasing number of institutes.' Drastic decline in employment opportunities is one of the significant reasons for vacant seats. Demand for fresh architects has decreased since the real estate sector suffered losses in the last five years (DT Next, 2020). The percentage of vacant seats (CoA 2019; 2020; 2021; DNA Correspondent 2018; The New Indian Express 2019; Hindustan Times 2022; Umamaheswara Rao 2022) created enormous economic pressure on institutions resulting

in "hiring fewer underqualified faculty members or part-time teachers, who give insufficient time and academic inclination to teaching " (CoA, 2020b).

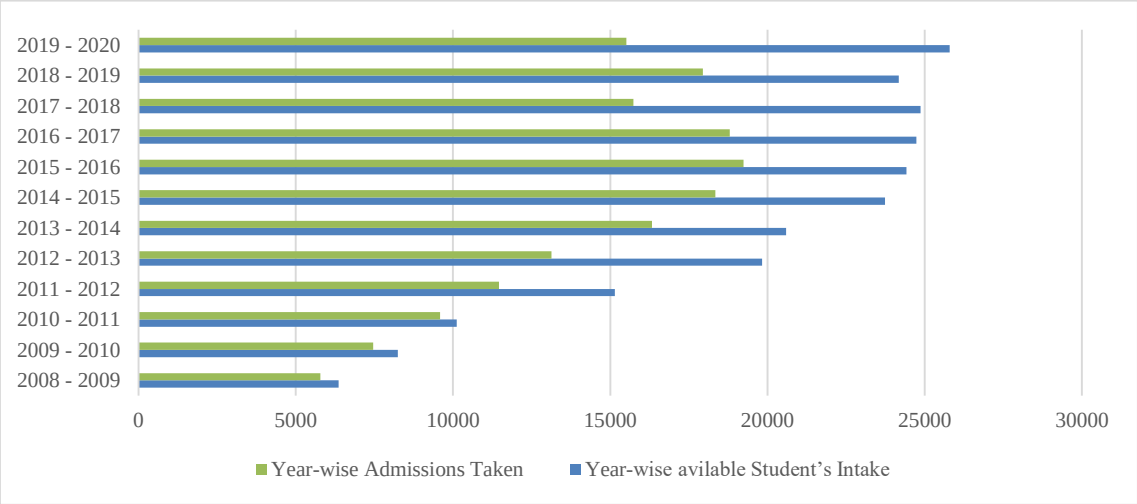
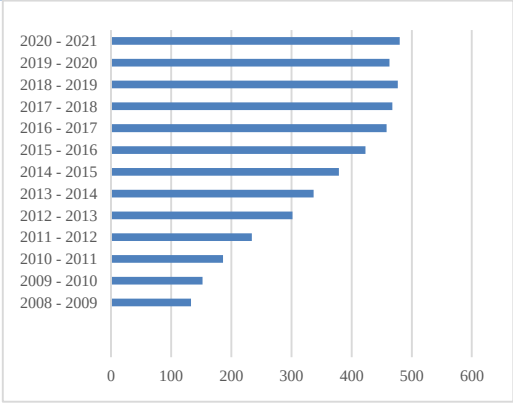
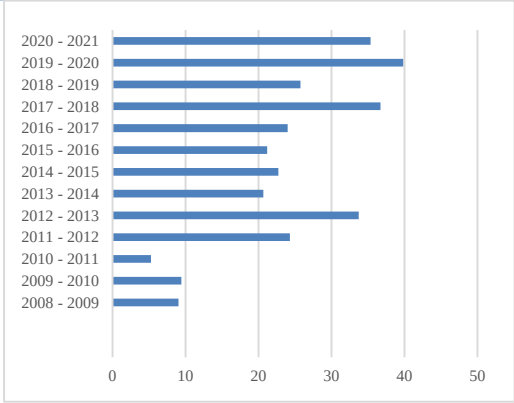


Figure 1. Comparison of Admissions Taken and Available Student's Intake (Source: Authors)

Table 2. Growth of Architectural Institutes vs Growth in Vacancy (Source: Authors)

	
Year wise growth in architectural institutes (Note: x-axis shows number of institutes and y-axis shows academic year from 2008-2009 to 2022-2021)	**Year wise vacancy in architectural institutes** (Note: x-axis shows percentage of vacancy in architecture institutes and y-axis shows academic year from 2008-2009 to 2022-2021)

Primary reason for the decline of standards in architectural education is the compromise exercised in teaching quality, infrastructure, and lower institutional profit. According to the latest *Skill India* reports, only 40% of graduates are employable. Therefore, architectural institutes need to adapt their curricula to market demands; *be it industrial, individual or societal* (Sharma, 2021).

3. Methodology

The methodology adopted is explanatory mixed-method research to identify societal aspects affecting architectural education and practice. It is broken up into three sub-tasks (Figure 2). First task uses descriptive statistics to study the growth of the architectural institutes from 2008 to 2022. Spatial distribution of architects in various

states and union territories is studied using Lorenz curve. Second task is research on correlation study of NITI Aayog, the Innovation Index†, i.e., enablers + performance, and foreign direct investment (FDI)‡ with registered architects. Co-relational study of Innovation Index (II) and foreign direct investment (FDI) with registered architects in states and union territories will help identify crucial factors affecting architects' inequality in a particular region. Third task reinforces aspects identified in the second task. It further analyzes current architectural education and practice scenarios through an interview and survey.

