

Attempts to Assess Engineering Consultancy Services in Jordan Practices and Potential

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Presentation Outlines

- Study Approach
- Facts and Definitions
- Archived Data Analysis
- Working Field Analysis
- Offices' Capacities and Assets
- Relationship Analysis

Study Approach

- Reviewing Archive Data (Annual Report by Offices and Engineering Companies Authority)
- by Offices and Engineering Companies Authority on-line database
- A questionnaire form was electronically made available on-lines and the invitation for engineering offices was repetatdely asked to fill-in the form and after four reminders and a sample of 94 engineering entities were collected.
- The form consists of three parts as follows
 - Office general characteristics (Assets and Capacities)
 - Office specialties and practices
 - Software in use
- The data were analysed and graphically preseted

Facts and Definitions

Engineering Offices Classification

- Engineer Office: Consists of two ranks, Practicing the profession in one specialty only with office space of 40 m²
 - Rank A: One of the founders not less than twelve years of experience,
 - Rank B: One of the founders not less than seven years of experience
- Engineering Office: Practicing the profession in two or more specialties and each specialty is headed by an engineer with a minimum of seven years' experience. Office space is less than 60 m²
- **Consultation** Office: Practicing the profession in two or more specialties and each specialty is headed by an engineer with a minimum of twelve years' experience. Office space is less than 80 and 100 m² for supporting and contracting offices respectively
- Expert/Opinion Office: Services are limited to advice and consultation in the field of expertise. The founder had practiced the profession for a period of not less than (15) years. The minimum office space 40 m²

Some Facts

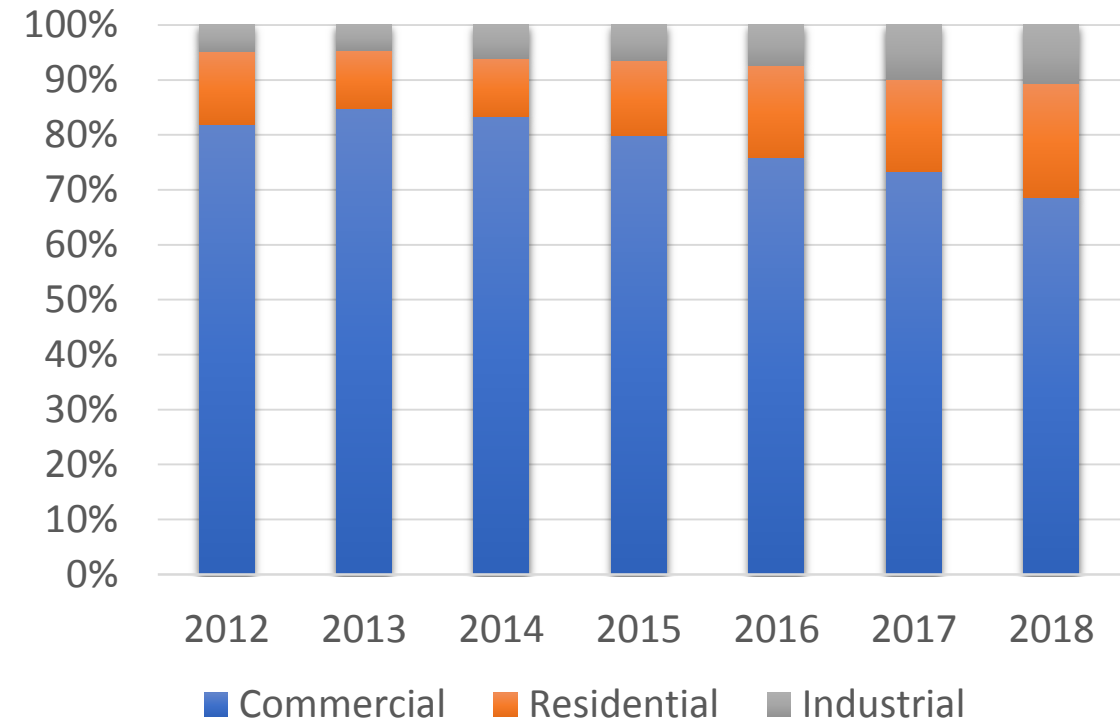
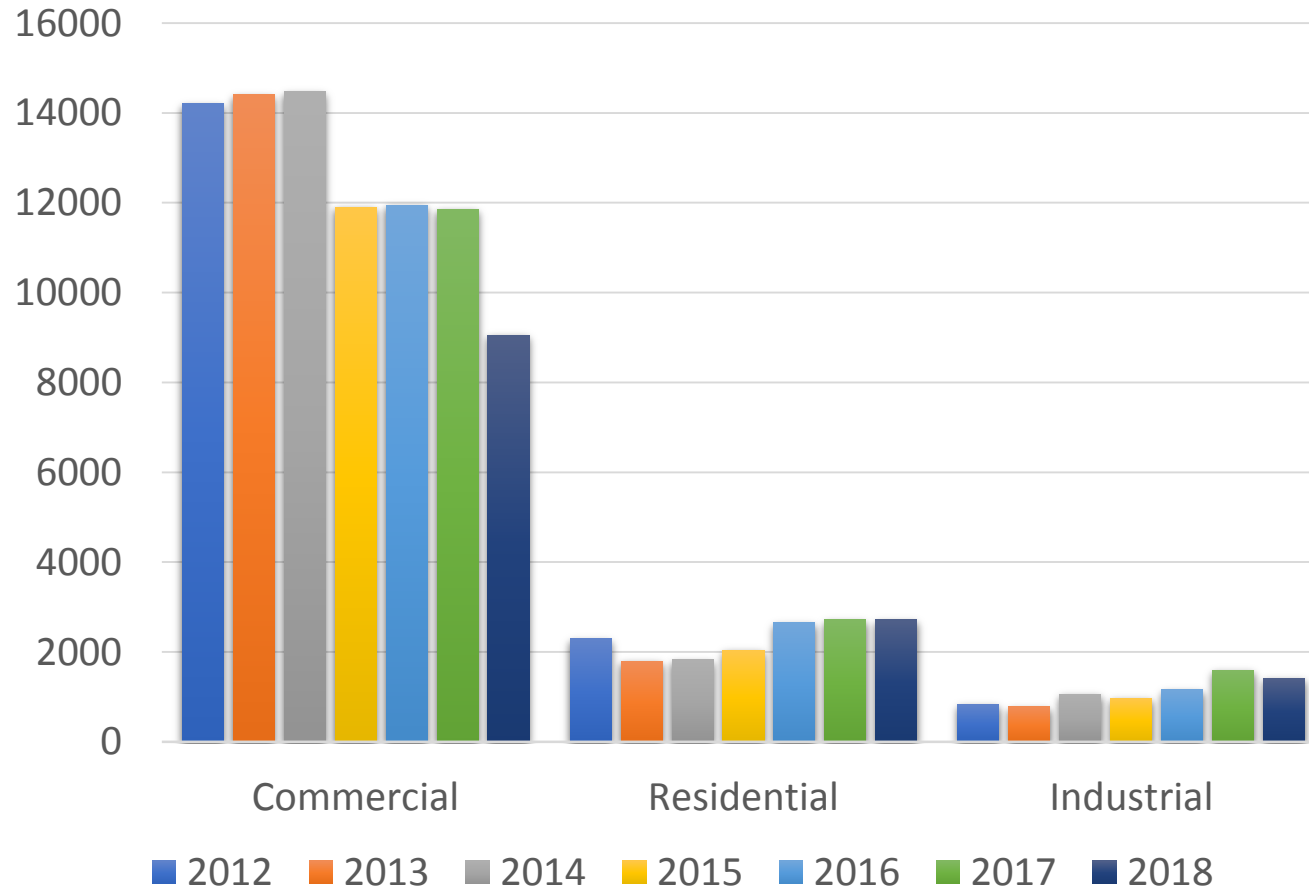
- 1227 offices and engineering by the end of 2018 working in 1997 specialties produced 11.85 million m².
- 23.78% of offices with experience of less than or equal to 10 years.
- 53.23% of offices increase or equal their experience of 25 years
- 12161 Engineers working in these engineering offices
 - 35.6% of engineers working in offices have 5 years experience and less.
 - 18.2% of engineers working in offices have experience of 6 - 10 years.
 - 7.2% of engineers working in offices have 11 to 15 years of experience.
 - 39% of their experience is more than 15 years.

Archived Data Analysis

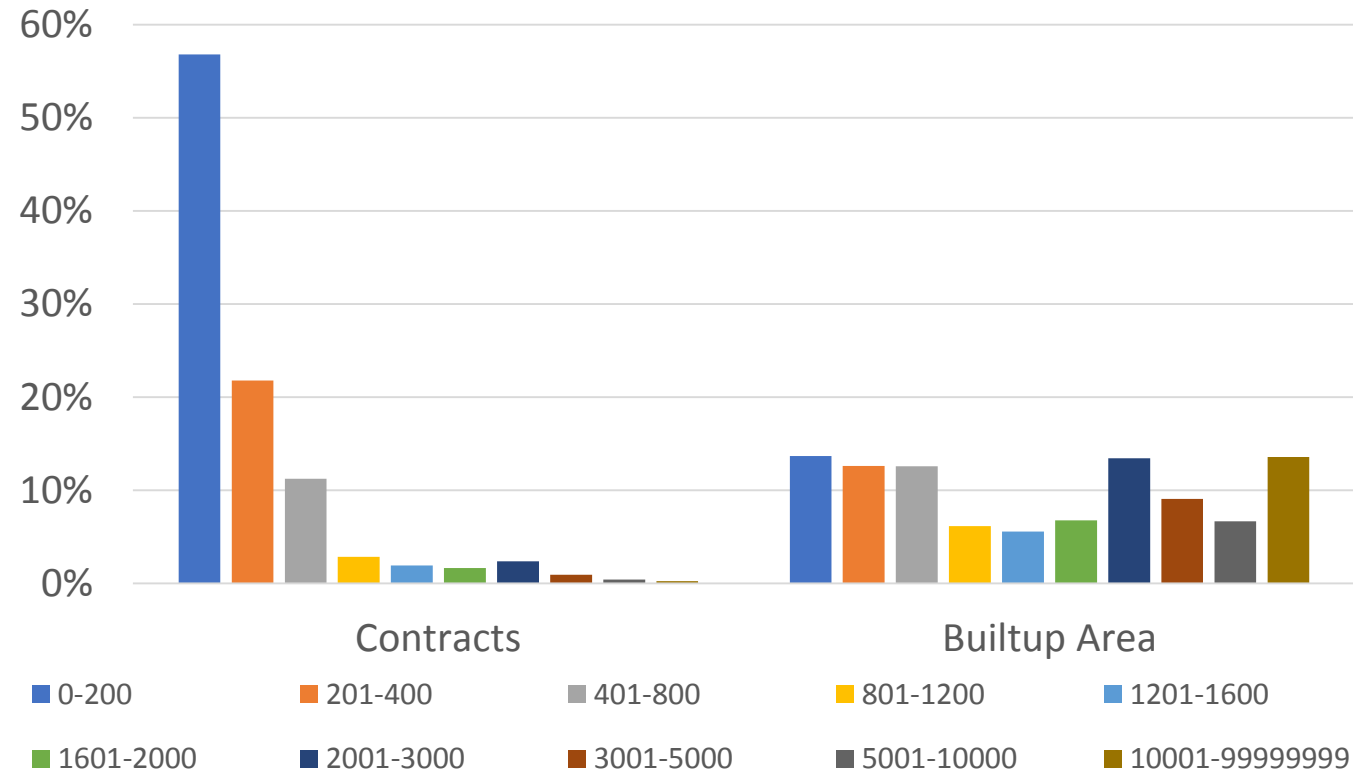
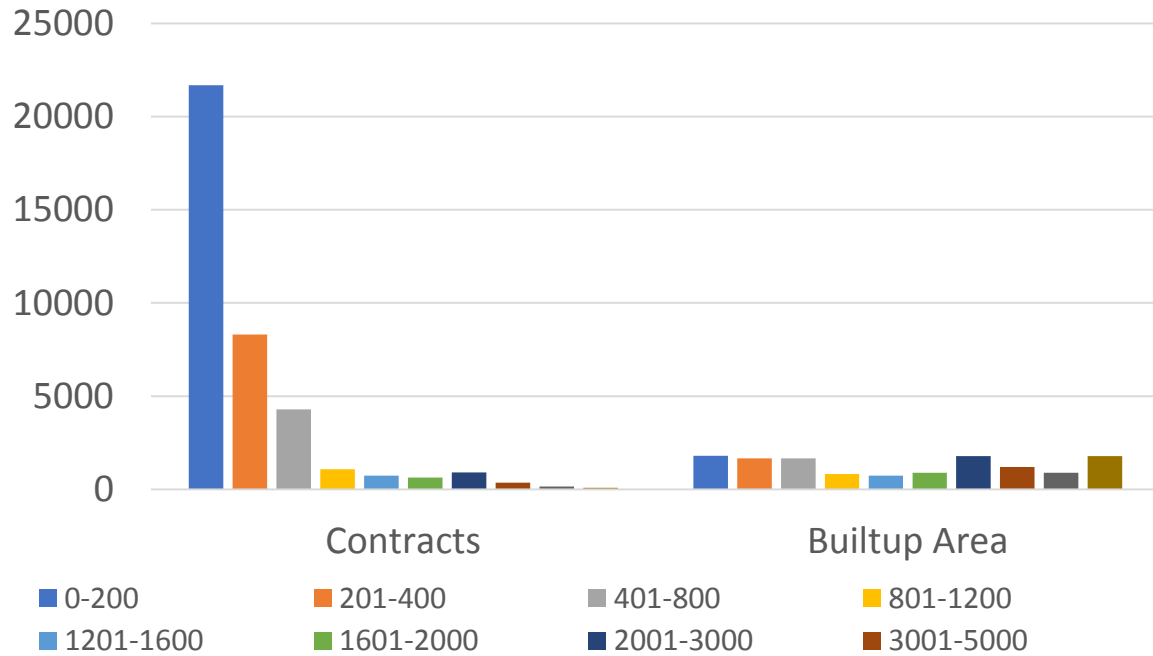
Average Number of Engineers and Number of Specialties for Office Categories

	Engineer Office	Engineering Office	Consulting	Opinion	Total
Number of Entities	742	260	218	7	1227
%	60%	21%	18%	1%	100%
Number of Engineers	3167	2752	6235	7	12161
%	26%	23%	51%	0%	100%
Number of specialties	748	565	677	7	1997
%	37%	28%	34%	0%	100%
Average No. of Engineer/Entity	4	11	29	1	10
No. of Specialties /Entity	1	2	3	1	2

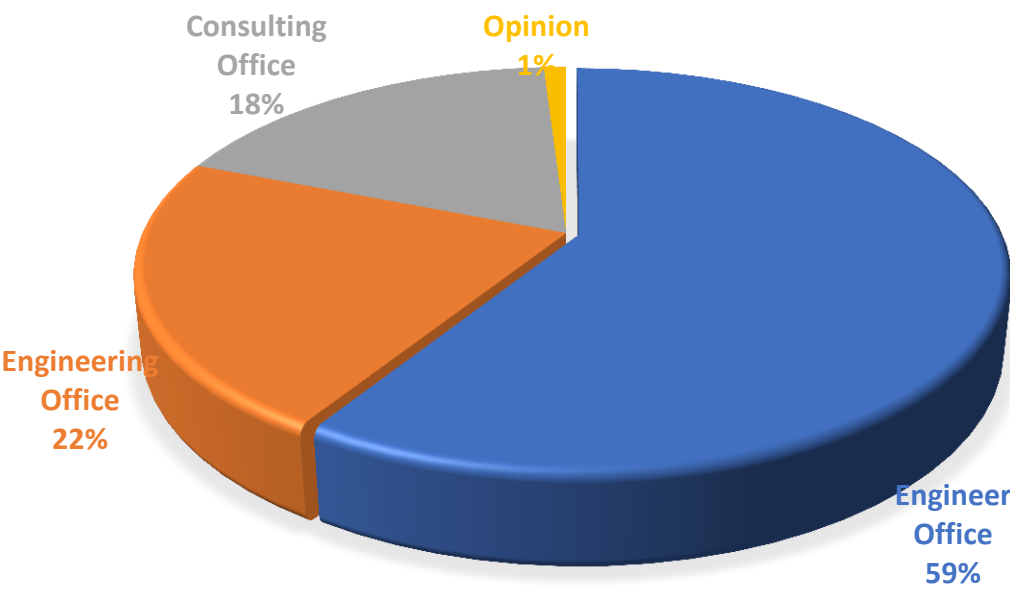
Distribution of Audited Project Areas by Type of Building in 1000 m² for the Years 2012 - 2018



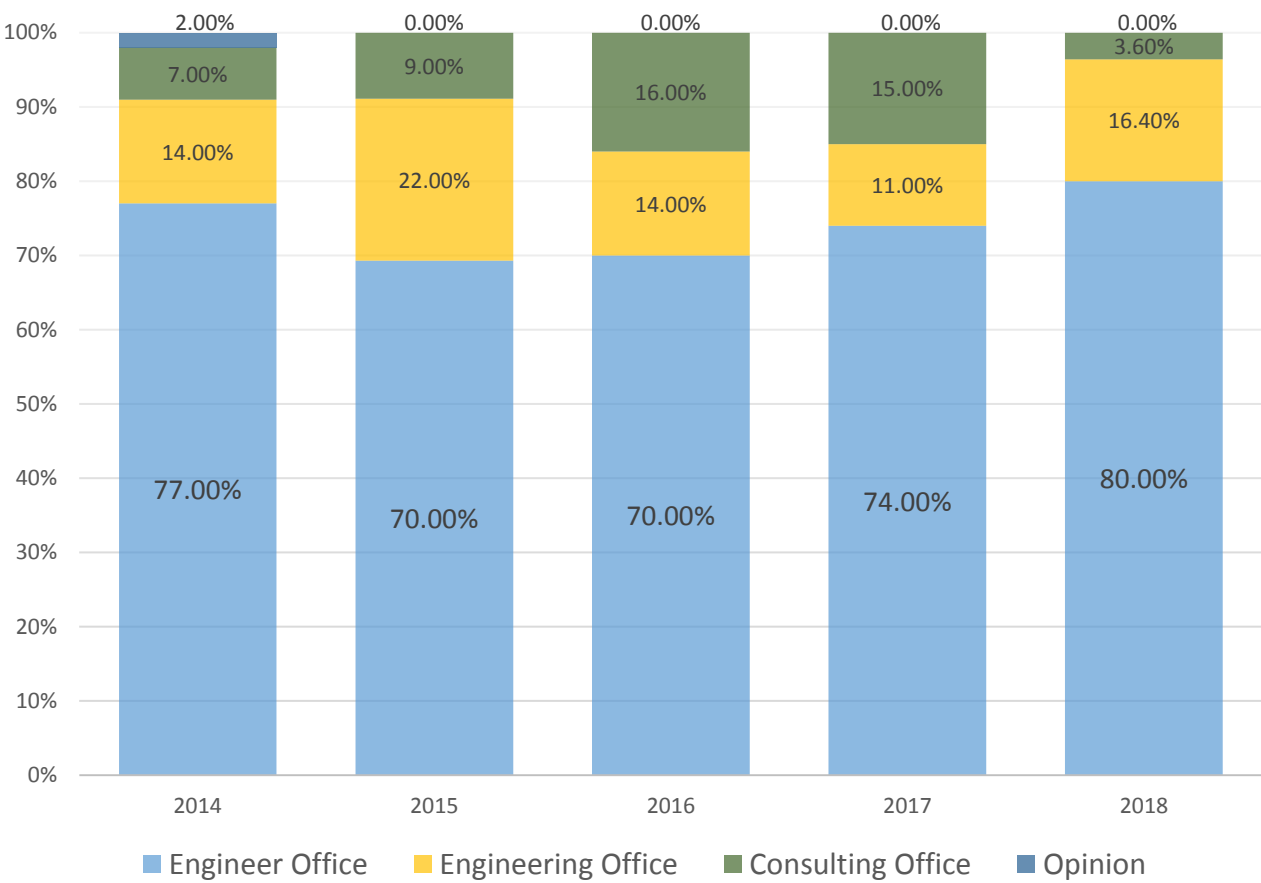
Distribution of Audited Project Areas by Project Area and Contracts (2018)