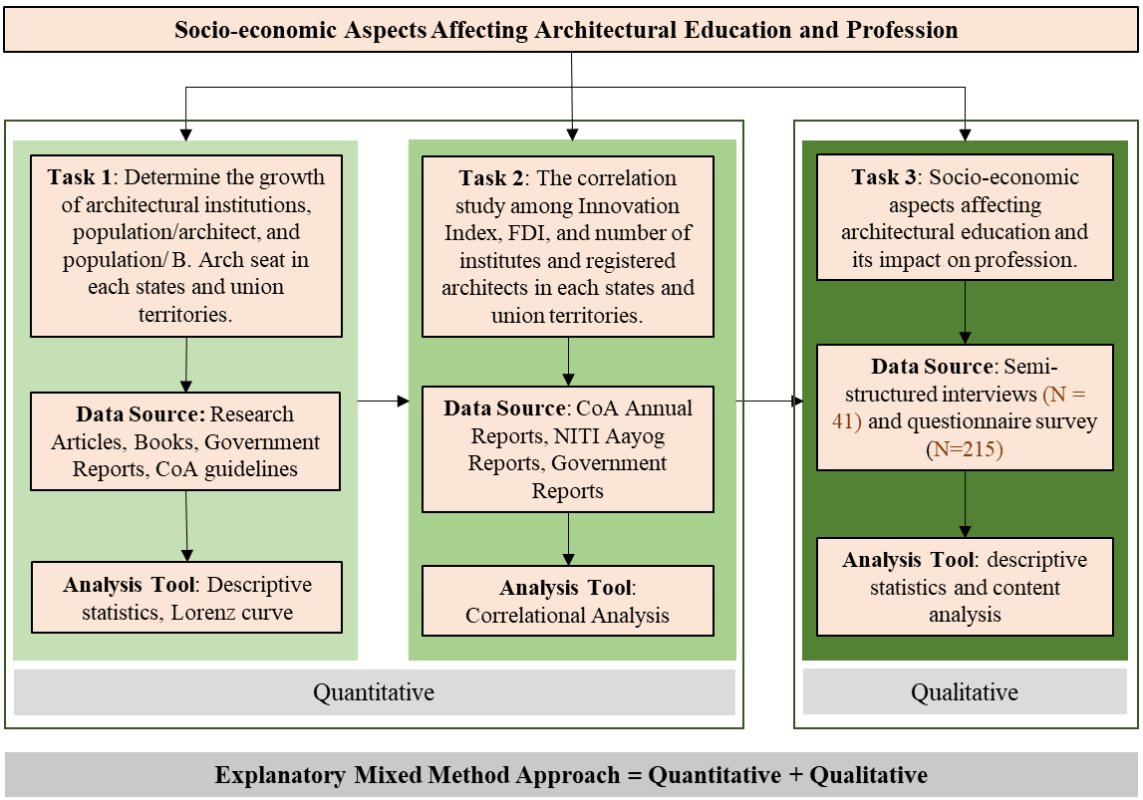


Figure 2. Research Framework (Source: Authors)

4. A Demographic Study of Architecture Education

Table 3 shows 28 states and eight union territories of India, with projected population, geographical area, registered architects in 2020, architectural institutes, number of seats available, and institutes that are under closure. Based on this data, population/architect, geographic area/architect, population / B. Arch seat is worked out. State-wise, architects' population density varies. While there is one architect per 1,485 people in *Chandigarh*, whereas, in *Bihar* one architect served 1,71,193 people which is

† NITI Aayog and Institute for Competitiveness, "The India Innovation Index", accessed February 22, 2022, https://www.niti.gov.in
The index attempts to create an extensive framework for the continuous evaluation of the innovation environment in all States and Union Territories in India.

‡ Foreign Direct Investment percentage, accessed February 22, 2022, www.rbi.org.in/scripts/bs_viewcontent.aspx?Id=2513
The foreign direct investment percentage is the percentage share in states and union territories in India.

far too less. In terms of numbers, *Rajasthan, being* the biggest state, has only 2.2% of architects, whereas *Maharashtra*, the third-biggest state, has 28% of architects. Thus, density of architects does not correlate with population or geographical area (Figure 4). Further, the research indicates that relevant factors determining the density and number of 'architects required in the future' need to be rationally identified. Compared with overall Indian architects' density, *i.e., 1:13247;* there is 1:3000 in the USA, 1:400 in Italy, and 1:580 in Greece (Biber, 2020; Mandrup, 2018), It may be due to the fact that "Architects work in a volatile economic sector" (Baker, 2018). In the case of India, there are variations among states and union territories in the number of architects, architectural institutions, and the total number of available seats that are approved by the CoA. It is crucial to understand and comprehend this situation for better future planning in architectural education. There arise two remarkably interesting scenarios while analyzing Table 3: why architect density differs in states and union territories, also whether this variation is associated with societal variable.

Table 3. Overall Demographics of India in terms of Population, Registered Architects, Architectural Institutions, and their Intake (Source: Compiled by Authors)

N	State	Projected Population 2020	Geographic Area (km^2)	Registered Architects 2020	Arch. Institutes	No. of Seats	I. under closure	Population/ Architect	Geographic Area/ Architect	Population/ B.Arch. seat
1	Andaman and Nicobar	4,17,036	8,249	36	0	0	0	11584	206.225	0
2	Andhra Pradesh	5,39,03,393	1,60,205	1,447	9	400	0	37252	104.232	134758
3	Arunachal Pradesh	15,70,458	83,743	61	0	0	0	25745	1147.164	0
4	Assam	3,56,07,039	78,438	698	2	80	0	51013	109.245	445088
5	Bihar	12,47,99,926	94,163	729	2	70	0	171193	110.780	1782856
6	Chandigarh	11,58,473	114	780	1	40	0	1485	0.143	28962
7	Chhattisgarh	2,94,36,231	1,35,191	880	4	130	0	33450	142.607	226433
8	D.& Nagar Haveli and Daman & Diu	6,15,724	603	54	0	0	0	11402	27.409	0
9	Delhi	1,87,10,922	1,483	9,377	8	562	0	1995	0.156	33293
10	Goa	15,86,250	3,702	762	1	40	0	2082	4.740	39656
11	Gujarat	6,38,72,399	1,96,024	6,067	34	1320	10	10528	28.980	48388
12	Haryana	2,82,04,692	44,212	3,943	24	760	7	7153	10.452	37111
13	Himachal Pradesh	74,51,955	55,673	508	3	40	1	14669	101.779	186299
14	Jammu & Kashmir	1,36,06,320	42,241	334	4	160	0	40737	117.336	85040
15	Jharkhand	3,85,93,948	79,714	518	3	50	1	74506	145.199	771879
16	Karnataka	6,75,62,686	1,91,791	7,338	44	2800	0	9207	24.219	24130
17	Kerala	3,56,99,443	38,863	5,207	36	1770	1	6856	6.339	20169
18	Ladakh	2,89,023	59,146	4	0	0	0	72256	14786.500	0
19	Lakshadweep	73,183	32	4	0	0	0	18296	8.000	0
20	Madhya Pradesh	8,53,58,965	3,08,245	2,718	17	780	0	31405	107.402	109435
21	Maharashtra	12,31,44,223	3,07,713	27,986	101	5749	12	4400	10.130	21420
22	Manipur	30,91,545	22,327	110	0	0	0	28105	177.198	0
23	Meghalaya	33,66,710	22,429	128	1	30	0	26302	167.381	112224
24	Mizoram	12,39,244	21,081	84	1	30	0	14753	197.019	41308
25	Nagaland	22,49,695	16,579	56	0	0	0	40173	267.403	0