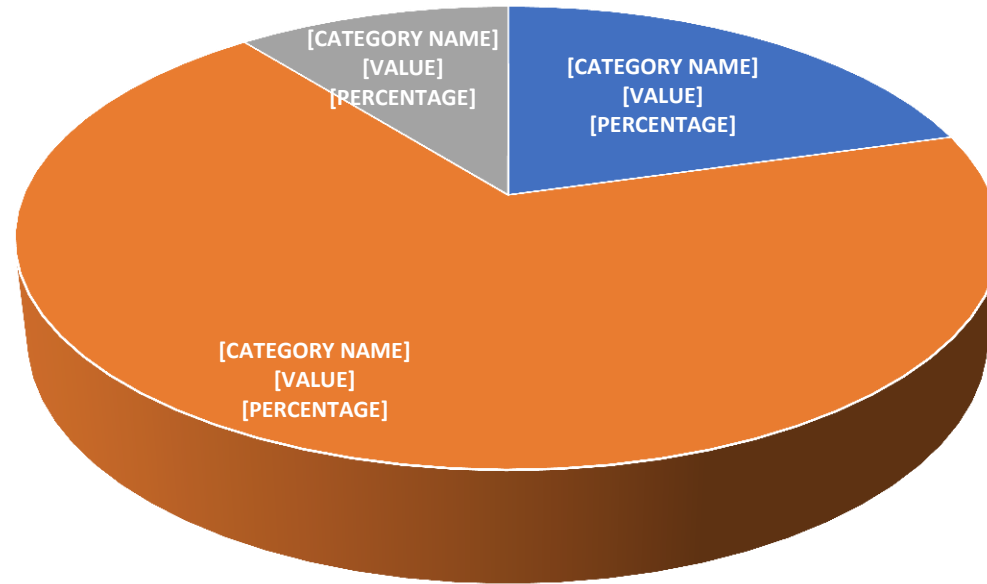
Number of Registered –Active offices 2018



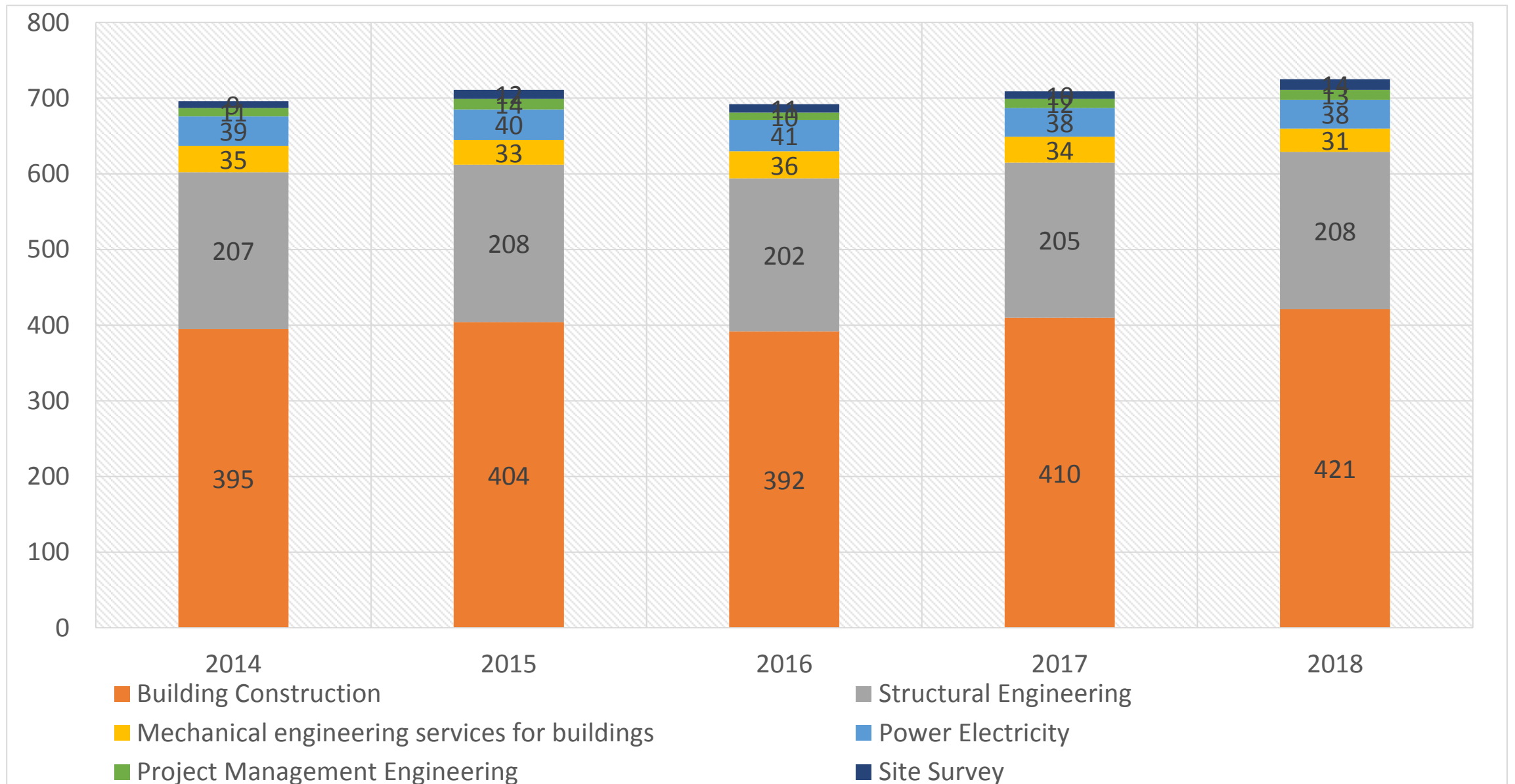
Number of registered and re-registered offices annually and their percentages during the period 2018-2014



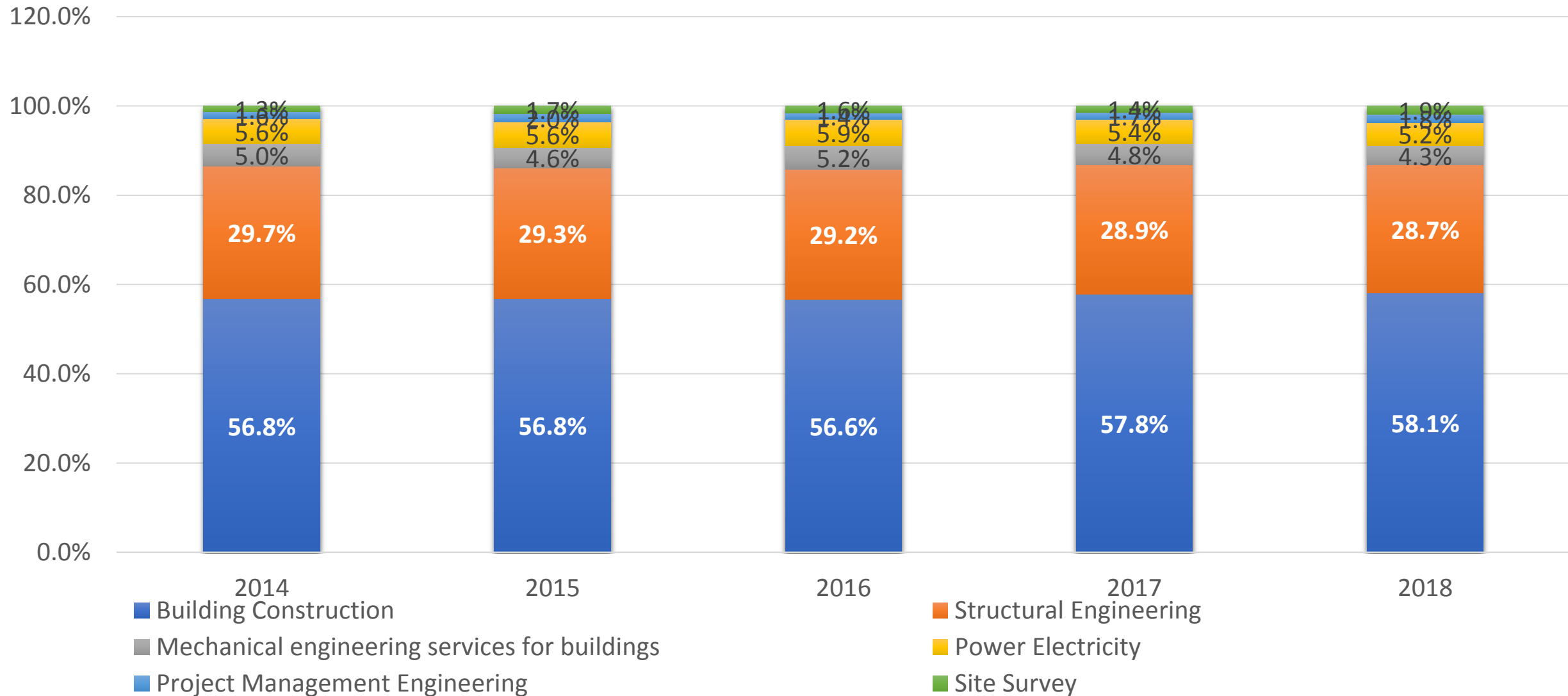
Distribution of approved project areas in 2018 by type of building



Annual Progression of building specialties for engineer office category 2014-2018- Engineer Office (No.)

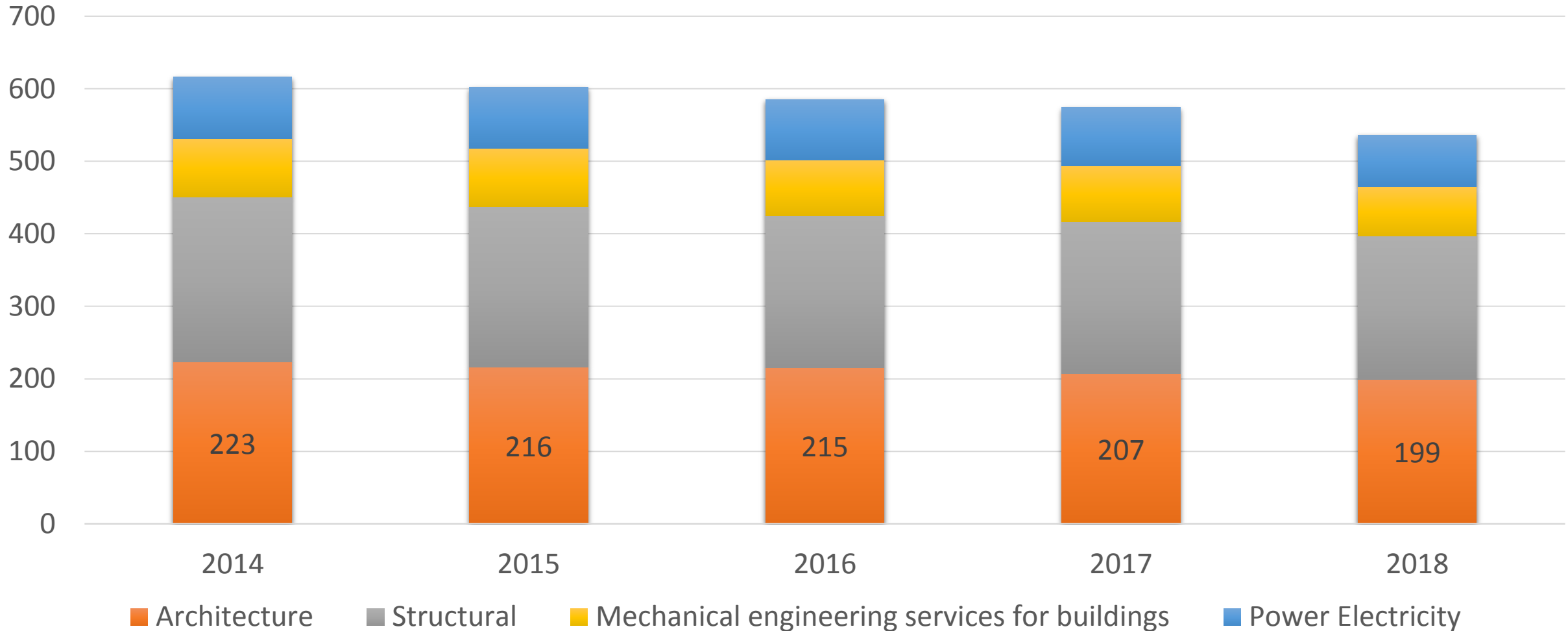


Buildings' Specialties - Engineer Office Category 2014 – 2018 (%)

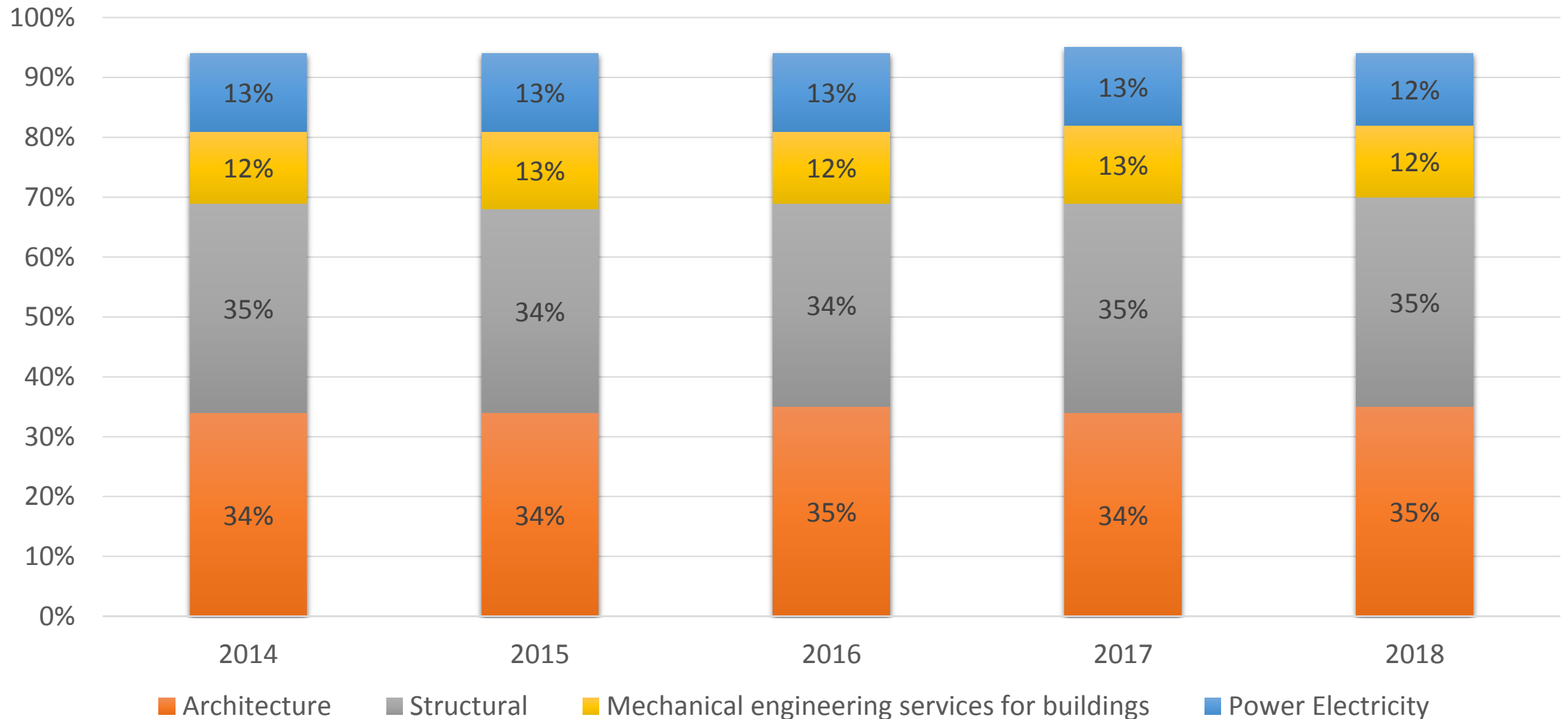


Offices' Specialties - Engineering Office

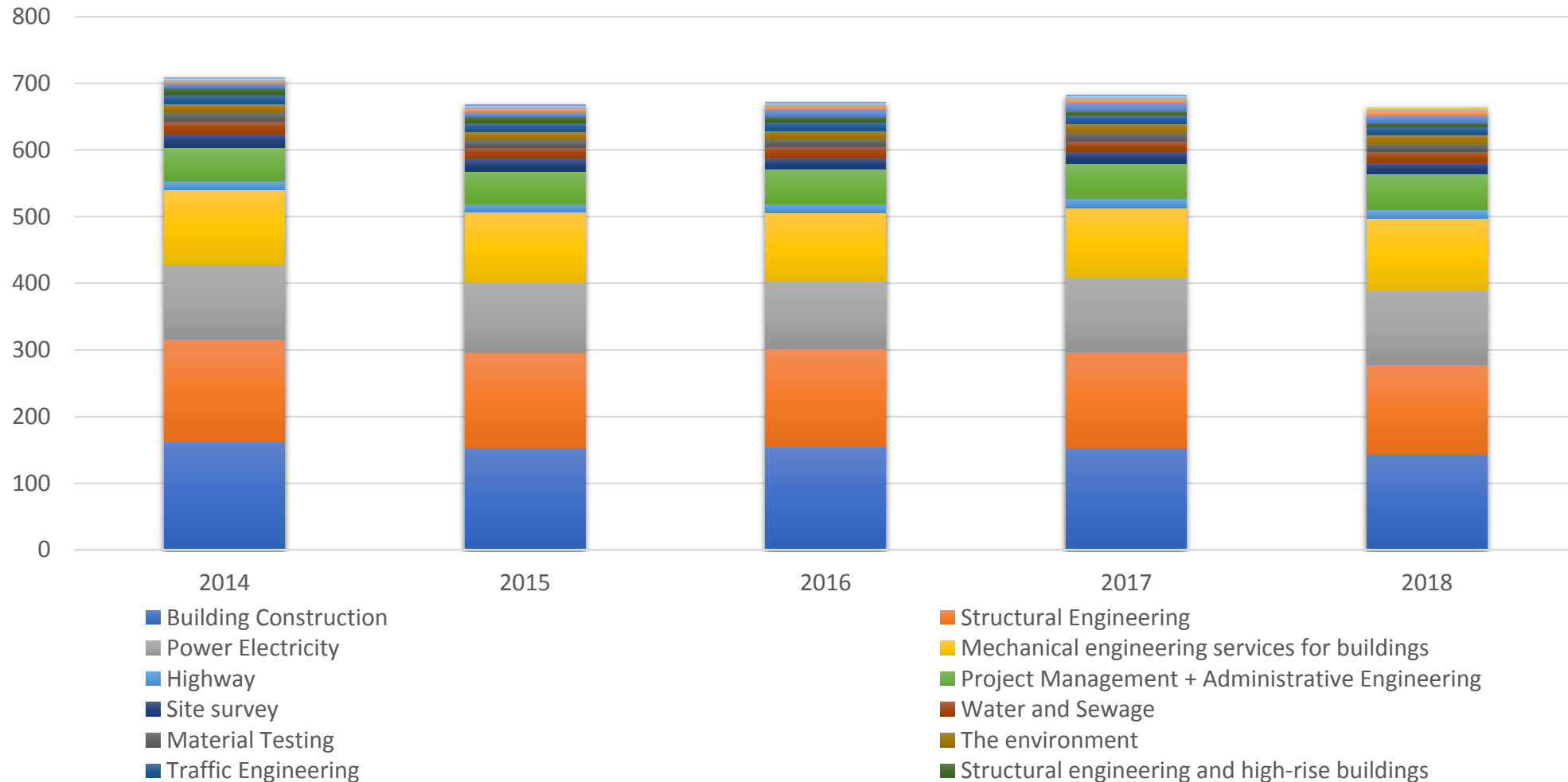
Category: 2014 – 2018 (No.)