26	Odisha	4,63,56,334	1,55,707	967	9	280	2	47938	134.115	165558
27	Puducherry	14,13,542	479	206	1	40	0	6862	2.207	35339
28	Punjab	3,01,41,373	50,362	1,957	16	772	2	15402	24.459	39043
29	Rajasthan	8,10,32,689	3,42,239	2,179	16	688	2	37188	150.105	117780
30	Sikkim	6,90,251	7,096	75	0	0	0	9203	87.605	0
31	Tamil Nadu	7,78,41,267	1,30,058	10,619	76	3860	9	7330	10.903	20166
32	Telangana	3,85,10,982	1,12,077	3,705	15	1035	0	10394	29.999	37209
33	Tripura	41,69,794	10,486	42	0	0	0	99281	262.150	0
34	Uttar Pradesh	23,78,82,725	2,40,928	7131	38	1224	9	33359	31.514	194349
35	Uttarakhand/ Uttaranchal	1,12,50,858	53,483	816	6	170	0	13788	63.219	66182
36	West Bengal	9,96,09,303	88,752	2,297	8	304	0	43365	36.857	327662
Total		1,37,05,08,601	26,02,922	26,02,922	480	23184	56			

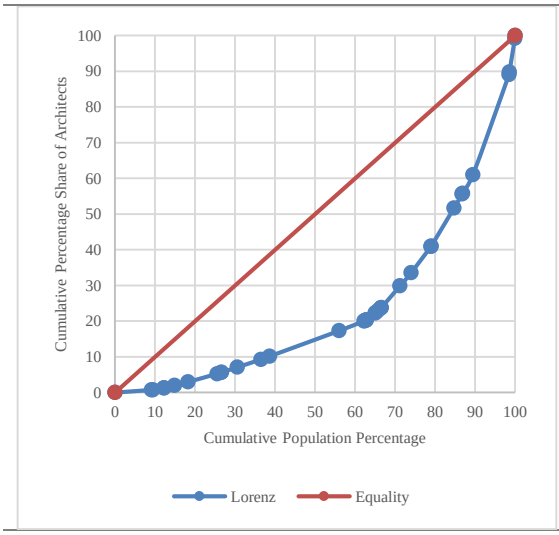
Note:
- Source Population Projection 2020: (National Commission on Population Ministry of Health & Family Welfare Nirman Bhawan, 2019)
- Source for Geographical Area of Indian States and Union Territories: https://www.jagranjosh.com/general-knowledge/largest-state-in-india-check-list-of-all-states-by-area-and-population-1619423868-1
- Source for Registered Architects, Institutes and their intake, Institutes under Closure in States and Union Territories of India: (CoA, 2021, 2022c)

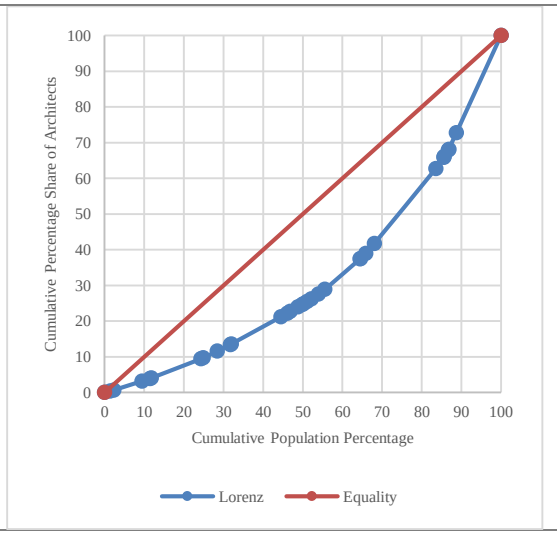
5. Dispersion of architects

Lorenz curve is the graphical method for studying dispersion, measuring the deviation of actual distribution from the line of equal distribution (Frank A. Cowell, 2011; Ray, 1998). Lorenz curve and Gini coefficient are used in this research to understand 'dispersion and inequality' of architects in Indian states and union territories (CoA, 2022c, 2022a). Further, it is compared with European territories (UNStudio, 2018). Formal education in architecture seemingly started in European countries (Ghom & George, 2021a), and a comparison will shed light on the gap in Indian scenario. The greater the distance of the Lorenz curve from the line of equal distribution, the greater the inequality in its series. In Table 4, the Lorenz curve is too far from the egalitarian line, in the case of India, which indicates unequal dispersion; the *Gini coefficient is 0.53*, indicating a severe shortage of architects in India. In contrast, closer the proximity of Lorenz curve to the line of equal distribution indicates a lower degree of inequality, as in the case of European countries. The Gini coefficient for European countries is 0.35, indicating adequate equality. The calculation of Lorenz curve and Gini coefficient is shown in Table 5. This situation further reinforces the requirement to identify factors affecting inequality.

Though Lorenz curve and Gini coefficient are used in determining income distribution and the degree of income inequality (Frank A. Cowell, 2011; Sitthiyot & Holasut, 2020), in this research, Lorenz curve helps in understanding the distribution of architects in various states and union territories of India and European countries in Europe. Whereas Gini coefficient helps in measuring the degree of architect inequality. Although the number of architects is less and there is inequality among the places, it does not mean that work will be done by increasing the number of architects, as "only 20% of world's-built environment is designed by architects" (Bryson, 2017). Hence, it is crucial to analyze the factors affecting inequality among states and union territories and find strategies to improve 'empowerment and employability' in architecture profession, which will solve the problem.

Table 4. Lorenz Curve for Measuring inequality of Architects in States and Union Territories of India and Countries of Europe (Source: Authors)





Lorenz Curve for India Gini Coefficient = 0.53	Lorenz curve for European countries Gini Coefficient = 0.35

Gini index < 0.2 represents perfect income equality, 0.2–0.3 relative equality, 0.3–0.4 adequate equality, 0.4–0.5 big architect gap, and above 0.5 represents severe architect gap.

Table 5. Calculations of the Lorenz Curve and Gini Coefficient for Indian States and Union Territories, and European Countries (Source: Authors)

Sl. No	Indian States and Union Territories	Population Percentage	Percentage Share of Architect	Architect/ Population	Cumulative Population Percentage	Cumulative % Share of Architects	Area under Lorenz	European Countries	Population Percentage Share	Percentage share of Architect	Architect/ Population	Cumulative Population Percentage	Cumulative % Share of Architects	Area under Lorenz
1	Bihar	9.106	0.730	0.080	9.106	0.730	0.0333	Bulgaria	1.298	0.376	0.289	1.2978	0.3756	0.0024
2	Tripura	0.304	0.042	0.138	9.410	0.772	0.0023	Slovakia	1.019	0.322	0.316	2.3168	0.6976	0.0055
3	Jharkhand	2.816	0.519	0.184	12.226	1.291	0.0291	Poland	7.087	2.504	0.353	9.4034	3.2017	0.1382
4	Ladakh	0.021	0.004	0.190	12.247	1.295	0.0003	Czechia	1.997	0.715	0.358	11.3999	3.9172	0.0711
5	Assam	2.598	0.699	0.269	14.846	1.995	0.0427	Latvia	0.356	0.145	0.407	11.7560	4.0621	0.0142
6	Odisha	3.382	0.969	0.286	18.228	2.963	0.0838	France	12.527	5.366	0.428	24.2831	9.4282	0.8450
7	West Bengal	7.268	2.301	0.317	25.496	5.264	0.2990	Lithuania	0.522	0.259	0.497	24.8047	9.6875	0.0499
8	Jammu & Kashmir	0.993	0.335	0.337	26.489	5.599	0.0539	Romania	3.607	1.878	0.521	28.4113	11.5656	0.3833
9	Nagaland	0.164	0.056	0.342	26.653	5.655	0.0092	Netherlands	3.250	1.860	0.572	31.6612	13.4259	0.4061
10	Andhra Pradesh	3.933	1.450	0.369	30.586	7.105	0.2509	Estonia	0.248	0.143	0.577	31.9093	13.5690	0.0335
11	Rajasthan	5.913	2.183	0.369	36.499	9.287	0.4846	United Kingdom	12.513	7.602	0.608	44.4227	21.1709	2.1736
12	Chhattisgarh	2.148	0.882	0.410	38.647	10.169	0.2089	Austria	1.662	1.037	0.624	46.0845	22.2083	0.3604
13	Uttar Pradesh	17.357	7.144	0.412	56.004	17.313	2.3850	Croatia	0.758	0.483	0.637	46.8421	22.6913	0.1701
14	Madhya Pradesh	6.228	2.723	0.437	62.232	20.035	1.1631	Sweden	1.928	1.252	0.649	48.7702	23.9433	0.4496
15	Manipur	0.226	0.110	0.489	62.458	20.146	0.0453	Finland	1.032	0.680	0.659	49.8018	24.6230	0.2505
16	Meghalaya	0.246	0.128	0.522	62.703	20.274	0.0496	Slovenia	0.391	0.261	0.667	50.1931	24.8842	0.0969
17	Arunachal Pradesh	0.115	0.061	0.533	62.818	20.335	0.0233	Ireland	0.927	0.626	0.676	51.1198	25.5102	0.2335
18	Lakshadweep	0.005	0.004	0.750	62.823	20.339	0.0011	Norway	1.002	0.715	0.714	52.1219	26.2257	0.2592
19	Punjab	2.199	1.960	0.891	65.022	22.299	0.4689	Hungary	1.824	1.306	0.716	53.9458	27.5314	0.4902

20	Mizoram	0.090	0.084	0.931	65.113	22.384	0.0202	Switzerland	1.607	1.342	0.835	55.5525	28.8729	0.4531
21	Himachal Pradesh	0.544	0.509	0.936	65.657	22.893	0.1231	Spain	8.836	8.514	0.964	64.3888	37.3871	2.9275
22	Uttarakhand/ Uttaranchal	0.821	0.817	0.996	66.478	23.710	0.1913	Cyprus	0.166	0.170	1.025	64.5546	37.5570	0.0621
23	Andaman and Nicobar	0.030	0.036	1.185	66.508	23.746	0.0072	Serbia	1.293	1.431	1.107	65.8478	38.9880	0.4949
24	D.& Nagar Haveli and Daman & Diu	0.045	0.054	1.204	66.553	23.800	0.0107	Belgium	2.156	2.701	1.253	68.0041	41.6889	0.8698
25	Gujarat	4.660	6.078	1.304	71.213	29.878	1.2508	Germany	15.527	21.017	1.354	83.5309	62.7059	8.1046
26	Telangana	2.810	3.712	1.321	74.023	33.589	0.8917	Greece	1.999	3.184	1.592	85.5304	65.8898	1.2856
27	Karnataka	4.930	7.351	1.491	78.953	40.940	1.8371	Luxembourg	0.117	0.197	1.683	85.6473	66.0865	0.0771
28	Sikkim	0.050	0.075	1.492	79.004	41.016	0.0206	Denmark	1.087	1.860	1.711	86.7343	67.9468	0.7285
29	Tamil Nadu	5.680	10.638	1.873	84.683	51.653	2.6317	Malta	0.096	0.179	1.862	86.8304	68.1256	0.0654
30	Haryana	2.058	3.950	1.919	86.741	55.603	1.1037	Portugal	1.922	4.651	2.419	88.7526	72.7762	1.3542
31	Puducherry	0.103	0.206	2.001	86.844	55.810	0.0575	Italy	11.247	27.224	2.420	100.0000	100.0000	9.7164
32	Kerala	2.605	5.216	2.003	89.449	61.026	1.5217							
33	Maharashtra	8.985	28.036	3.120	98.434	89.062	6.7429							
34	Goa	0.116	0.763	6.595	98.550	89.825	0.1035							
35	Delhi	1.365	9.394	6.880	99.915	99.219	1.2905							
36	Chandigarh	0.085	0.781	9.244	100.000	100.000	0.0842							

- Total area under Lorenz curve = 23.52
- Area under equality line = 50
- Area between equality and Lorenz = 50 – 23.52 = 26.48
- **Gini Coefficient** = 26.48/50 = **0.53** (representing severe gap)

- Total area under Lorenz curve = 32.57
- Area under equality line = 50
- Area between equality and Lorenz = 50 – 32.57 = 17.43
- **Gini Coefficient** = 17.43/50 = **0.35** (adequate equality)

Note: Gini index < 0.2 represents perfect income equality, 0.2–0.3 relative equality, 0.3–0.4 adequate equality, 0.4–0.5 big architect gap, and above 0.5 represents severe architect gap.
The numbers of architects and population for Indian states and territories are taken from (CoA, 2022c, 2022a); for European countries, they are taken from (UNStudio, 2018).