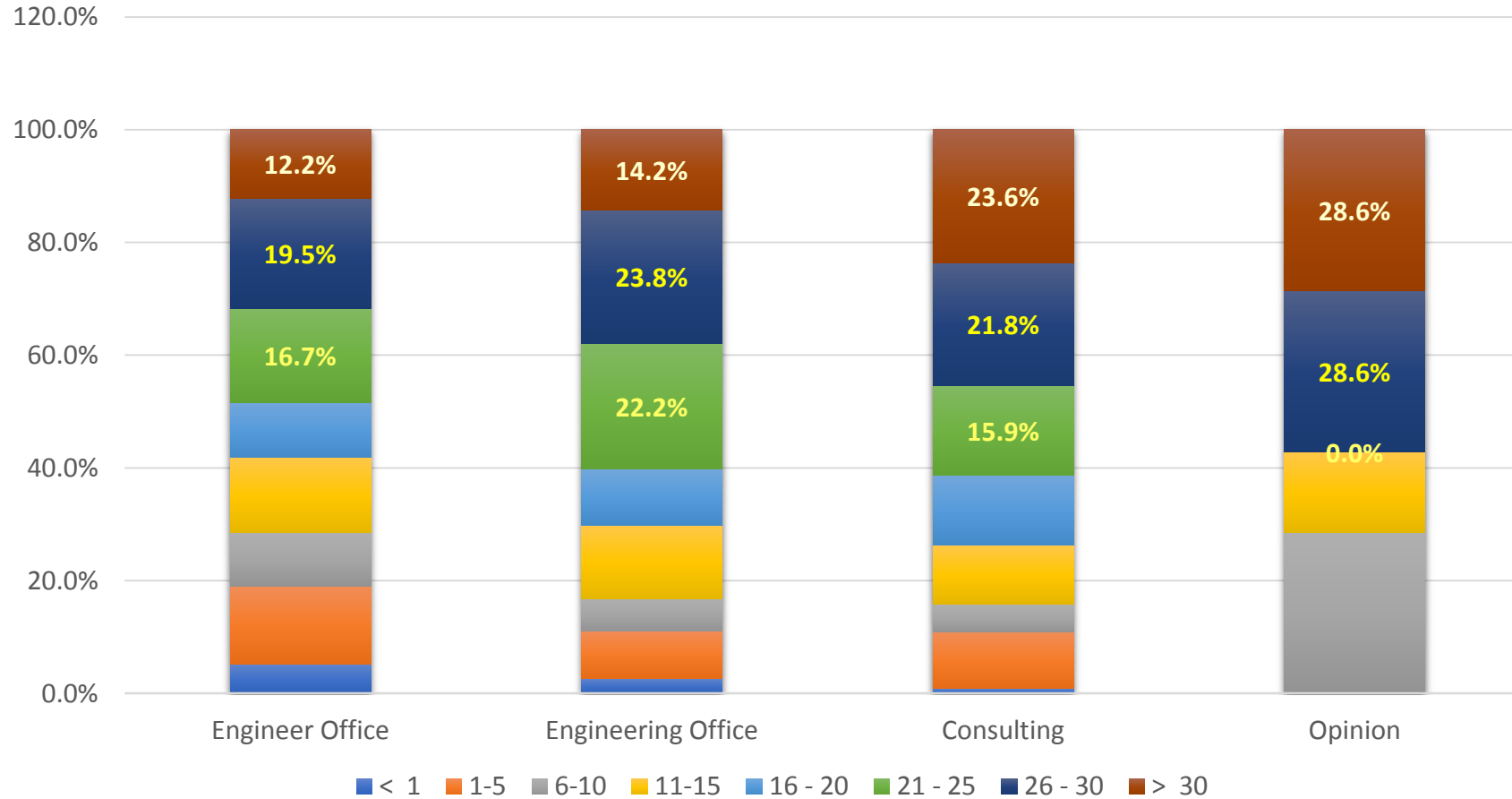
Offices' Specialties - Engineering Office Category: 2014 – 2018 (%)



Offices' Specialties - Consulting Office Category: 2014 – 2018 (No.)



Years of Engineering Offices' Experience



التصنيف	Engineer Office	Engineering Office	Consulting	Opinion
< 1	39	7	2	0
5-1	103	22	22	0
6-10	71	15	11	2
11-15	100	34	23	1
16 - 20	73	26	27	0
21 - 25	125	58	35	0
26 - 30	146	62	48	2
> 30	91	37	52	2
المجموع	748	261	220	7

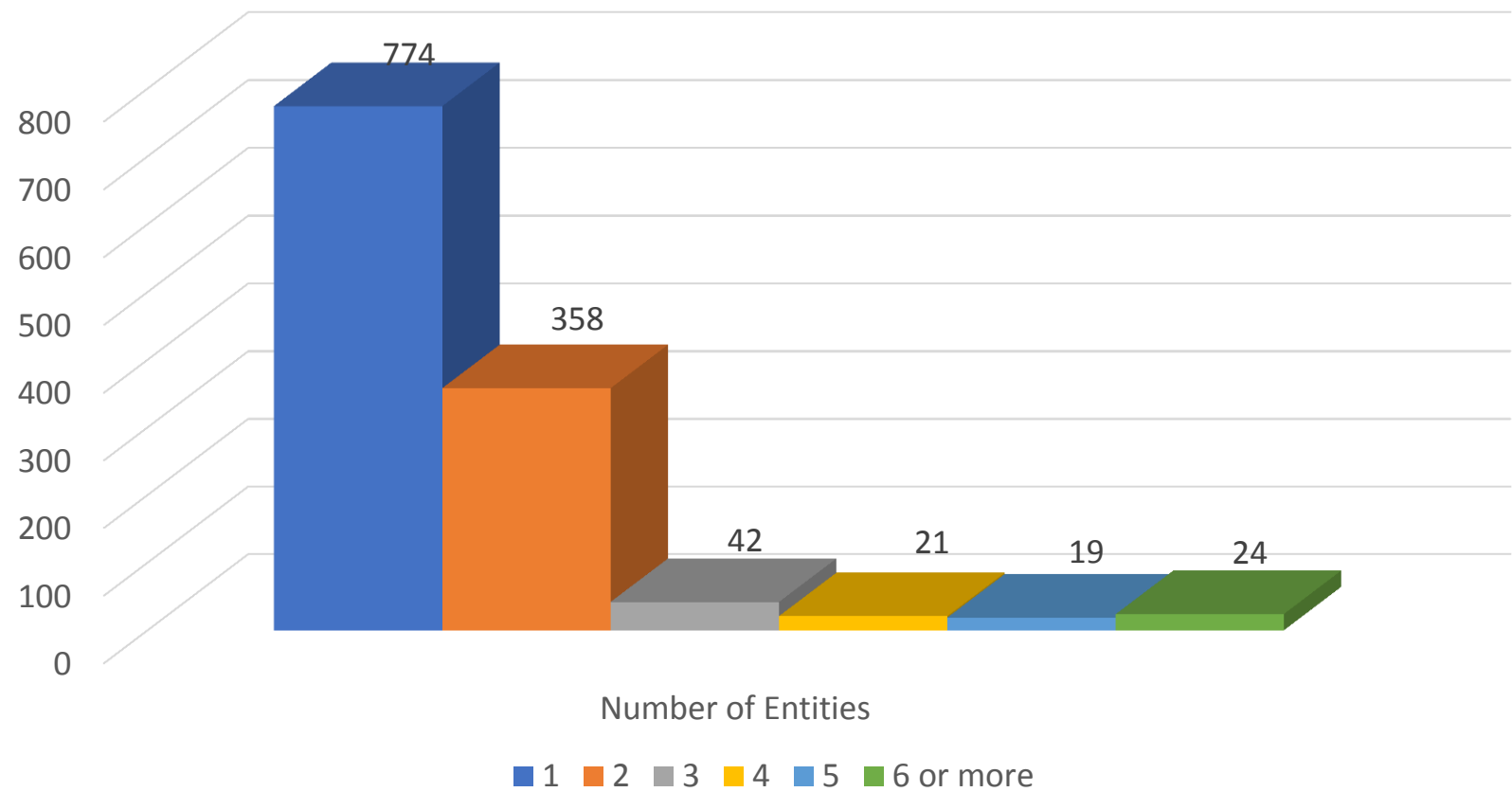
Number of Registered Engineers by Office Category and Field

Field	Engineer Office	Engineering Office	Consulting	Opinion	Total
Resident supervision	903	772	1702	0	3377
Building Construction	783	501	912	0	2196
Structural Engineering	306	324	527	0	1157
Mechanical engineering	53	121	387	0	561
Power Electricity	46	127	380	0	553
Geotechnical Engineering	39	49	90	2	180
Project Management	17	1	93	2	113
Water and Sewage	4	0	81	0	85
Environment Engineering	25	0	47	0	72
Highway	3	1	57	0	61
Material Testing	0	10	53	0	63
Traffic	1	0	33	1	35
Surveying Engineering	3	0	31	0	34
Bridge Engineering	0	1	30	0	31
Structural Engineering High Rise Building	1	0	16	0	17
Urban Planning	0	0	10	0	10
Administrative Engineering	1	0	4	2	7
Interior Design	0	2	5	0	7
Chemical Testiing for Construction	4	0	0	0	4
Design and supervision of energy services	3	0	0	0	3
Telecommunication Engineering	1	1	0	0	2
Dam Engineering	1	0	0	0	1
Mining Engineering	0	0	1	0	1
Surface Water	0	1	0	0	1

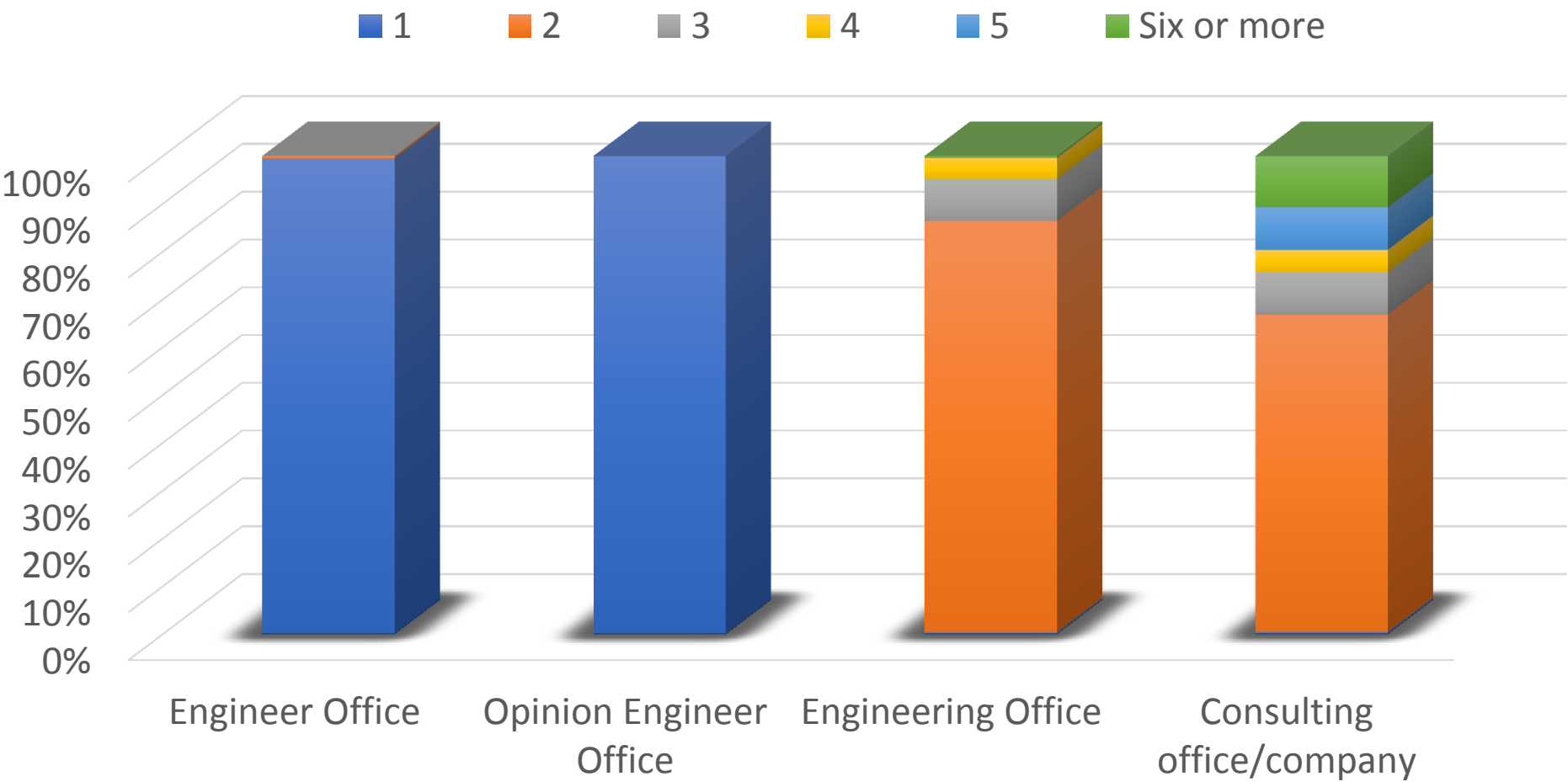
Employed Engineering Distribution By Division and Years of Experience

Experience	Civil	Architecture	Mechanical	Electricity	Mining	Chemical
Training	2.7%	4.2%	5.4%	4.7%	0.9%	3.7%
1	4.8%	1.7%	1.1%	0.0%	0.0%	0.0%
2	8.7%	5.9%	5.3%	2.6%	2.6%	0.0%
3	9.1%	7.8%	5.5%	3.9%	3.5%	0.0%
4	8.9%	6.7%	4.0%	4.5%	4.3%	7.4%
5	7.3%	7.6%	4.7%	5.8%	2.6%	3.7%
6--10	17.7%	21.4%	13.1%	15.0%	2.6%	11.1%
11--15	5.9%	8.3%	9.5%	9.0%	10.4%	3.7%
16-20	4.1%	5.7%	5.4%	7.3%	2.6%	11.1%
21-25	2.6%	4.6%	5.5%	5.5%	6.1%	11.1%
26-30	4.0%	8.0%	10.9%	11.8%	14.8%	7.4%
31-35	11.1%	9.0%	15.3%	13.8%	17.4%	11.1%
36-40	8.0%	5.0%	6.4%	8.0%	19.1%	11.1%
41-45	2.9%	2.3%	4.8%	4.5%	12.2%	11.1%
46-50	2.4%	1.8%	3.0%	3.4%	0.9%	7.4%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

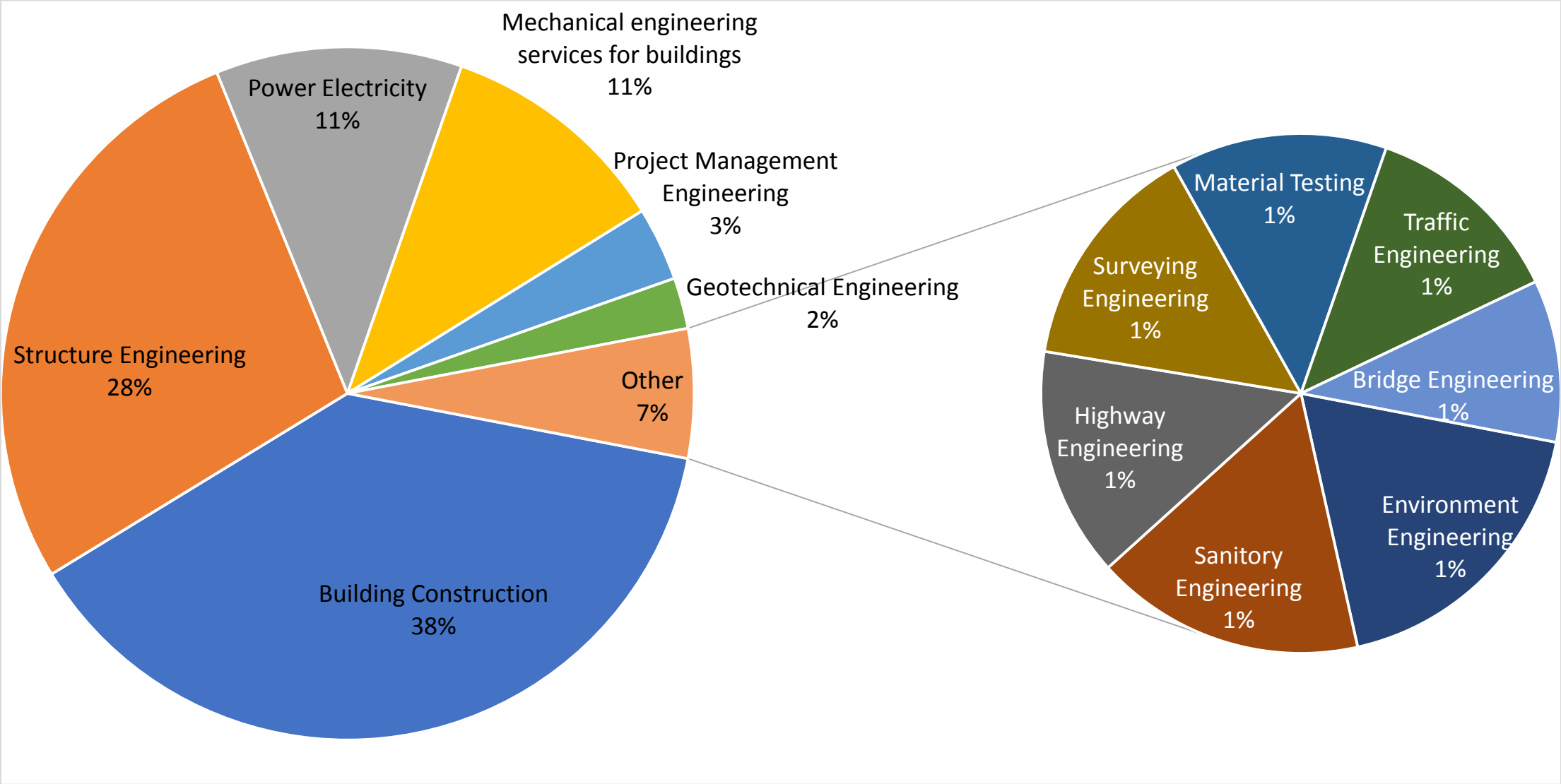
Engineering Offices by Number of Specialities: All Categories