6. Correlational Study

Correlation study among registered architects in respective regions, Innovation Index (NITI Aayong, 2020), and Foreign Direct Investment (FDI) (Andreica & Maricescu, 2011) are conducted to understand the 'concentration of architects in states or union territories'. These three aspects are likely linked. Two criteria for innovation are 'enablers and performance.' Human capital, investment, knowledge workers, business environment, safety, and legal environment are sub-criteria of enablers (Table 6) (NITI Aayong, 2020).

Table 6. Enablers in India Innovation Index (Source: NITI Aayog, 2020)

Enablers	
Human Capital	• Enrolment in Ph. D. • Enrolment in Engineering and Technology • Grading NAAC • Student-teacher Ratio • Schools with ICT labs • NAS scores
Investment	• Expenditure on higher-technical education • Expenditure on research and development • Expenditure on science, technology & environment • FDI Inflow • Venture capital deals
Knowledge Workers	• Knowledge-intensive employment • NGOs involved in knowledge intensive areas • Private R&D units • State funded R&D units

Business Environment	• Ease of doing business ranking • Online services transactions • Internet subscribers • Incubator centres • Common facility centres
Safety and Legal Environment	• Information Technology/Intellectual Property related acts • Cyber-crime • Police stations • Pendency of court case

Knowledge diffusion and knowledge output are performance sub-criteria (Table 7) (NITI Aayong, 2020).

Table 7. Performance in India Innovation Index (Source: NITI Aayog)

Performance	
Knowledge Diffusion	• ICT exports • High and medium high-tech manufacturing entities • Geographical Indications (GI) registered • Citations
Knowledge Output	• Grass root innovations Patent • Patent applications filed • Trademark applications filed • Presence of start-ups • Industrial Design applications filed • New businesses registered • Publications

Interpretations of correlation coefficients are adopted from (Lodico et al., 2006). The correlation between "registered architects and innovation index" is 0.609, a moderately strong relationship. "Registered architects and FDI percentage" is 0.783, a strong relationship (Table 8). Conclusively, there are more registered architects in places with more Foreign Direct Investment, human capital, knowledge workers, a good business environment, a safe and legal environment, diffusion of knowledge, and production of knowledge.

Table 8. Correlation among Registered Architect, Innovation Index, and FDI Percentage (Source: Authors)

		Registered Architect	Innovation Index	FDI Percentage
Registered Architect	Pearson Correlation	1	.609**	.783**
	Sig. (2-tailed)		<.001	<.001
Innovation Index	Pearson Correlation		1	.595**
	Sig. (2-tailed)			<.001
FDI Percentage	Pearson Correlation			1
	Sig. (2-tailed)			

**. Correlation is significant at the 0.01 level (2-tailed).

7. Socio-economic Aspects Creating Inequality

In-depth interviews are conducted with 40 experts to study the aspects affecting architecture education and the profession. Methodology of surveys / interview is shown in Figure 3.

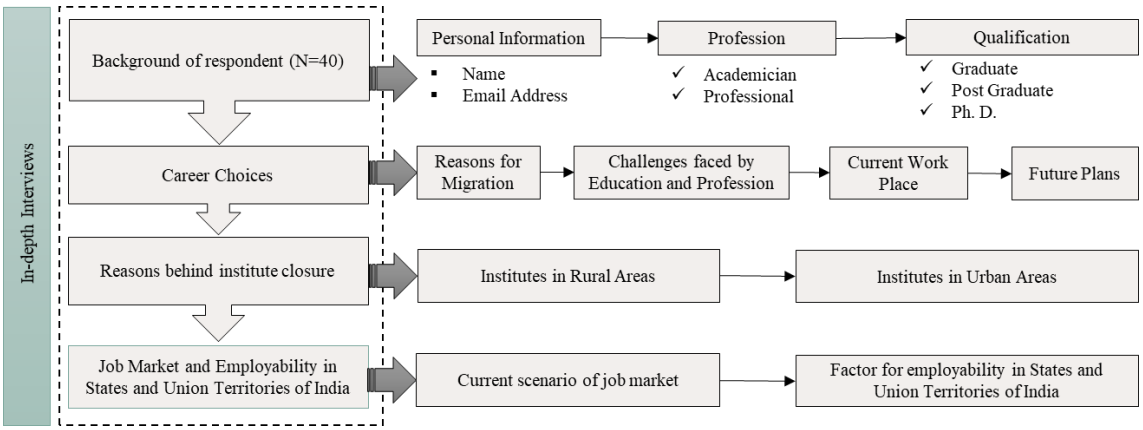


Figure 3. Flowchart of Interview Schedule (Source: Authors)

These experts are architects from industry and academics with more than ten years of experience. Their demographic information is shown in Figure 4.

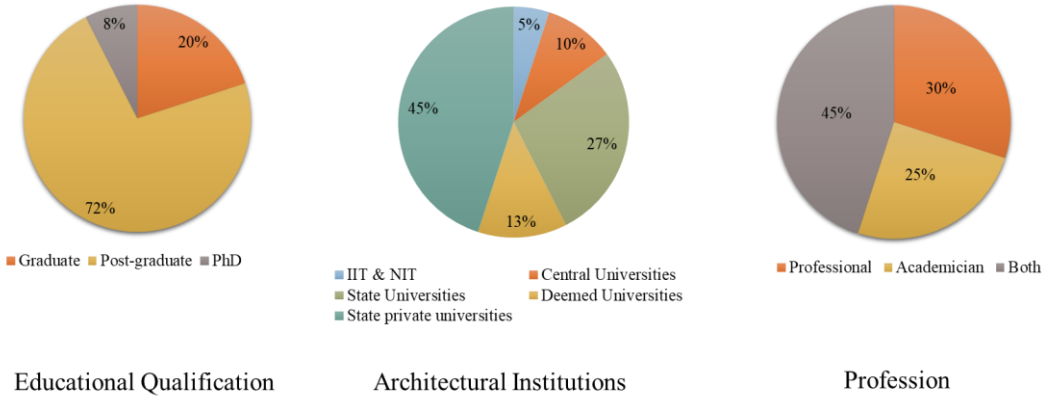


Figure 4. Demographic Information of Architects (Source: Authors)

7.1. Architecture Career Choices

Architectural education opens many avenues besides the core domain, and it is crucial to understand which parameters a fresh graduate considers while making career choices. Investment in architecture in terms of time and finances is more compared to other engineering fields, whereas employability and pay packages are meager in for a fresh B. Arch graduate! As a result, vacancy rate in architectural institutions is increasing, also 56 institutes are considering closure in the coming year! Survival in architecture-professional life tends to be problematic, if the student has taken an education loan for B. Arch. Content analysis of experts' interviews on these issues are given below.

Migration: 62% experts have migrated in search either job or education because of location, organization's reputation, and salary.

Major challenges facing Architectural Education: Challenges faced are 'lower real-world exposure, minimal industry-academic interaction, low exposure to real projects, and community participation in design'. Experts think most curriculum content, norms, and regulations need to be updated. Despite tremendous growth in architectural institutions and student intake, acute shortage of appropriate faculty has negatively affected *teacher-student ratio.* Fresh graduates: lacking appropriate employability skills and professional or research experience, are hired to fill-up the faculty gap, as per norms. Arbitrary policies of the CoA regarding new institutions and intake further worsen the educational scenario.

Current Workplace and future Aspirations: It is found that 52% of experts are in academia, 12% are in architectural firms, 8% are in builders' offices, 5% have their own practice and attend institutes as *visiting faculty*, and 23% are in full-time private practice. Their future aspirations are different from their current work. It is a dream for architects to express themselves in the built environment: 25% want to work in academia, 32% want to have a private practice, 2% want to be academicians as well as practitioners, 20% want to be in research and development, which is quite encouraging, and 13% prefer working in other fields. Therefore, it is quite appropriate that architecture education adopt an *interdisciplinary approach* so that fresh graduates can excel in the field of their own choice. *Virtual, augmented, and mixed reality* are buzzwords in architectural education and practice (Abu Alatta & Freewan, 2017). 3% want to explore such options, and 5% want to pursue further education or lifelong learning (Figure 5).

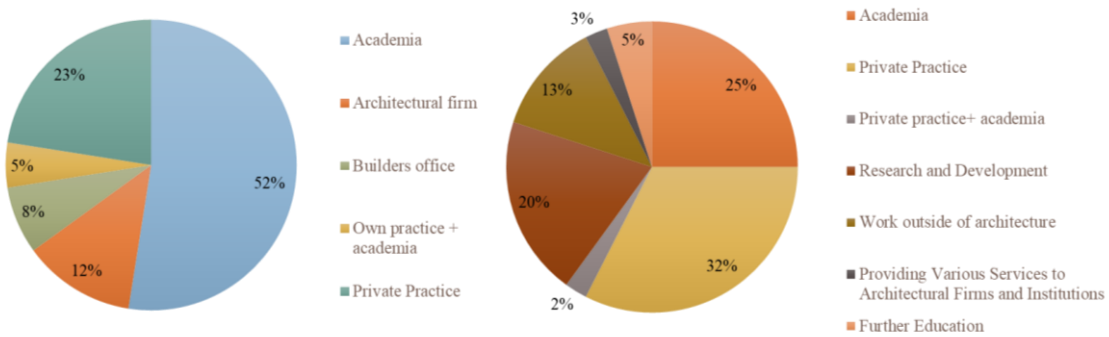


Figure 5. Current Workplace and Future Plans (Source: Authors)

The above scenario is not just related to the experts interviewed! *National Education Policy 2020* emphasizes *'broad-based, multi-disciplinary, holistic undergraduate education with flexible curricula, creative combinations of subjects, integration of vocational education and multiple entry and exit points with appropriate certification'* (NEP, 2020).

7.2. Reasons behind institute closure

Primarily, most of the architectural institutes are in rural or suburban areas. As per CoA standards, the B. Arch program demands larger spaces and infrastructure, academic tours, and field studies during the educational process. Hence, the investment required to establish an acceptable institute is considerably high compared with other streams like computer science. In response to these investments and the maintenance of these spaces, it is not easy to fetch returns and a commensurate profit in a short period of time. The

greater the cost of land and infrastructure, the greater the gap; hence, very few or only old architectural institutes are in urban areas that successfully survive! Although teachers in the architecture institutes are architects, they lack the much-needed professional experience and the real world of applications; therefore, visiting faculty is encouraged by the CoA to give students exposure to practical and real-world knowledge. Architecture is a profession that is yet to be recognized in rural areas of India; thus, most professionals settle in urban areas. This situation makes it difficult for an institute to provide students with appropriate industrial knowledge and find the required number of experienced faculty members in rural or suburban areas. This, in turn, impacts the admission count of those institutes, affecting their financial logistics.

In the era of rapid earnings through international job opportunities, a limited number of students and their parents are interested in a course that requires five years of duration and low initial pay packages. Also, the decreased availability of quick recruitment opportunities and handsome salary packages in the industry attracts people's interest in such programs, reducing the demand for architecture seats in educational institutes. Reduction in the demand for architectural seats has adversely affected the institutions' financial stability, leading to a compromise in the faculty numbers and facilities provided in the institute, which directly affects the quality of its graduates. Lowered quality and the resulting non-employability further aggravate future admissions to such institutes. The compounding effect of such situations results in non-viability and closure.

Figure 6. Societal Aspects Affecting Architectural Profession (Source: Authors)

Demand vs. supply of jobs, proximity of employment, growth and availability of urbanization and infrastructure, standard of living, location, construction market, and real estate indicators are some of the factors that experts pointed out, that influence the job market for architects (Figure 6). With "appropriate cutting-edge knowledge of architecture," as well as critical abilities like critical and creative thinking, problem-solving, analytical skills, communication skills, and lifelong learning, they can increase their employability in future. It follows that inequality that exists among states and union territories depends not only on Innovation Index and FDI indicators but also on those mentioned by experts.