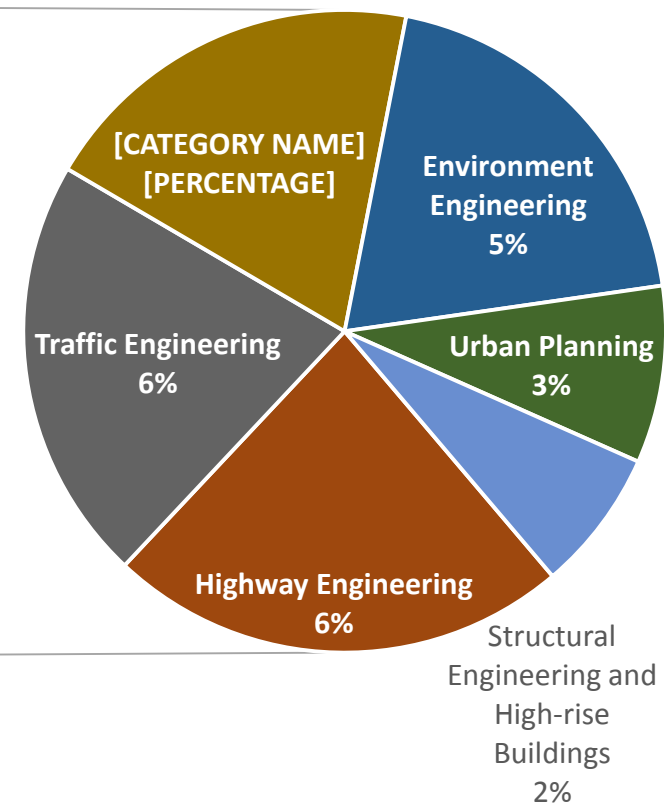
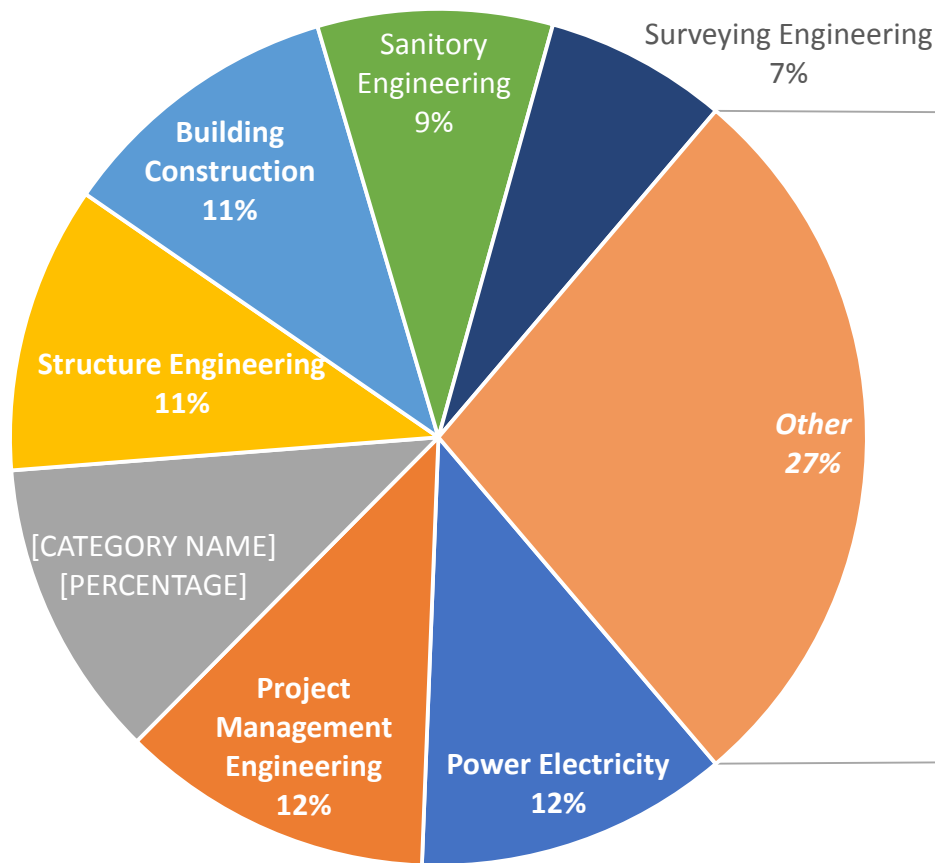
Engineering Offices by Number of Specialities & Office Category



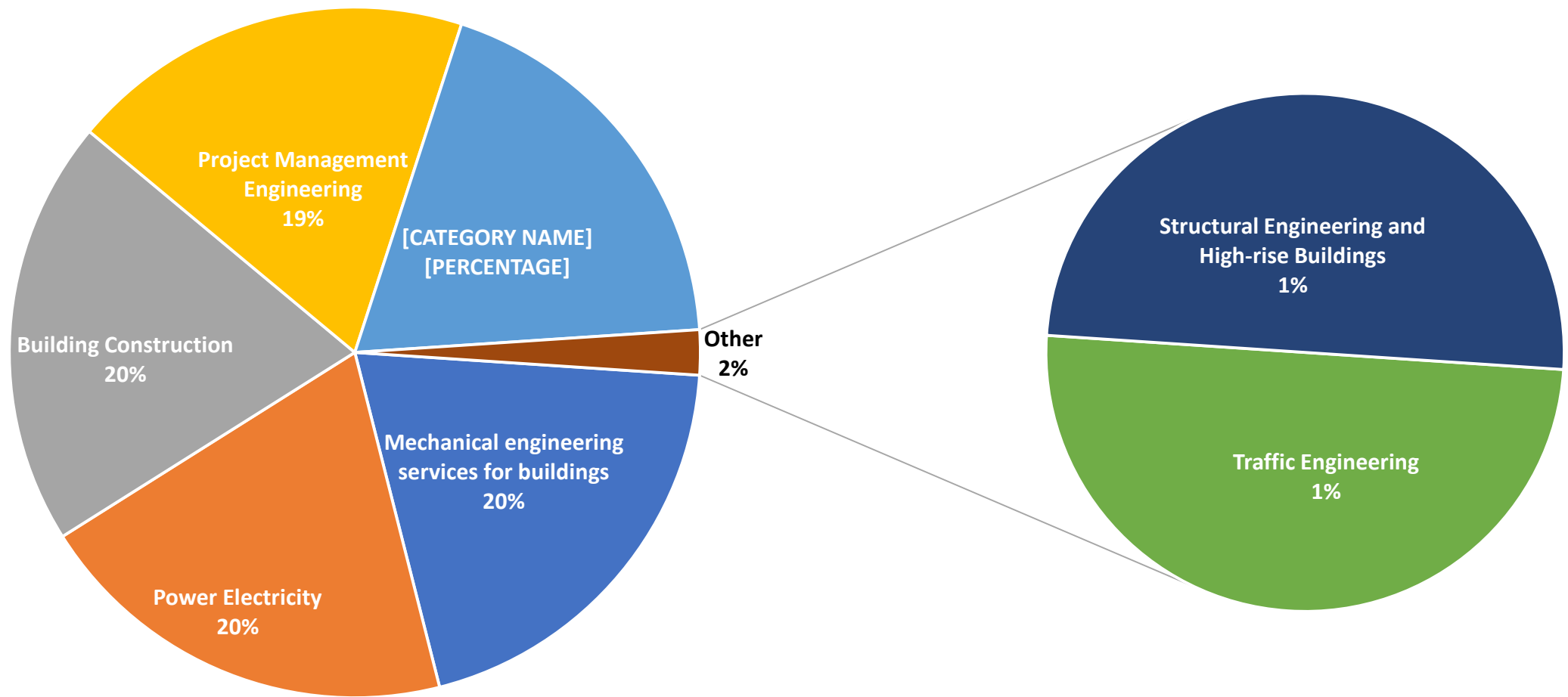
Specialties Distribution: All Categories (Archived Data)



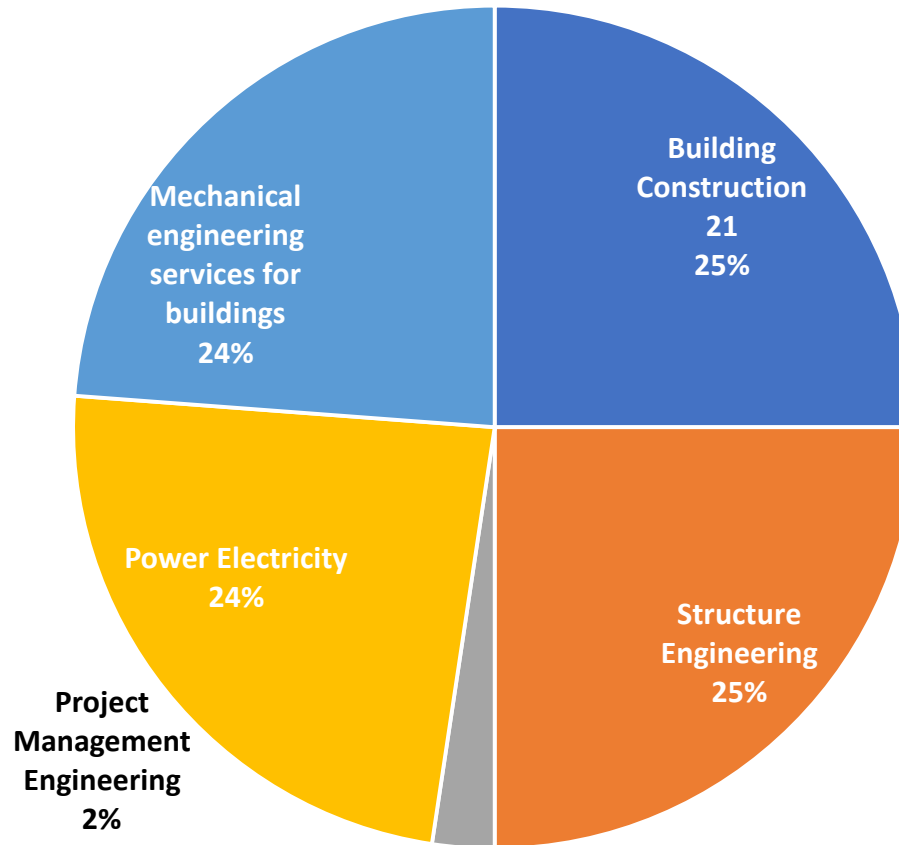
Specialties Distribution: Offices with Six or More Specialties (Archived Data)



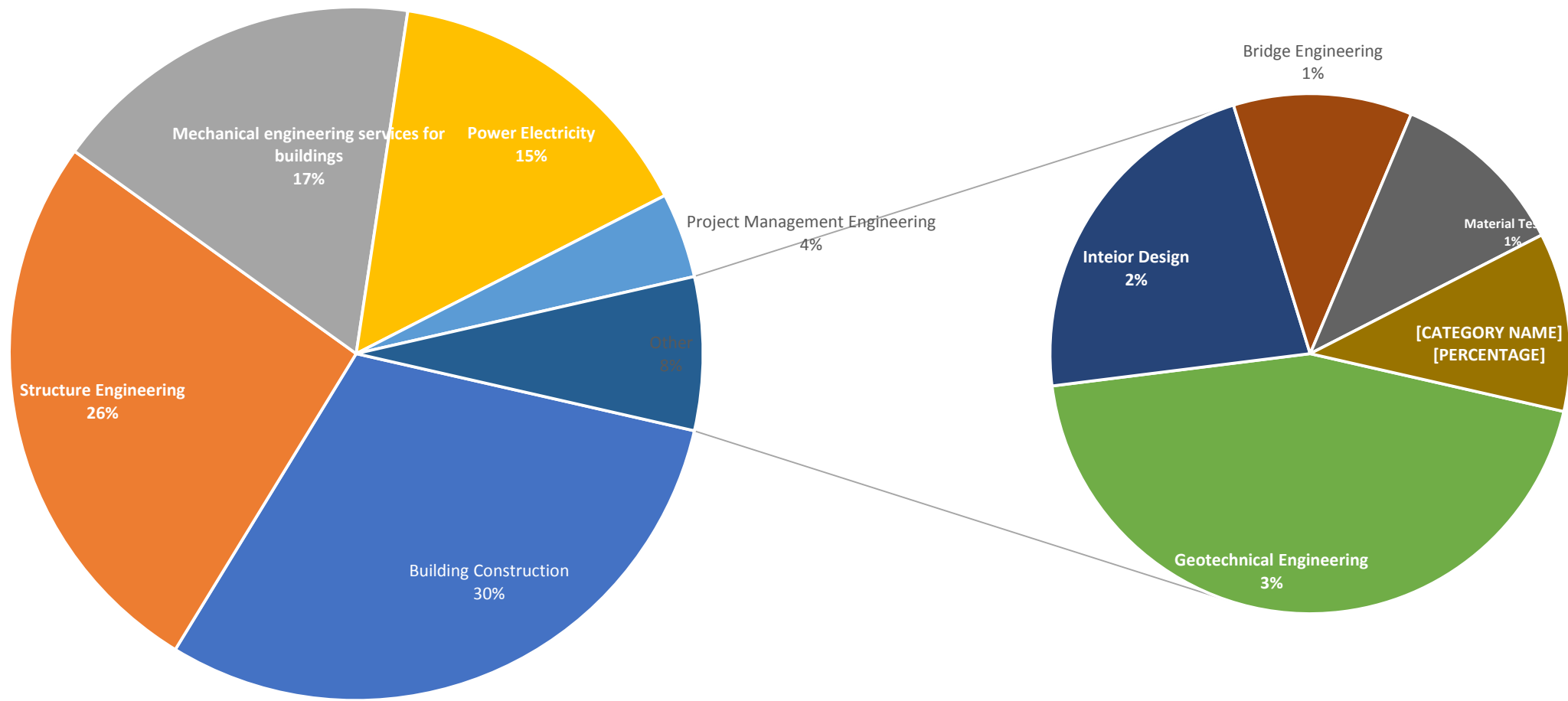
Specialties Distribution: Offices with Five Specialties (Archived Data)



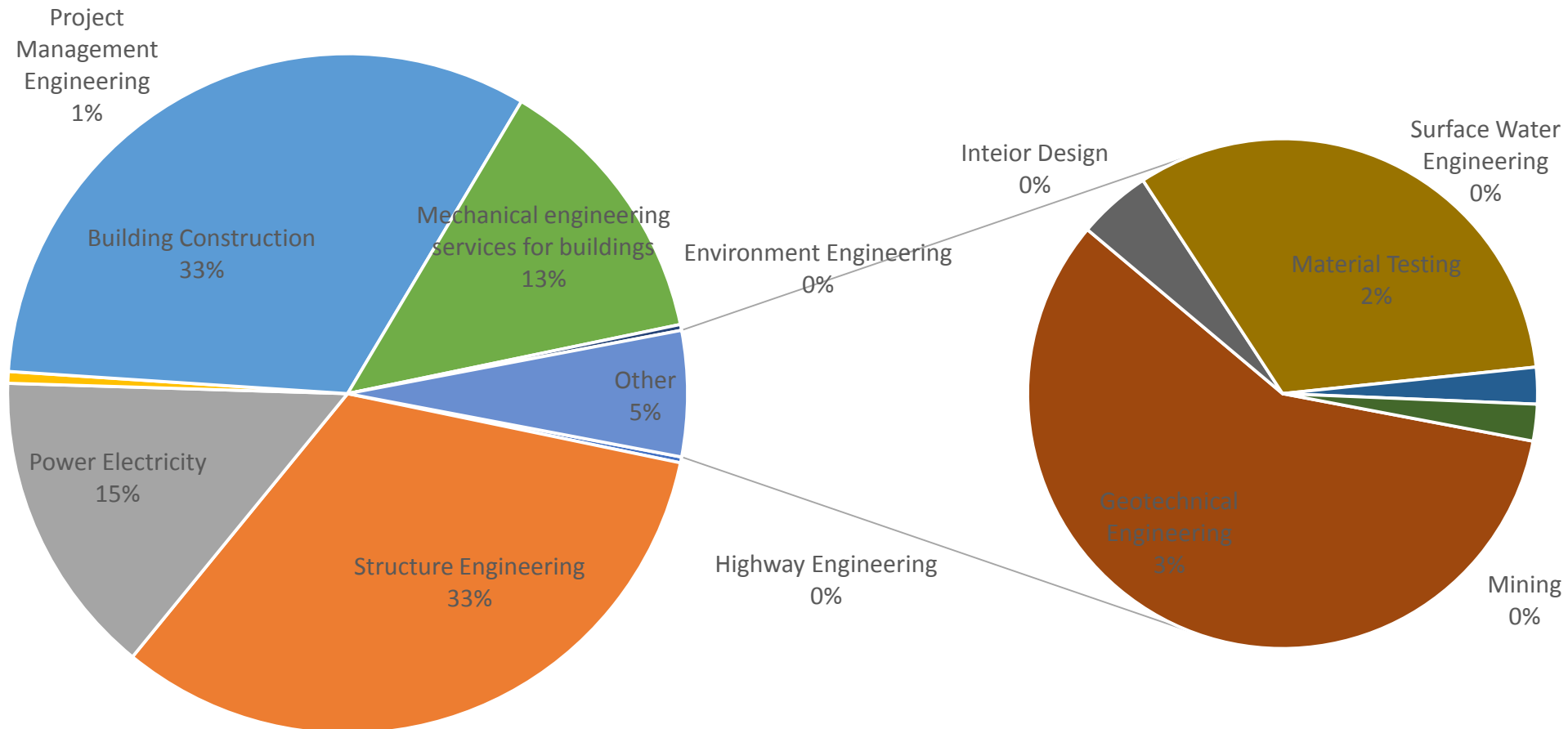
Specialties Distribution: Offices with Four Specialties (Archived Data)



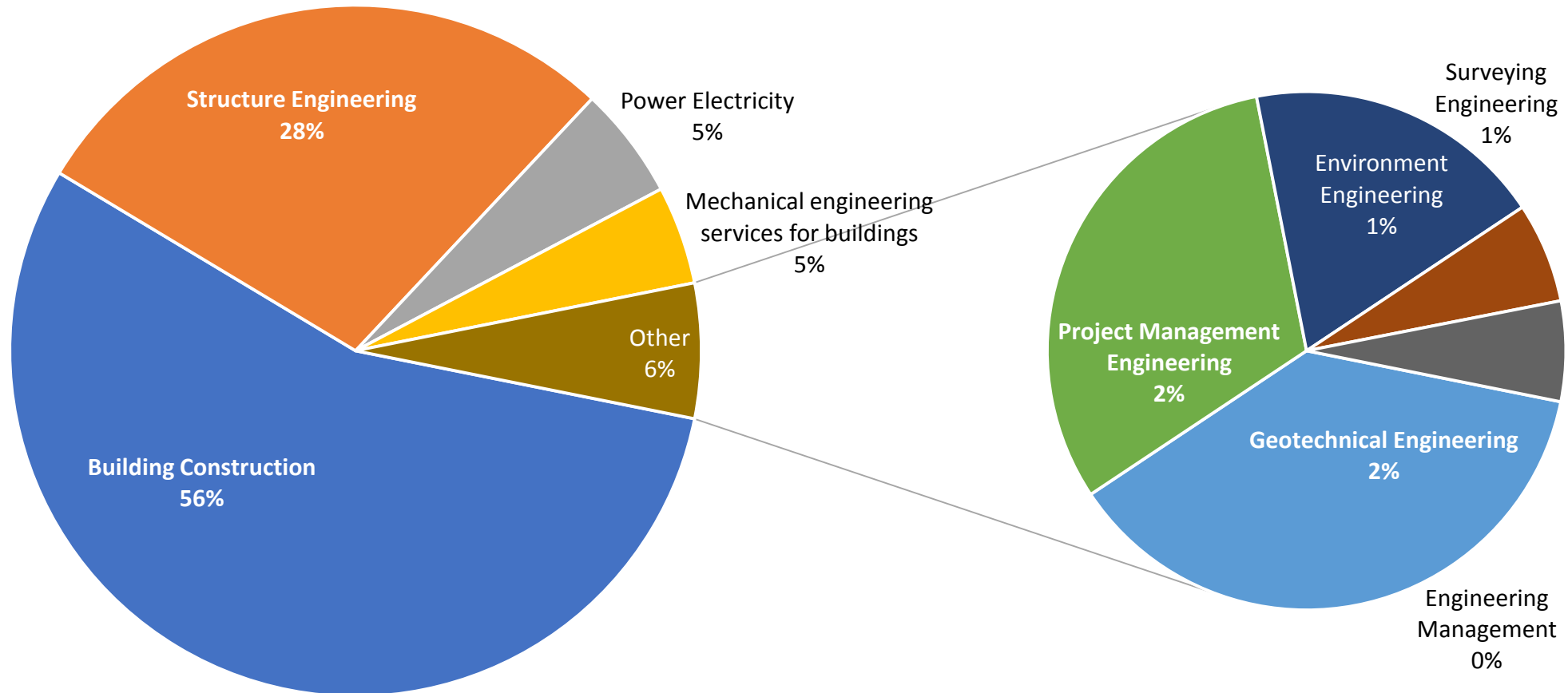
Specialties Distribution: Offices with Three Specialties (Archived Data)



Specialties Distribution: Offices with Two Specialties (Archived Data)

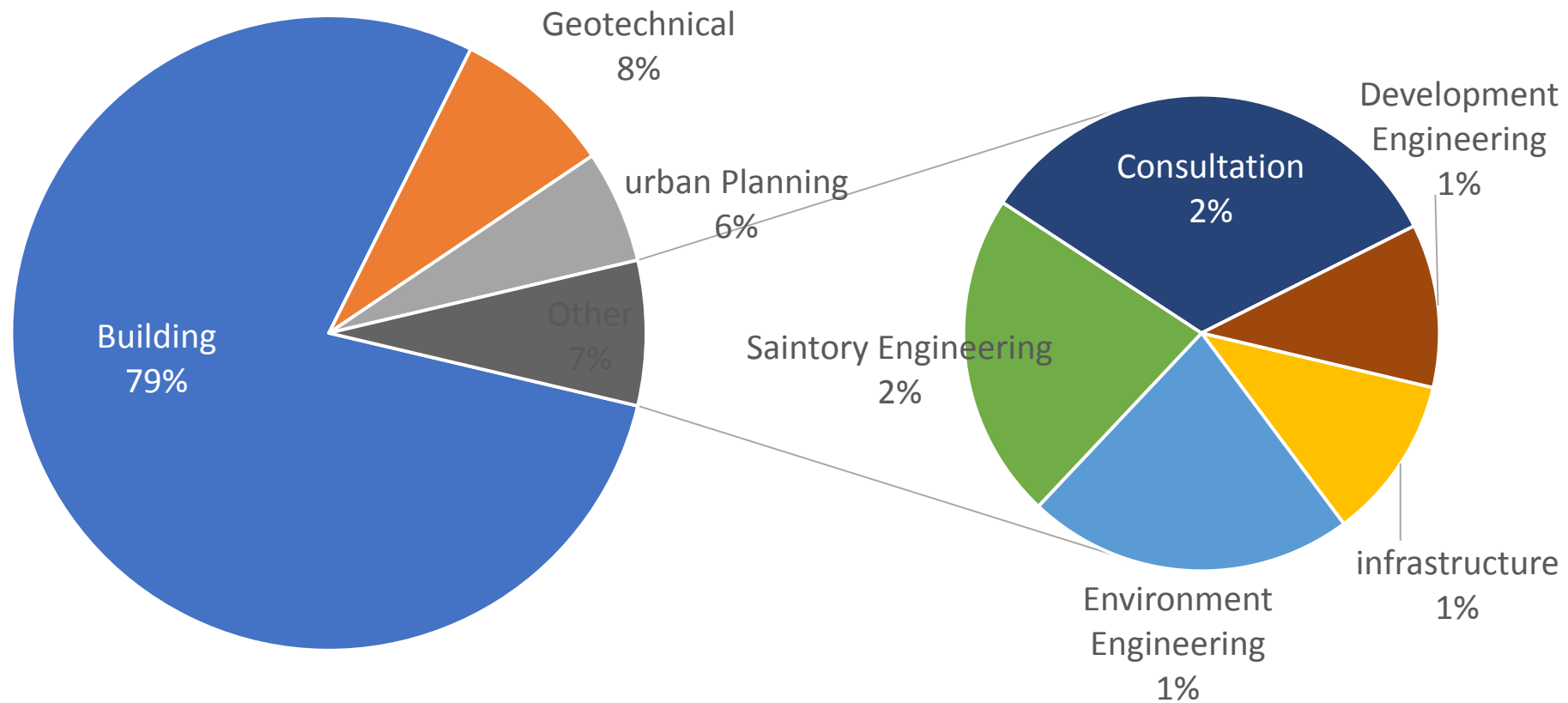


Specialties Distribution: Offices with One Specialty (Archived Data)

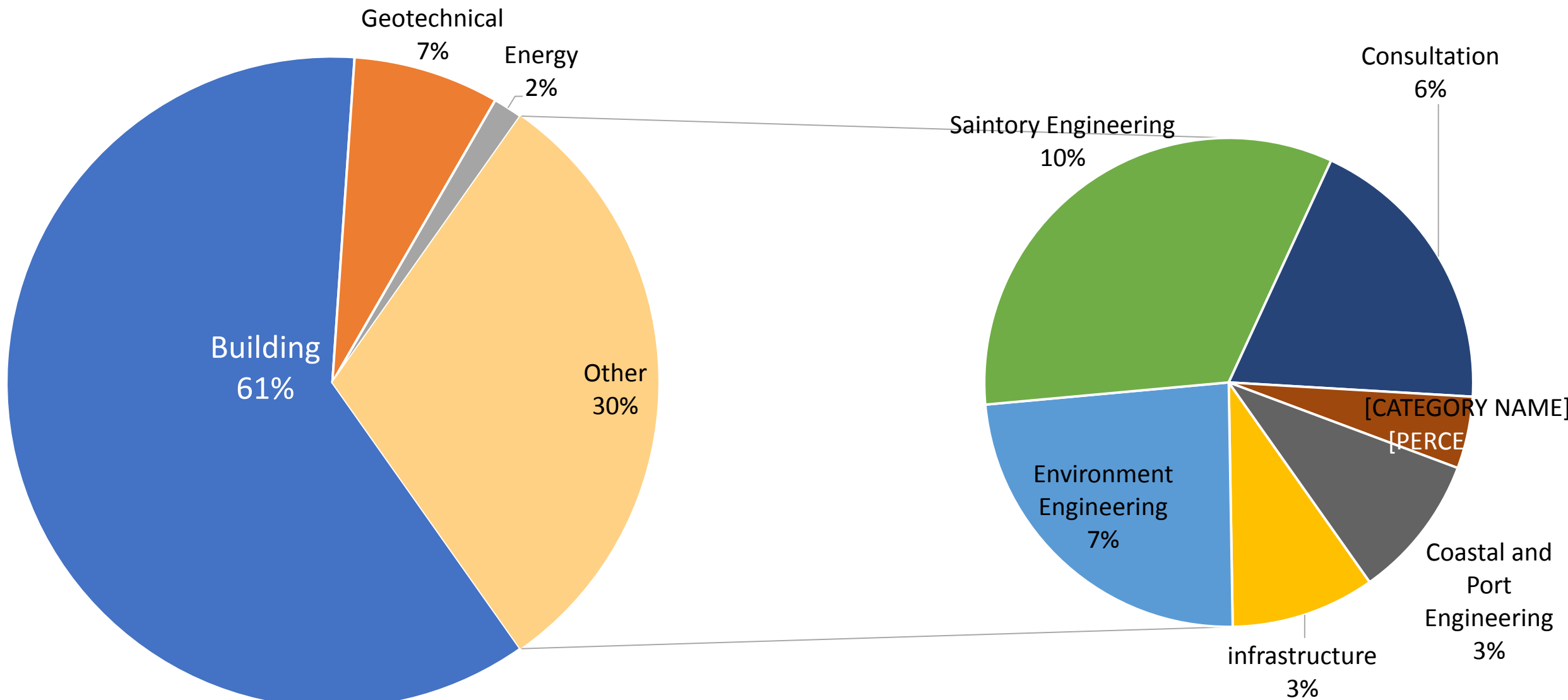


Working Areas Analysis: Surveyed Sample

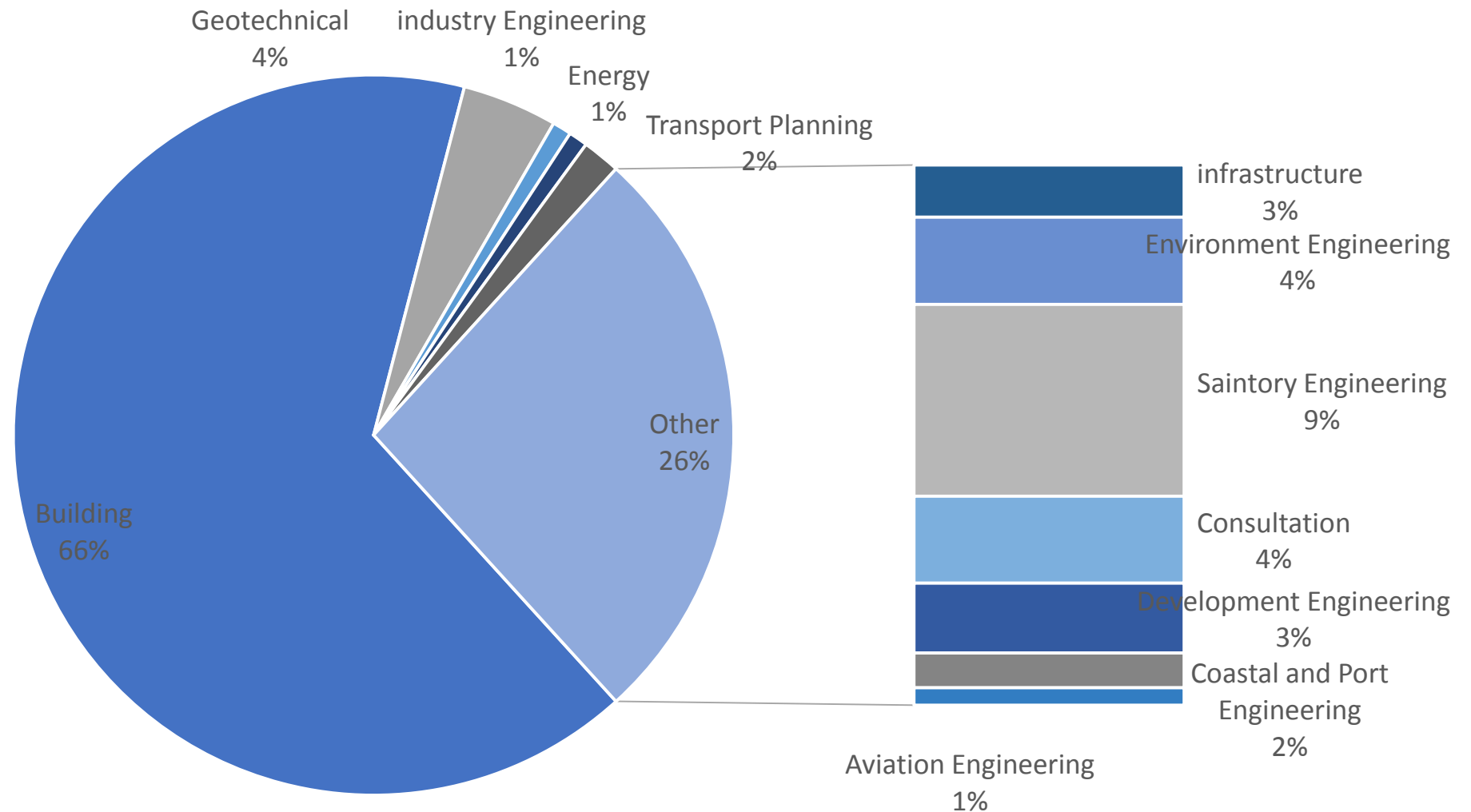
Engineering Companies' Specialities: Surveyed Sample



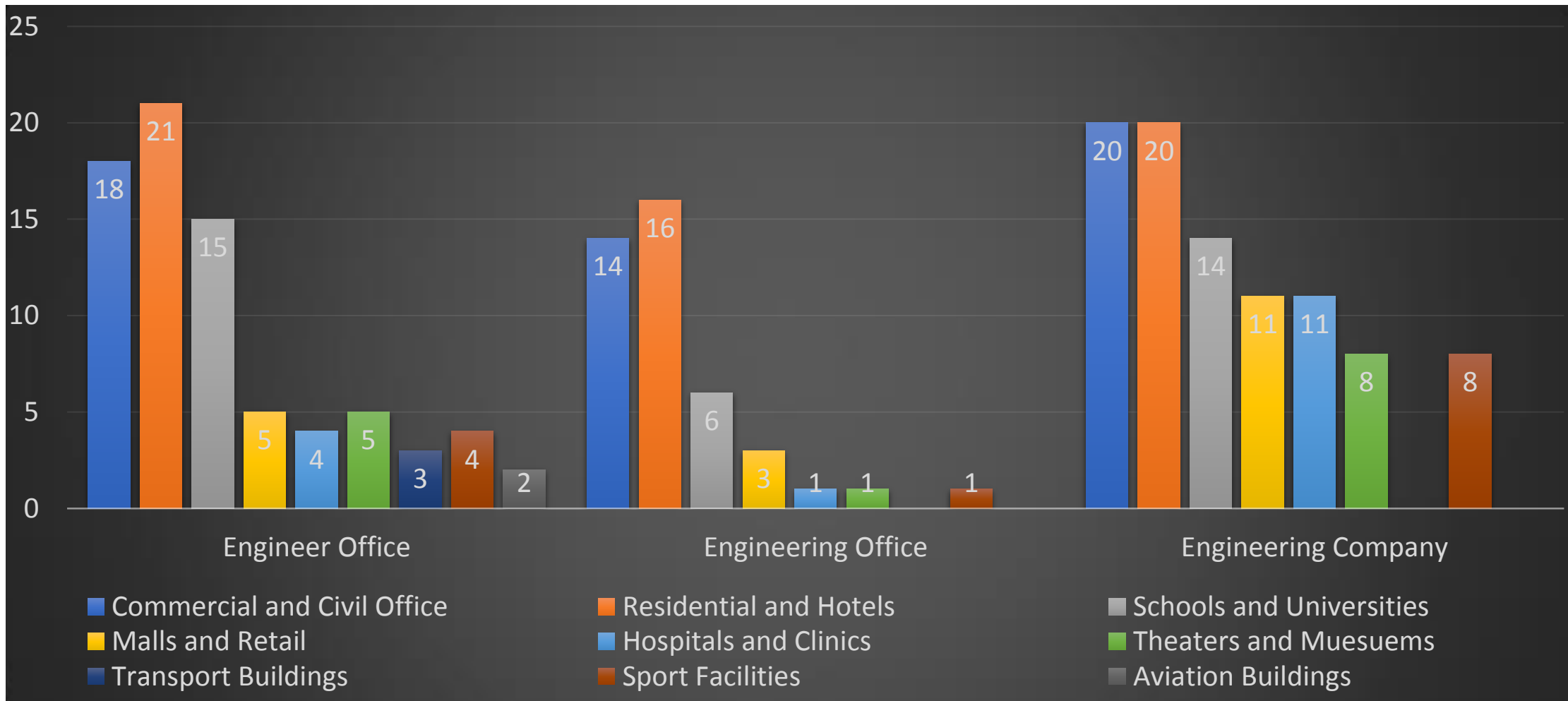
Engineering Office's Specialities: Surveyed Sample