8. Factors Affecting Architectural Education and its Impact on Profession: An Architects Perspective

Pan-India survey was conducted from March 2019 to March 2020 with the aim of studying the factors affecting architectural education and its impact on the profession in the contemporary scenario. There is always confusion about whether the knowledge and skills gained in a five-year architecture education are appropriate to be applied in real-life situations. In semi-structured interviews, it was found that problems exist in architectural education and that recent graduates need appropriate employability skills. It is essential to study the relevance of knowledge acquired through B. Arch program in a practical and real-world setting. Employability skills are transferable skills that a graduate can learn to make them more employable. Knowing what skills are needed and how to instill them in graduates is important. Architects who responded to the survey went through a five-year BArch program and worked in the architectural field and academia. Perspectives were also taken regarding the architecture curriculum in India. Demographic information is given in Table 9.

Respondents were asked "whether they identify themselves as architects?" in the section on demographic information with n = 215. Two hundred and five individuals identified themselves as architects, and ten did not identify themselves as architects. Out of ten, five who did not say they are architects; went on to higher studies and changed careers, and five worked in government offices in other domains. The survey is population-representative in terms of age, graduation year, educational qualification, place of graduation, and workplace (Table 9).

Experts complained about the disconnect between education and practice in interviews, so it is crucial to study the relevance of the subjects they learned as architecture students in the respective B. Arch programs they took. Whereas survey respondents were neutral based on the coefficient of variation, they thought knowledge gained through theory lectures are relevant for today's practical or real-world projects. In contrast, based on the frequency, the majority of the respondents think subjects are relevant. Based on the coefficient of variation, the design concepts realized in practice were neutral, but based on percentage frequency, the majority agreed with the concepts realized in practice. Although they agreed that appropriate technology would aid in solving future challenges, they are completely dissatisfied with the current curriculum offered in architectural education (Table 10).

Table 9. Demographic Information (Source: Authors)

Categories		Frequency	Percent
Do you identify yourself as 'Architect'	Yes	205	4.7
	No	10	95.3
Gender	Male	111	51.6
	Female	104	48.4
Age	20 to 30	66	30.7
	31 to 40	103	47.9
	41 to 50	23	10.7
	51 to 60	17	7.9
	Above 61	6	2.8
Graduation Year	2011 - 2020	146	67.9
	2001 - 2010	40	18.6
	1991 - 2000	13	6.0
	1981 - 1990	12	5.6
	1971 - 1980	4	1.9
Educational Qualification	G.D. Arch	2	0.93
	B. Arch or equivalent	89	41.40
	M. Arch or equivalent	106	49.30
	Others	10	4.65
	Ph.D. or equivalent	8	3.72
Place of your graduation college	Andhra Pradesh	2	0.93
	Assam	1	0.47
	Bihar	3	1.40
	Chandigarh	6	2.79
	Chhattisgarh	3	1.40
	Delhi	4	1.86
	Goa	1	0.47
	Gujrat	10	4.65
	Haryana	4	1.86
	Himachal Pradesh	0	0.00
	Jharkhand	0	0.00
	Karnataka	5	2.33
	Kerala	7	3.26
	Madhya Pradesh	5	2.33
	Maharashtra	104	48.37
	Odisha	11	5.12
	Punjab	2	0.93
	Rajasthan	4	1.86
	Tamil Nadu	4	1.86
	Telangana	7	3.26
	Uttar Pradesh	6	2.79
	Uttarakhand	2	0.93
	West Bengal	24	11.16
Where are you currently employed	Corporate	13	6.05
	Firm Principal Architect (Founder/Co-Founder)	20	9.30
	Government Office	21	9.77
	Higher studies	29	13.49
	Multinational/International Organization	6	2.79
	Others	22	10.23
	Private Sector	40	18.60
	Private University	16	7.44
	Self-employed	42	19.53
	Start-Up organization	6	2.79

Since the survey was anonymous, respondents were vocal about their unbiased opinion regarding the curriculum. Respondents who passed out before 2000 and after 2001 have two diametrically opposed perspectives. (Figure 7 and Table 10). Respondents who passed out before 2000 and are in their profession do not have much problem with architectural education. However, at the same time, they complain about the knowledge and skillset of fresh graduates. They believe systematic change and the gradual transformation of architectural education would be appropriate. However, respondents who passed out B. Arch after 2001 want a "*total redo*" of architectural education. Even though most maximum respondents have different opinions (Figure 7); one thing is infallible: upgrading architectural education based on tangible factors is needed.

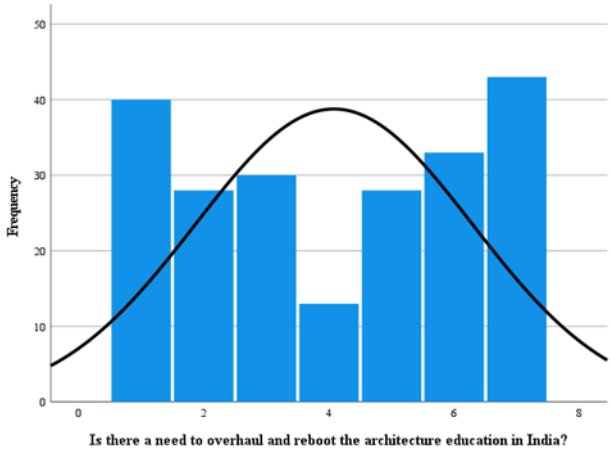


Figure 7. Need to Overhaul and Reboot the Architecture Education in India

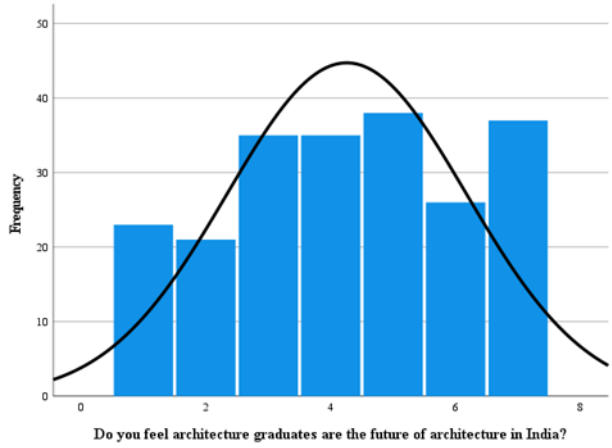


Figure 8. Architecture Graduate a Future of Architecture in India

Globalization has blurred the boundaries of the architecture profession (Bhattacharjee & Bose, 2015). The foreign architectural firm does major megaprojects in India. In the immediate post-independence era, when formal education was at a nascent stage, architects like Otto Königsberger and Le Corbusier came to India and undertook significant projects. However, even after eight decades, major infrastructure projects are done by foreign consultants. Are we lacking in providing fresh graduates with knowledge, resources, and empowerment? (Figure 8 and Table 10).