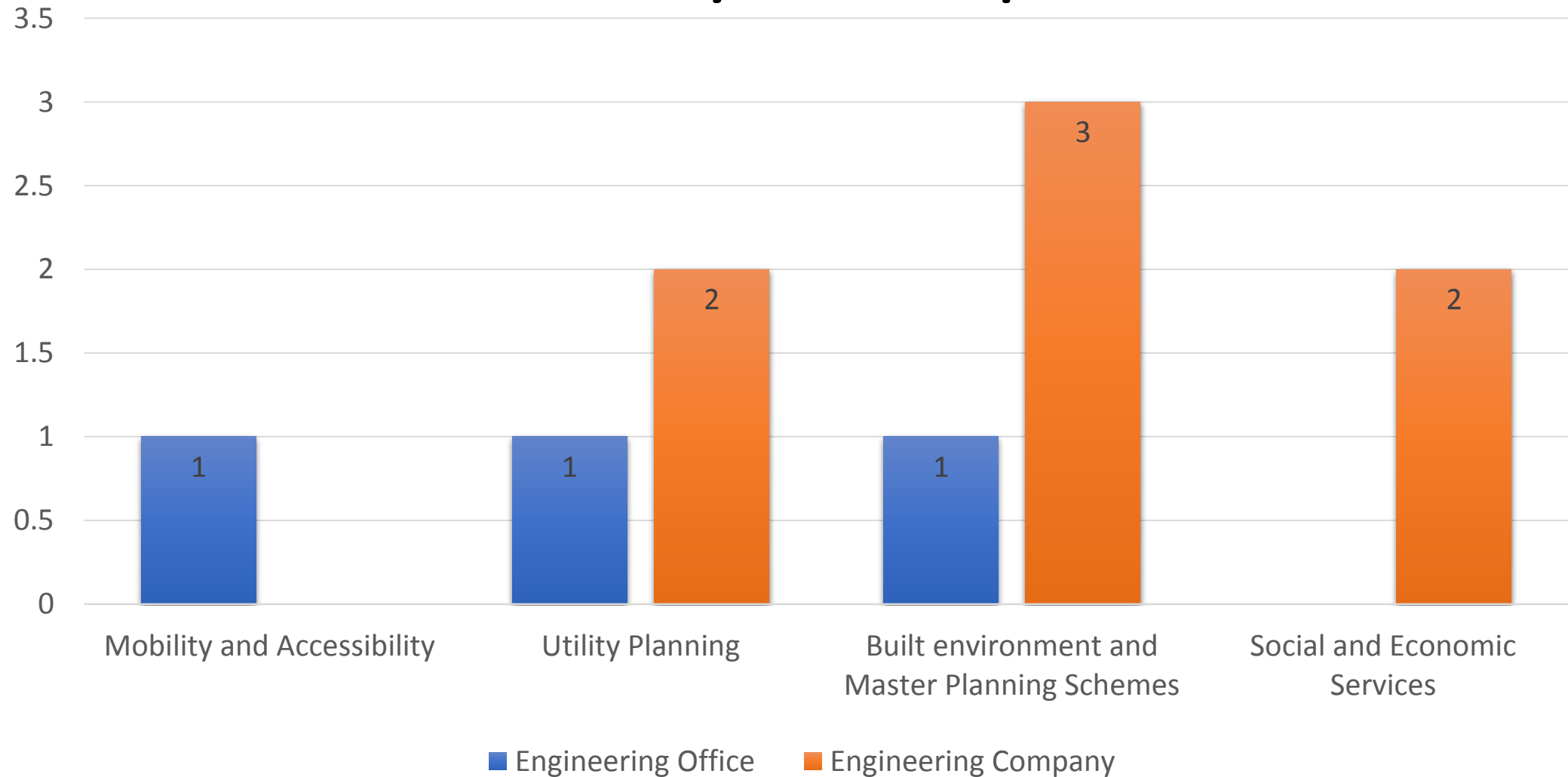
Engineer Office's Specialities: Surveyed Sample



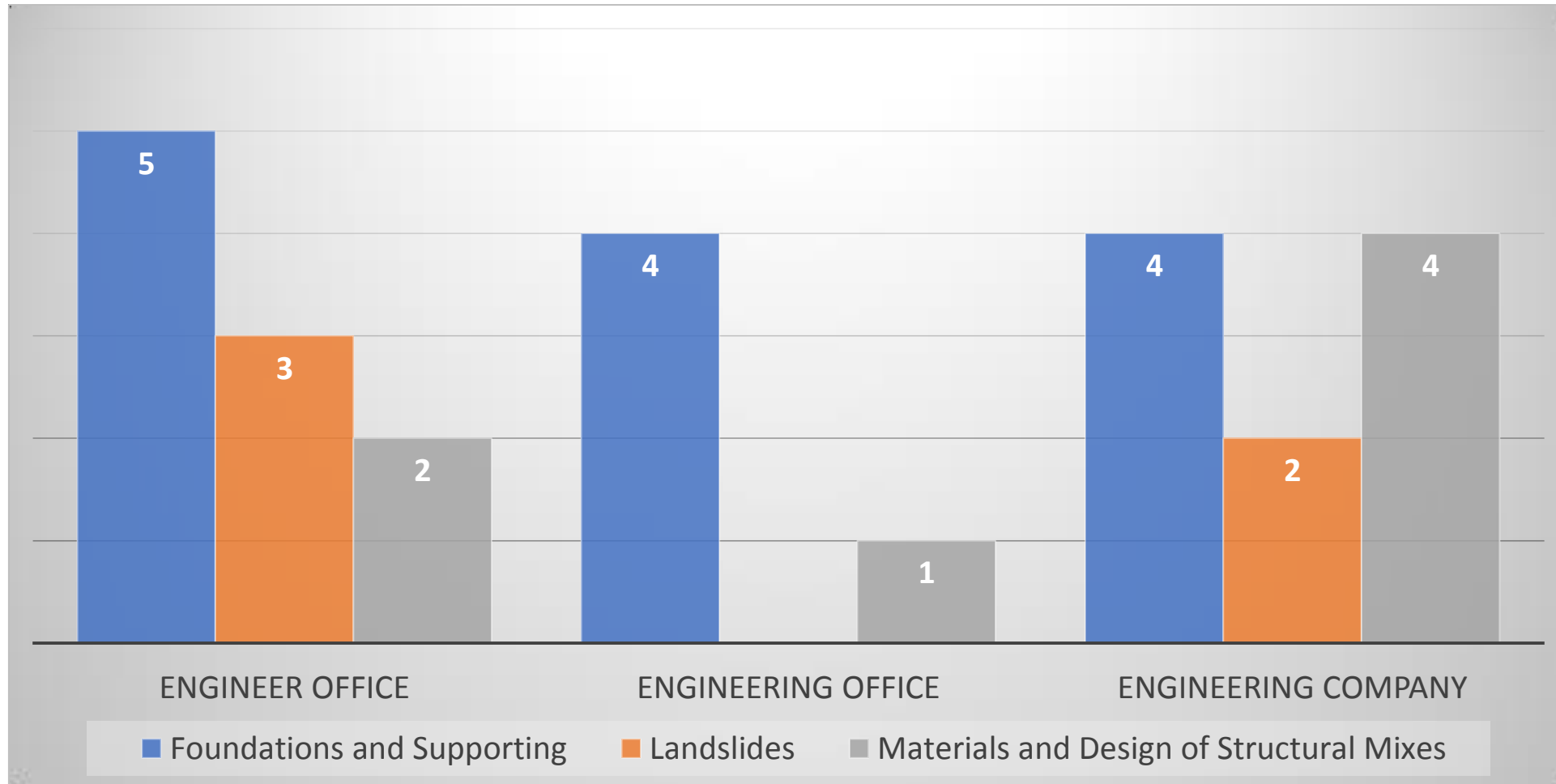
Building Consultancy Services Surveyed Sample



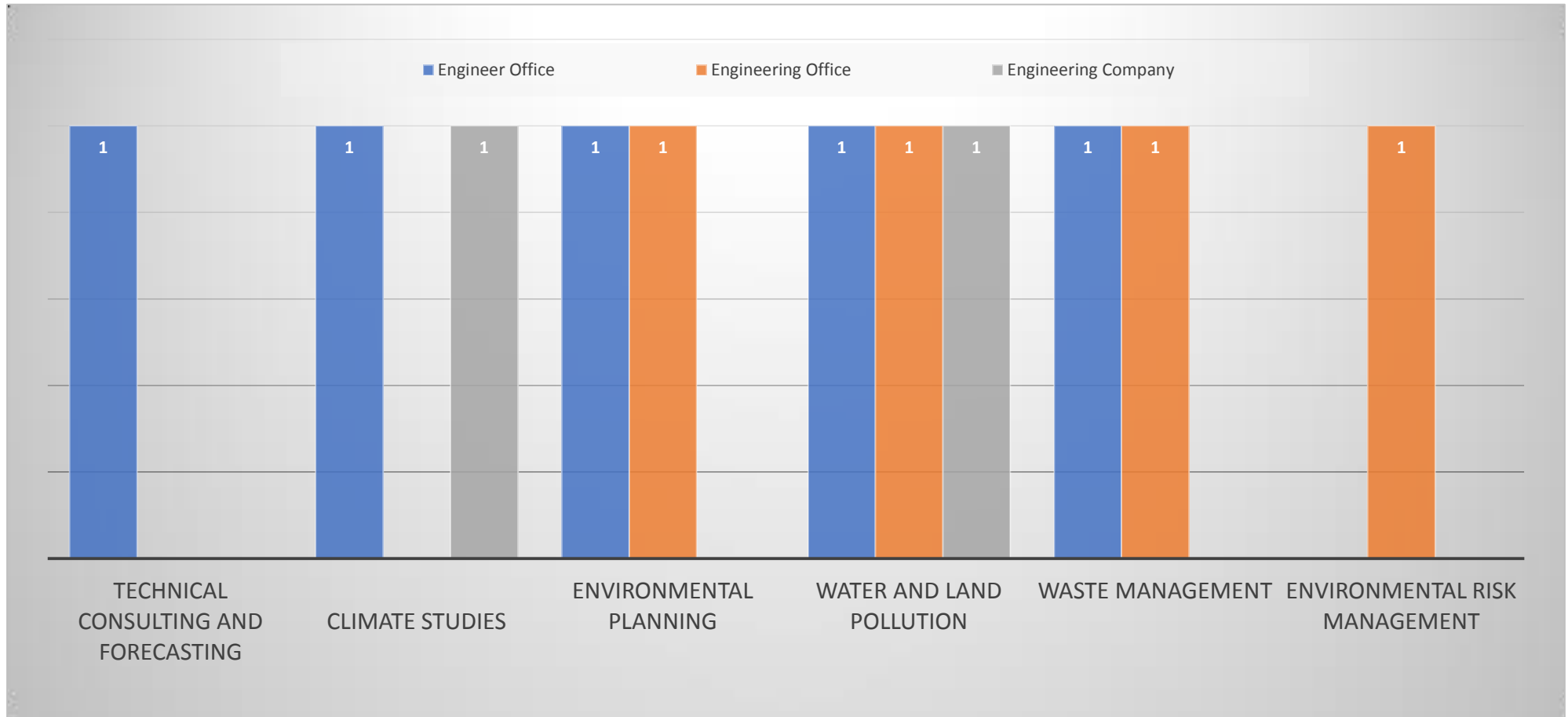
City and Urban Planning Consultancy Services Surveyed Sample



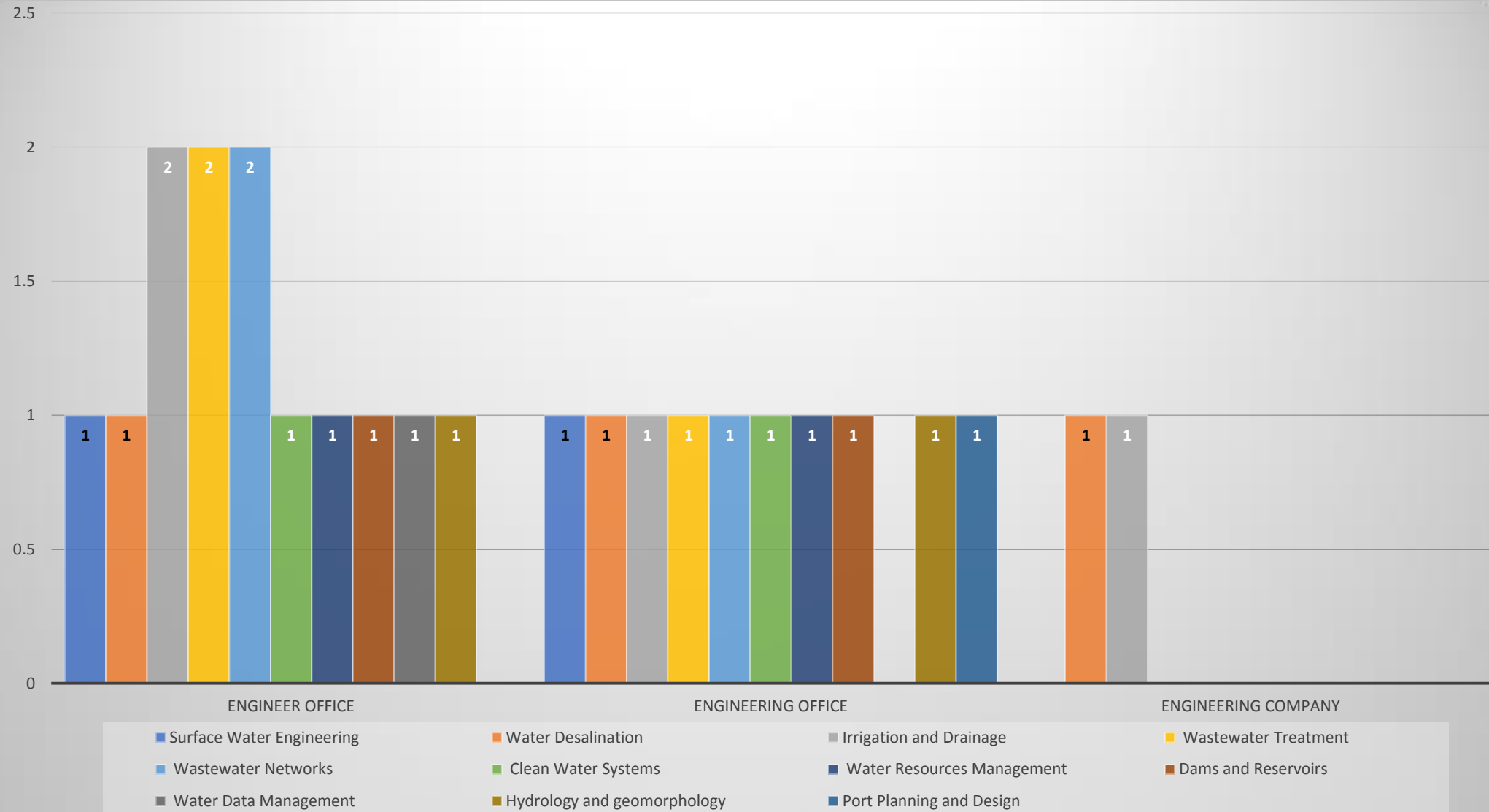
Geotechnical Engineering Consultancy Services Surveyed Sample



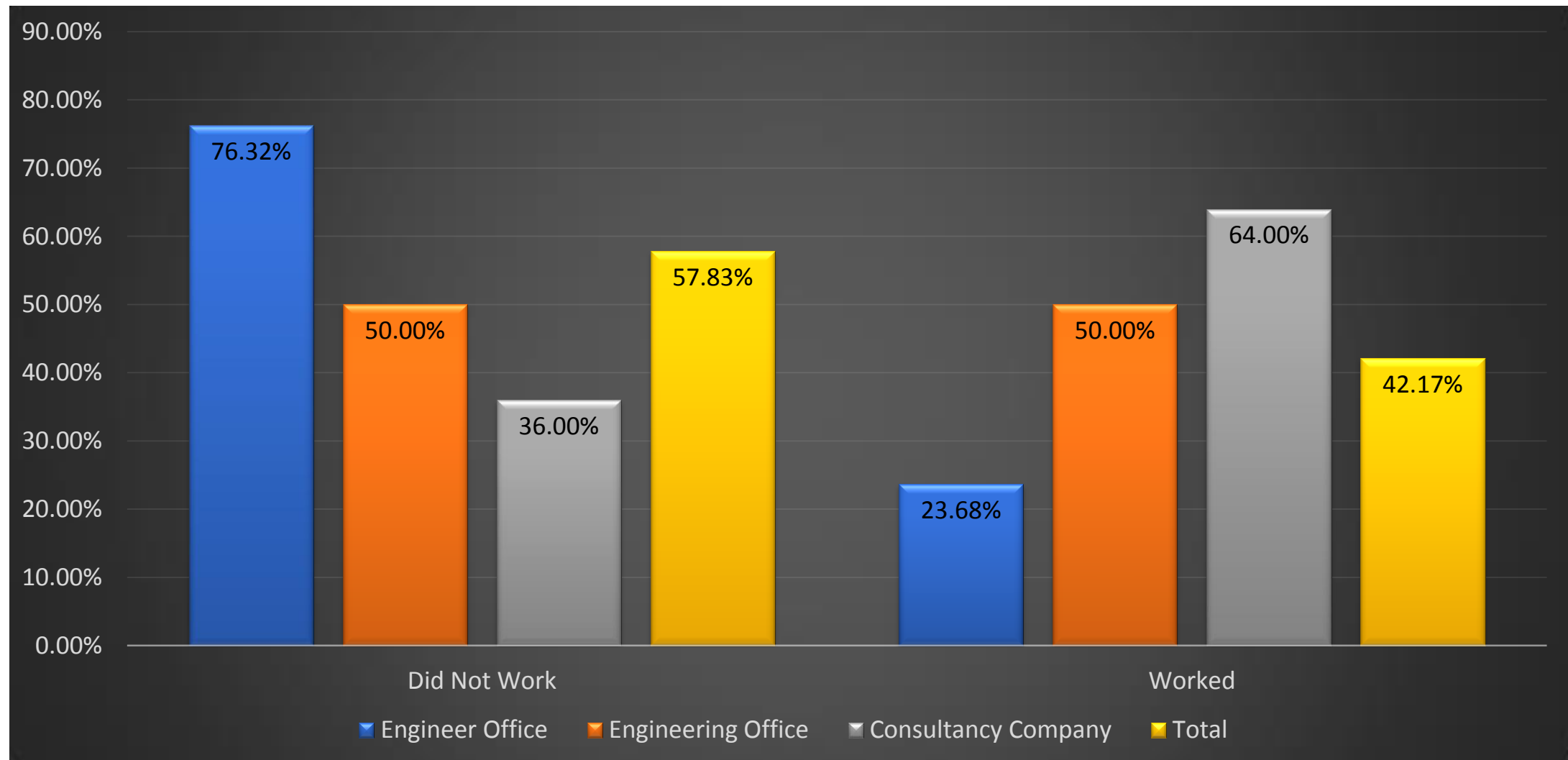
Environmental Engineering Consultancy Services Surveyed Sample



Water Engineering Consultancy Services Surveyed Sample



International Experience by Office Category



Offices' Capacities and Assets

Offices' Capabilities, Assets and Practices

Office Category	Number of Entities	Number of Engineers	Number of head of Specialty	Office Area (m ²)	Space per Engineer (m ²)	Number Software
Engineer Office	45	3.18	1.40	117.67	37.03	4.02
Engineering Office	21	3.10	1.58	96.50	31.13	8.10
Consultancy Company	28	18.26	5.33	251.18	13.76	10.14
Grand Total	94	7.59	2.63	153.31	20.21	6.76

Offices Productivity by Category

Office Category	Number of Projects	Building Area (m2)	Area per project	Design Area per Engineer	Design Area per Office Area m ²	No. Project per Engineers	Engineer per 10 Projects	Projects per 100 m ² office Area
Engineer Office	23.70	24756.73	1044.72	7790.58	210.40	7.46	1.34	20.14
Engineering Office	20.83	15040.67	721.95	4851.83	155.86	6.72	1.49	21.59
Consultancy Company	19.86	55961.95	2817.31	3064.85	222.80	1.09	9.19	7.91
Grand Total	21.84	32065.67	1468.50	4226.42	209.15	2.88	3.47	14.24

Field of Engineering in Practices

Engineering Fields	Listed Area	Practiced Areas	% of Practice
General Consultation	4	4	100.0%
Geotechnical Engineering	3	3	100.0%
Buildings	9	9	100.0%
Cities and Urban Areas	5	5	100.0%
Transportation Planning	8	8	100.0%
Highway and Bridges	7	3	42.9%
Railway and public Transportations	8	1	12.5%
Bridges and Tunnels	4	3	75.0%
Aviation Engineering	5	2	40.0%
Environment Engineering	8	8	100.0%
Water Engineering	9	8	88.9%
Hydraulics and Ports	8	4	50.0%
Industry Engineering	6	6	100.0%
Energy Engineering	17	7	41.2%
Development	12	8	66.7%
Digital Infrastructure	5	1	20.0%

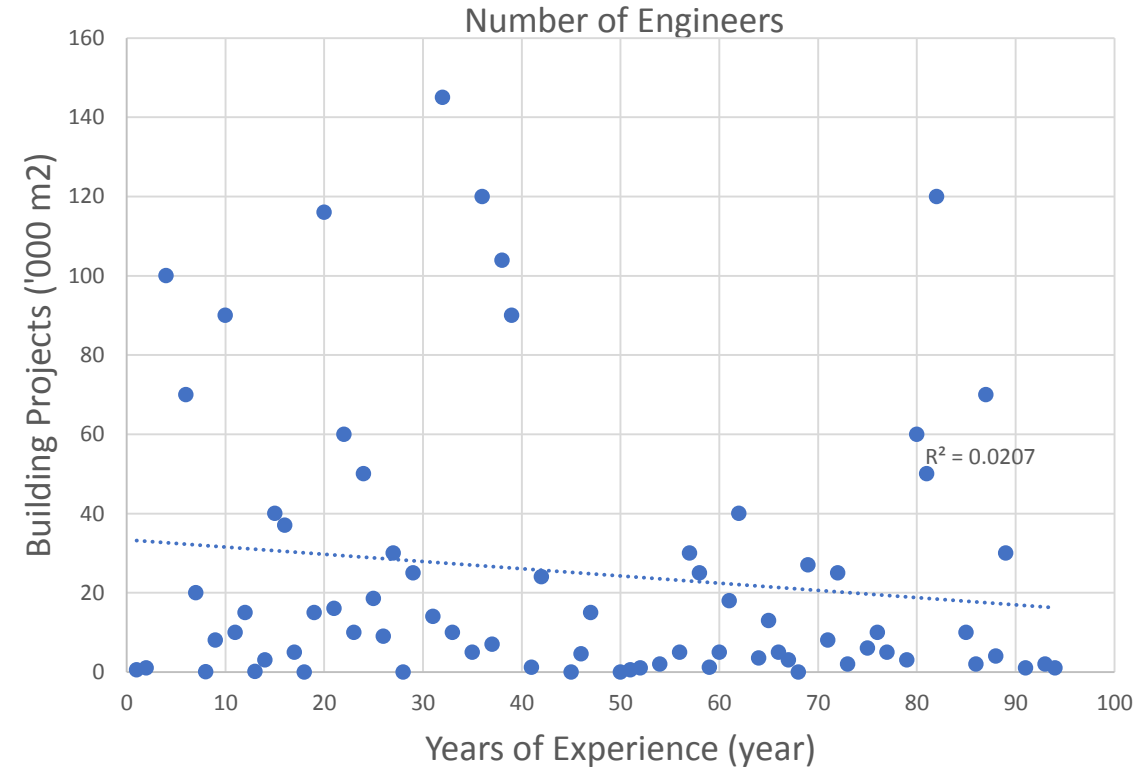
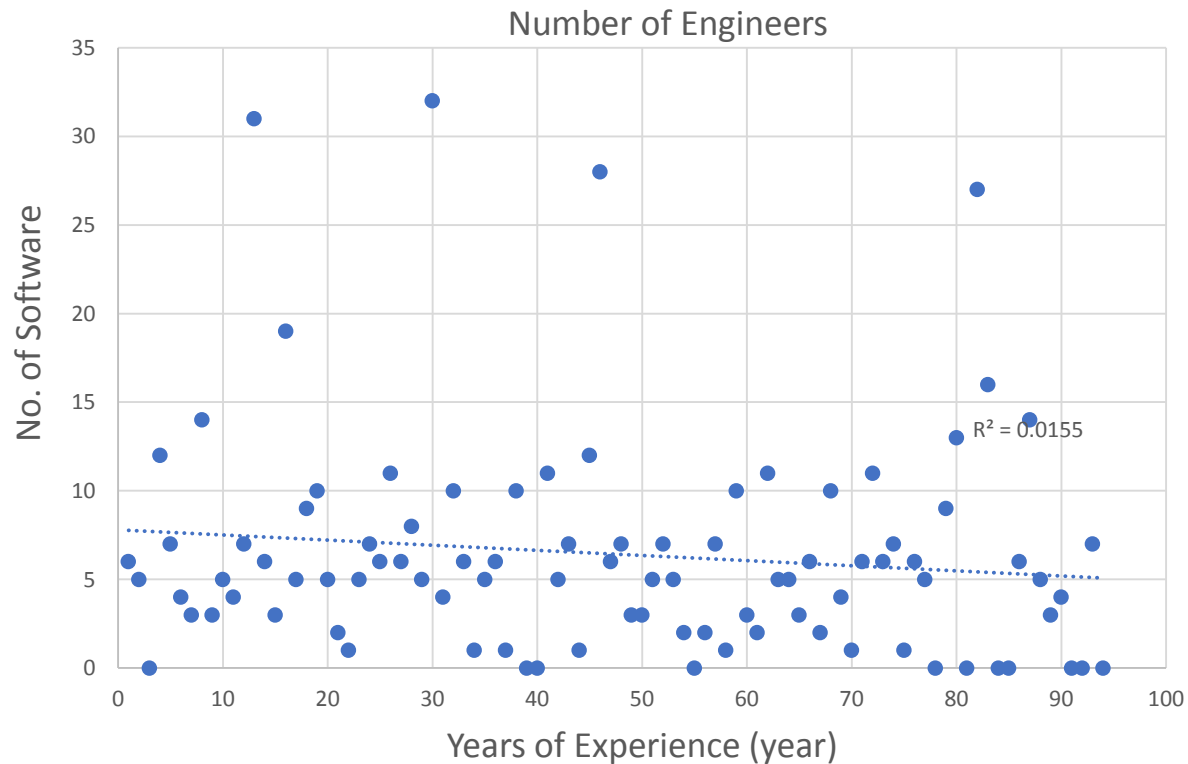
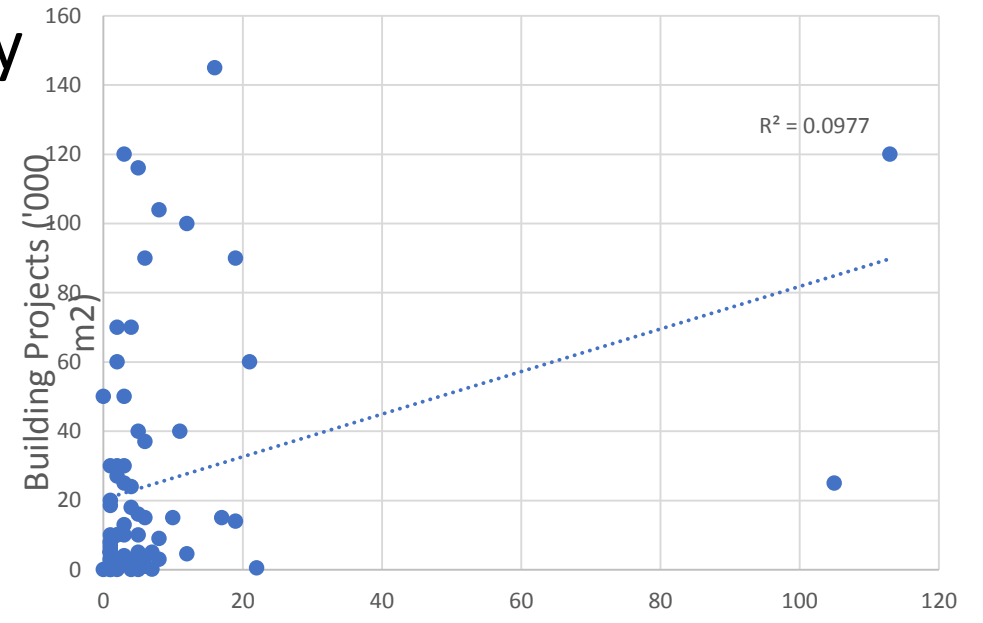
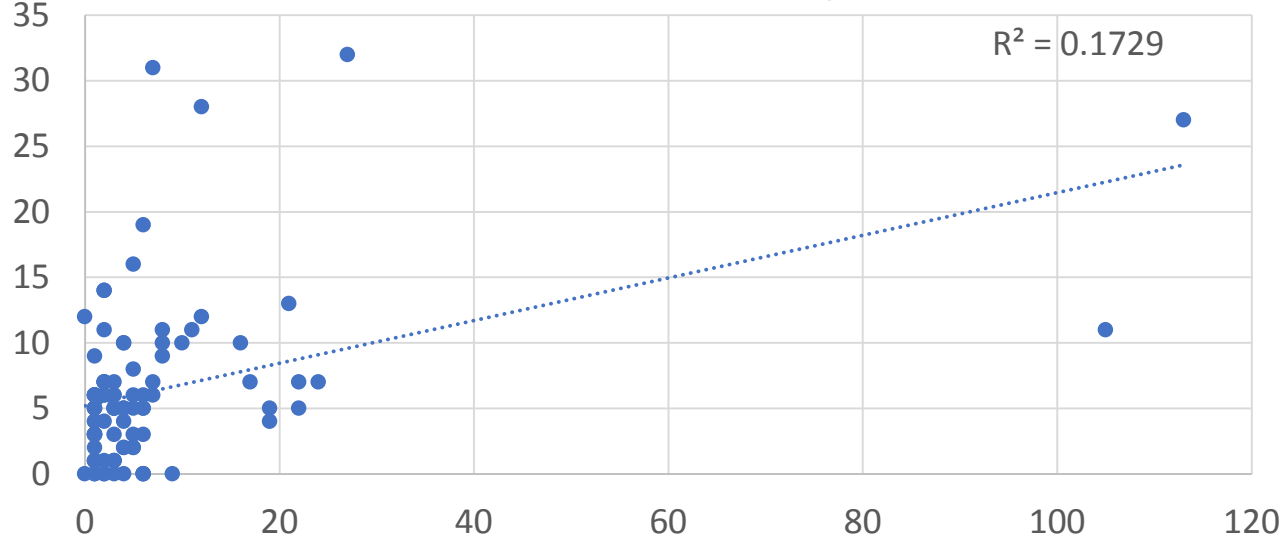
Software in Use by Engineering Field

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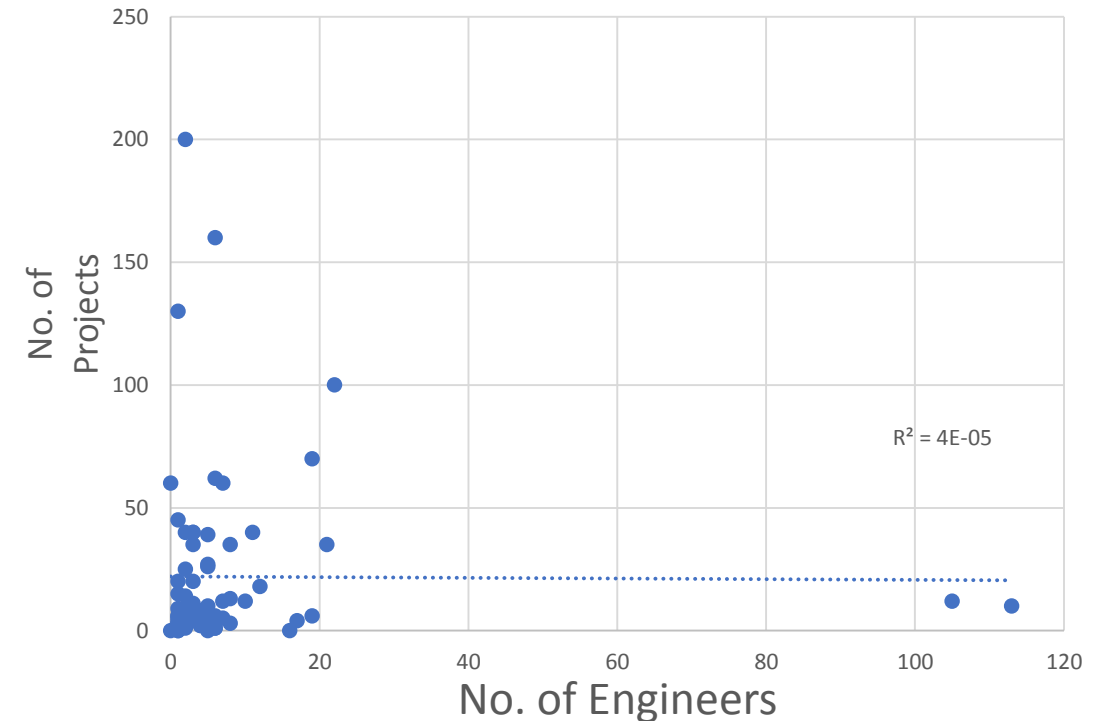
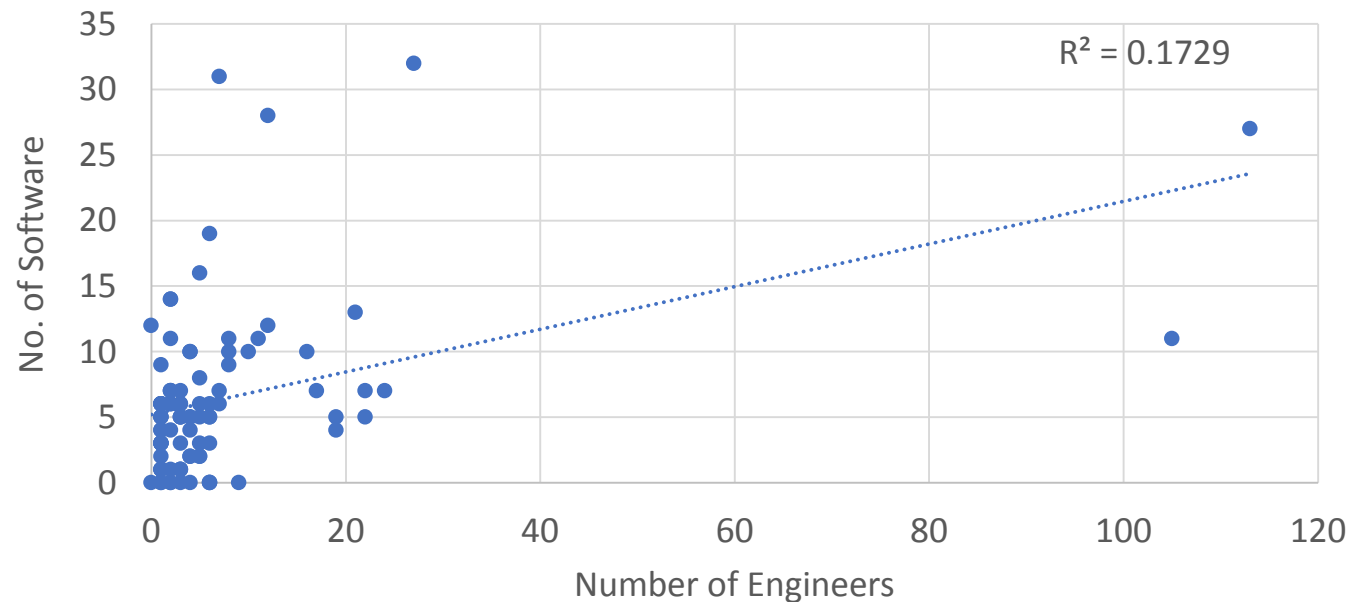
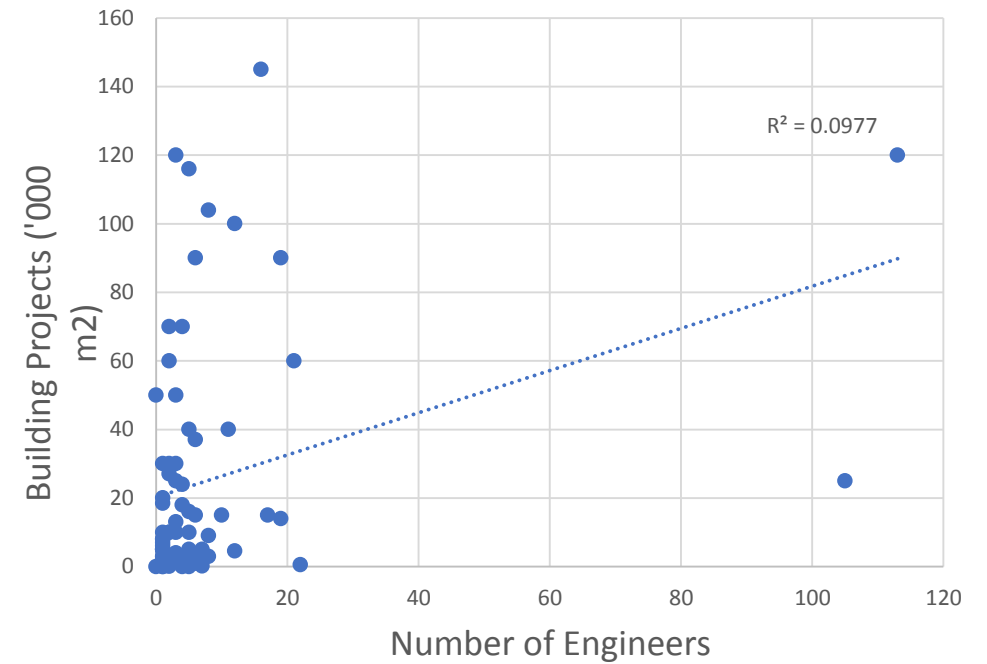
Relationship Analysis