Table 10. Architects' Perspective (Source: Authors)

Sr. No.	Statements of Architects Perspective	7-Point Likert Scale							Mean	Std Deviation	Skewness	Kurtosis	Co-efficient of Variation	Decision
		1	2	3	4	5	6	7						
"1" being " Not much, I feel obsolete " and "7" being " Fairly relevant, I am content "														
1	How relevant are the subjects you learned as an architecture student to the work you do today?	11	19	42	40	48	28	27	4.33	1.67	-0.09	-0.782	38.53	Neutral
		5.10%	8.80%	19.50%	18.60%	22.30%	13%	12.60%						
"1" being "I don't think anyone listens to me. I just stay quiet and do what my office and clients tell me to do" and "7" being "Oh, almost a 100% of my concepts are realized in practice"														
2	How often are your design concepts realized in practice?	7	23	33	37	63	35	17	4.39	1.55	-0.28	-0.66	35.20	Neutral
		3.30%	10.70%	15.30%	17.20%	29.30%	16.30%	7.90%						
"1" being "No, we are architects! we must draw a lot more. Drawing solves challenges, not technology" and "7" being "Yes, I think technology is necessary. It is a tool that aids visualizing the gravity of the challenge"														
3	Do you feel technology will aid in solving future challenges?	3	4	6	24	33	62	83	5.78	1.36	-1.27	1.45	23.4	Agree
		1.40%	1.90%	2.80%	11.20%	15.30%	28.80%	38.60%						
"1" being "No one cares about it. It is the degree what matters!" and "7" being "It is one of the best on this planet"														
4	How do you rate the current curriculum for architecture in India?	21	46	67	40	25	12	4	3.25	1.41	0.47	-0.20	43.52	Somewhat dissatisfied
		9.80%	21.40%	31.20%	18.60%	11.60%	5.60%	1.90%						
"1" being "No. Each new batch is a disaster!" and "7" being "Yes. I feel with more mentoring we will get there"														
5	Do you feel architecture graduates are the future of architecture in India?	23	21	35	35	38	26	37	4.26	1.92	-0.12	-1.06	45.05	Neutral
		10.70%	9.80%	16.30%	16.30%	17.70%	12.10%	17.20%						
"1" being "Yes, Let's REDO all of it!" and "7" being "No, we need a systematic change a gradual transformation of the architecture curriculum"														
6	Is there a need to overhaul and reboot the architecture education in India?	40	28	30	13	28	33	43	4.08	2.21	-0.06	1.49	54.24	Neutral
		18.60%	13.00%	14.00%	6.00%	13.00%	15.30%	20.00%						
"1" being "Not really, it is a waste of my time" and "7" being "Yes, I am eager to teach"														
7	How willing are you to mentor and teach architecture students?	1	10	11	24	29	53	87	5.68	1.49	-1.06	0.24	26.19	Agree
		0.50%	4.70%	5.10%	11.20%	13.50%	24.70%	40.50%						
"1" being "No need, they are all the same. It will be of no use. We must fix the current problems with societies and make them better" and "7" being "Yes, I feel new societies will help solve emerging challenges"														
8	Do you feel new communities, associations, and societies must be formed to solve challenges in architecture education in India?	8	14	13	24	34	40	82	5.37	1.77	-0.92	-0.18	32.89	Agree
		3.70%	6.50%	6.00%	11.20%	15.80%	18.60%	38.10%						
"1" being "No. It is not as meaningful in adding value to Architectural Education in India" and "7" being "Yes. I see myself as a part of a larger system. My work contributes and adds value to the larger context of architectural education India"														
9	Do you feel the work that you do adds value to the broader context of architectural education and practice?	21	18	23	37	45	34	37	4.47	1.87	-0.37	-0.87	41.82	Agree
		9.80%	8.40%	10.70%	17.20%	20.90%	15.80%	17.20%						
Note: Co-efficient of variation = Std. deviation/mean X 100 (The threshold for the coefficient of variance is considered to be less than 1/3, i.e., 33.33%, so the data disparity is less. When it is more, the consensus from experts is based on percentage frequency.)														

When respondents were asked whether architecture graduates are the future of architecture in India, they were neutral about it. Nevertheless, they strongly feel that new communities, associations, and societies must be formed to solve challenges in

architectural education in India since they can add value to the broader context of architectural education and practice. At the same time, they believed they could add value to architecture education and the curriculum if properly integrated into the learning process (Table 10).

9. Conclusion

The research shows that there has been fluctuating growth in architectural education from 2008 to 2021. Architects' densities in respective Indian states and union territories are unaffected by population or geographical area. Critical factors for settling of registered architects in specific Indian states are foreign direct investment, human capital, knowledge workers, business environment, safety and legal environment, knowledge production, and knowledge diffusion.

From semi-structured interviews with experts, it is concluded that factors affecting the architectural profession in India are standard of living, geographic location, construction market, growth in real estate, urbanization and infrastructure, research and development, human capital, investment, the economic and development trends of a place, a stable political situation, and demand vs. supply.

Further, it is established that the factors affecting architectural education are lower exposure to ground reality, minimal industry-academic interaction, lack of exposure to real-life projects, community participation in design, outdated curriculum content, inappropriate norms and regulations, a severe shortage of appropriate faculty, a critically lower teacher-student ratio, and a severe shortage of employability with a higher pay package. Through the research, major challenges confronting architectural education in India; resulting in the inevitable need for curriculum revision and revamping based on current market demand, are identified. Further, for enhanced employability, core knowledge and skills are important. Employability skills are core knowledge of all aspects of architecture, including project management skills, analytical skills, problem-solving skills, communication skills, and a good attitude towards continuous learning. Once these issues are addressed appropriately in architectural education, it will have a positive impact on the profession and facilitate its essential successful survival.

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