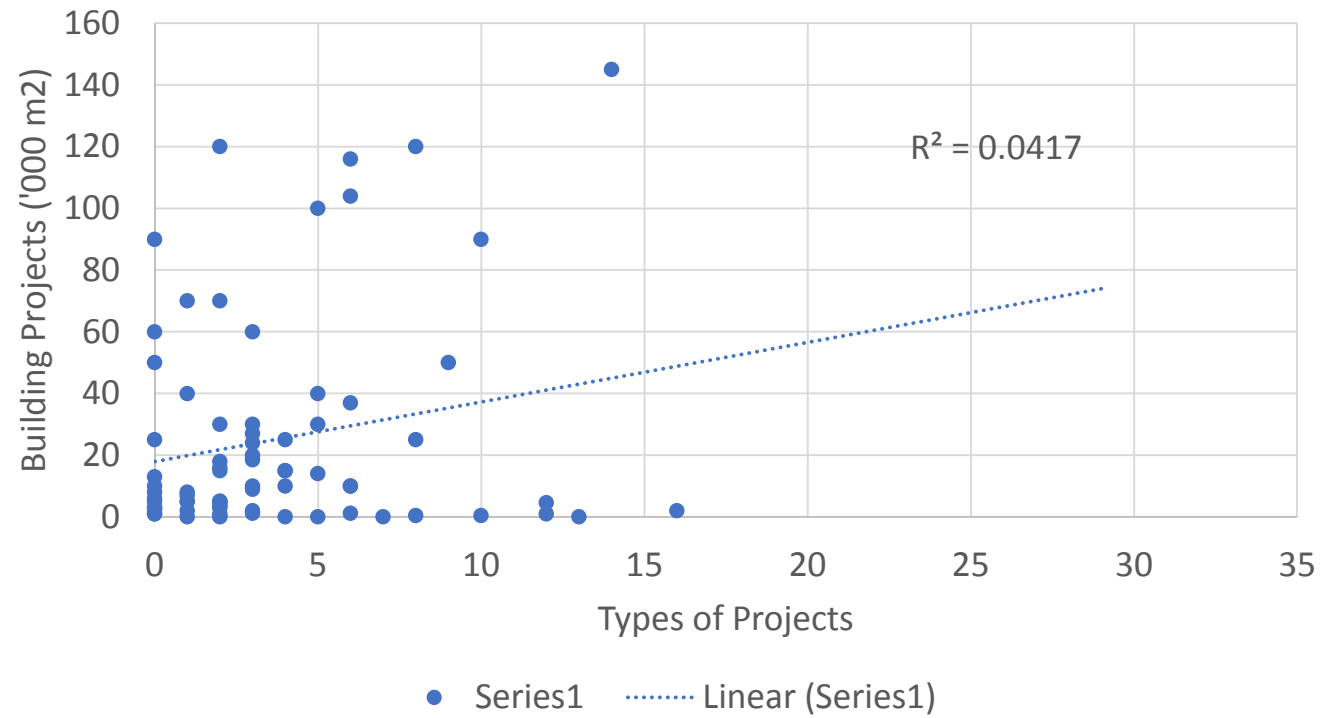
What influence Consultancy Services Productivity

No. of Software

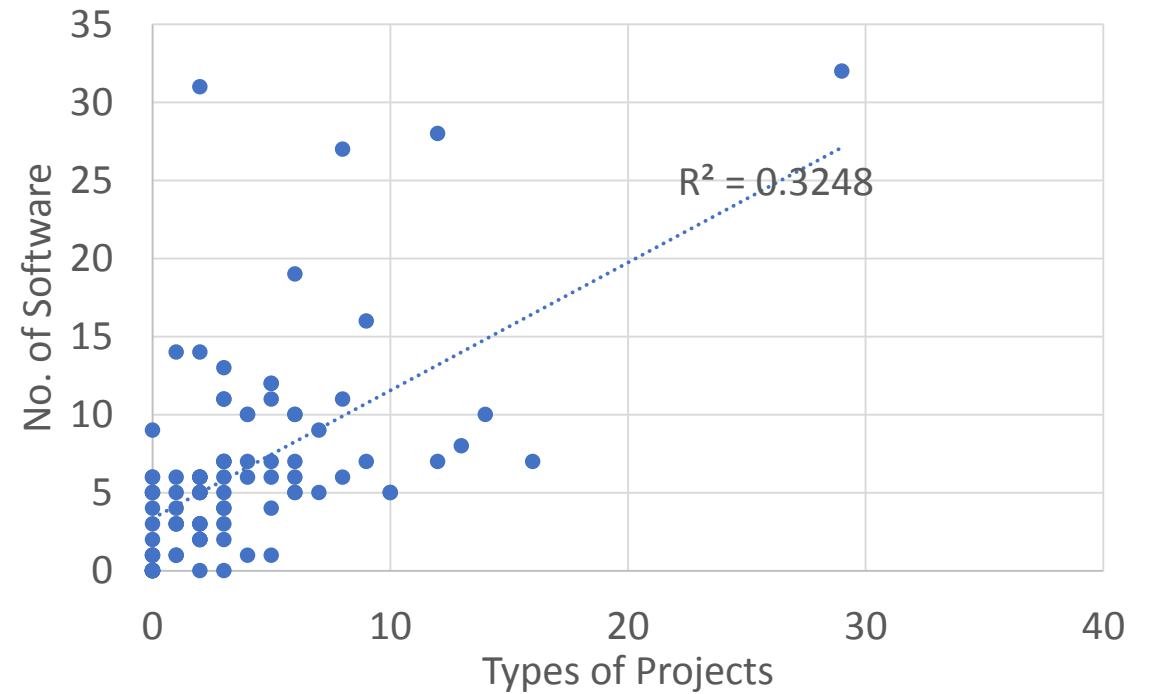


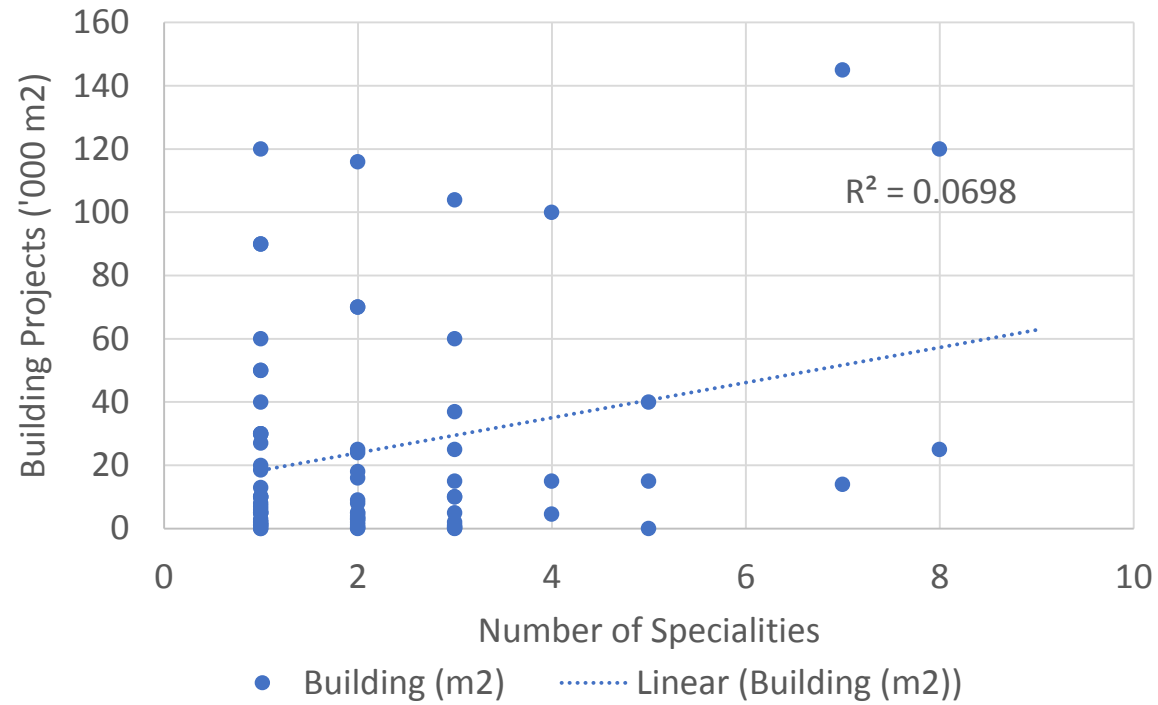
Relation of Number of Engineer and Office Practice



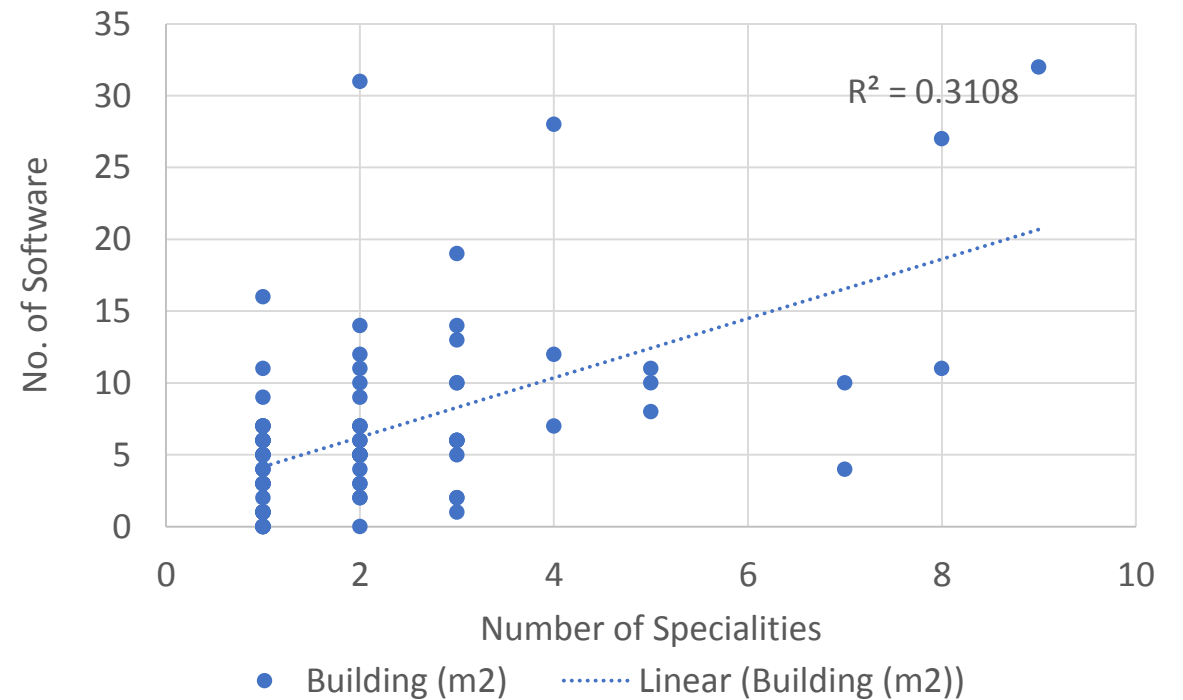


Relation of Types of Projects and Office Practice

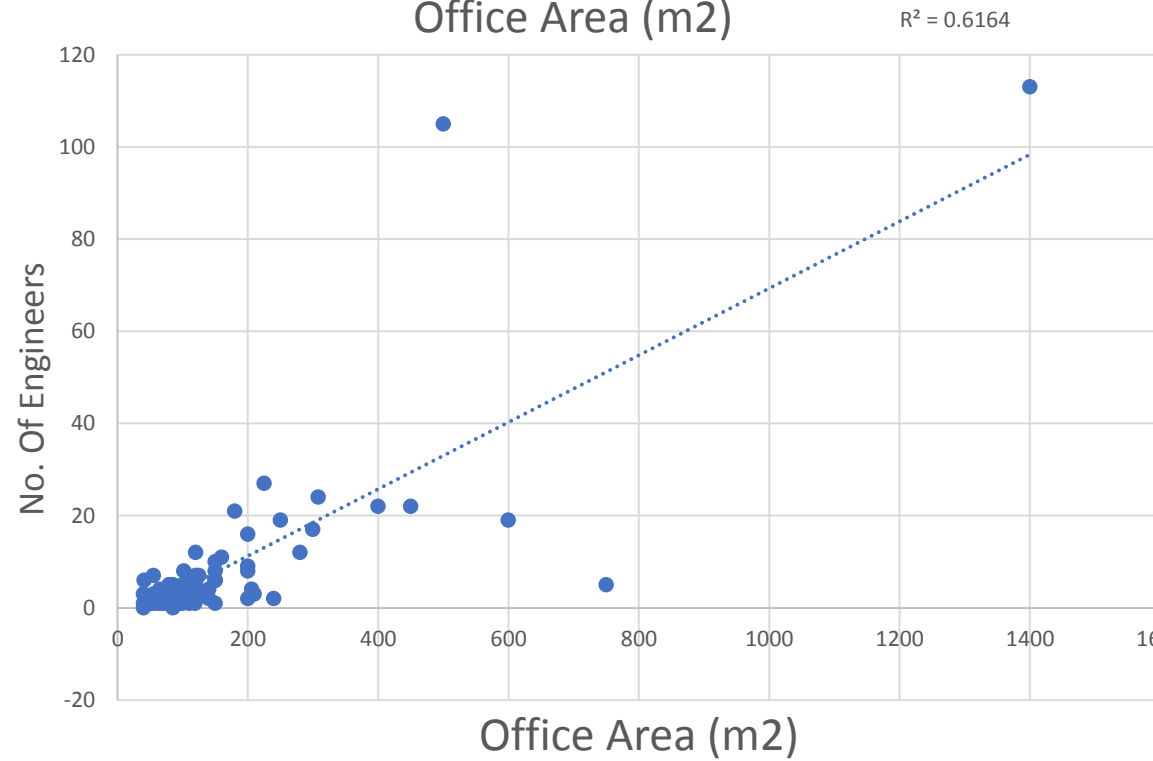
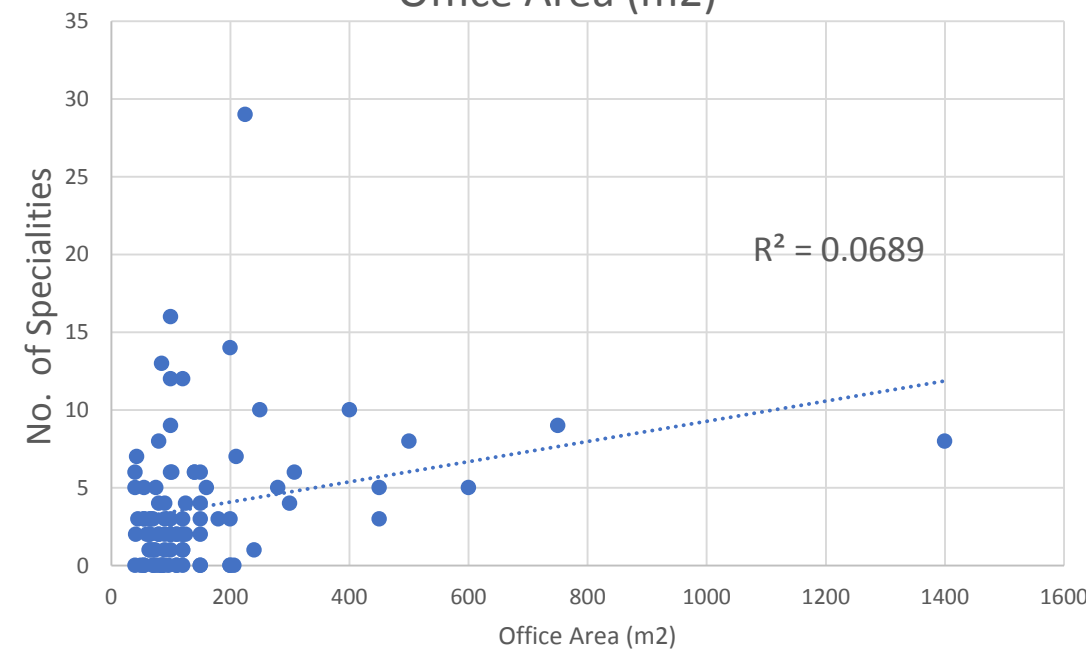
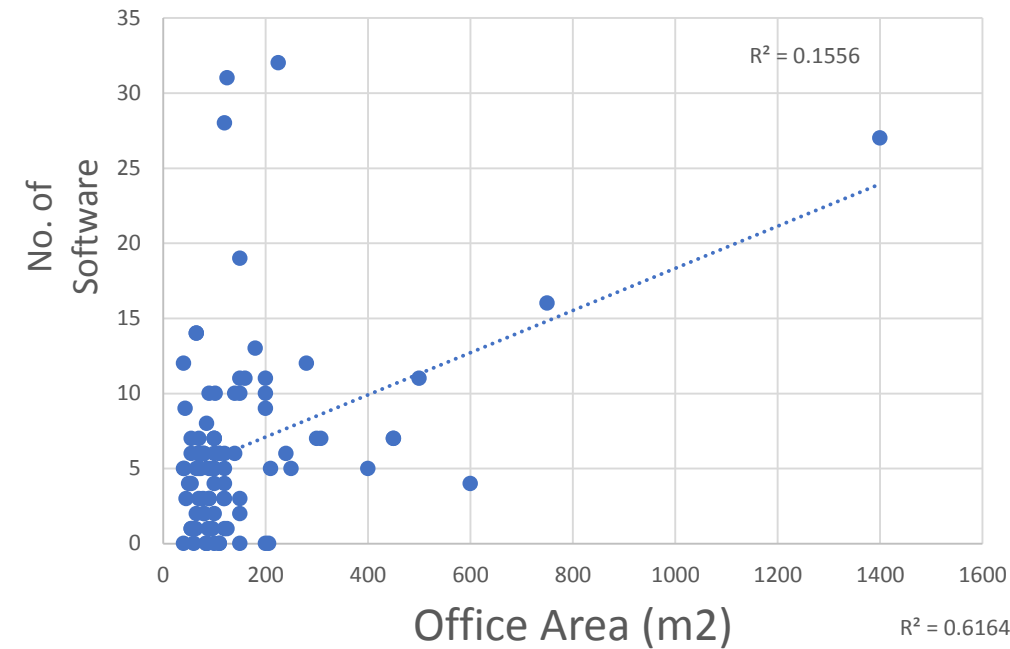
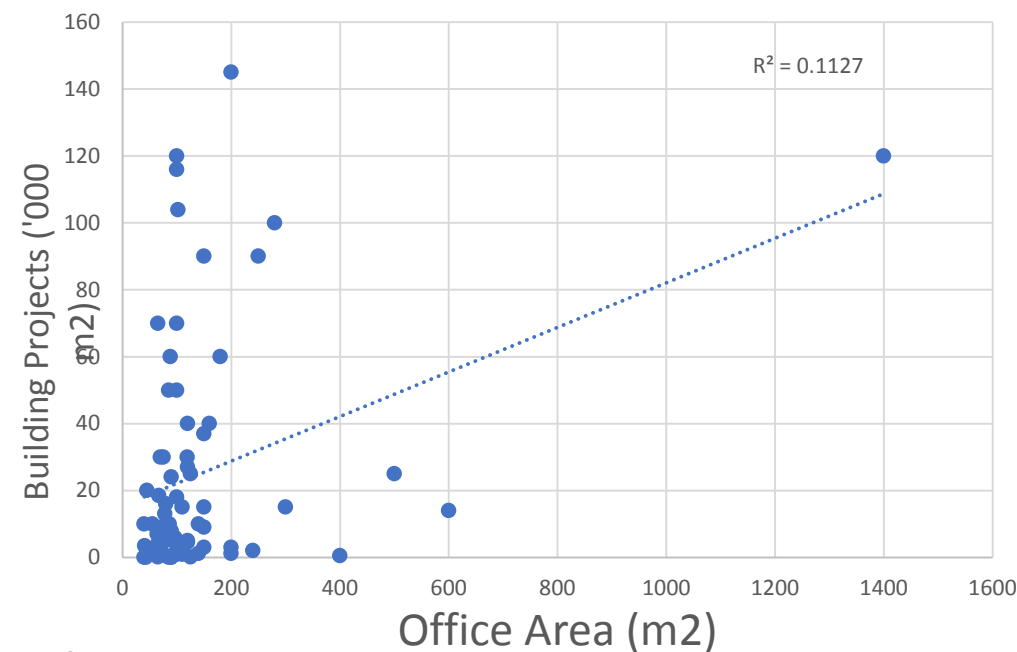




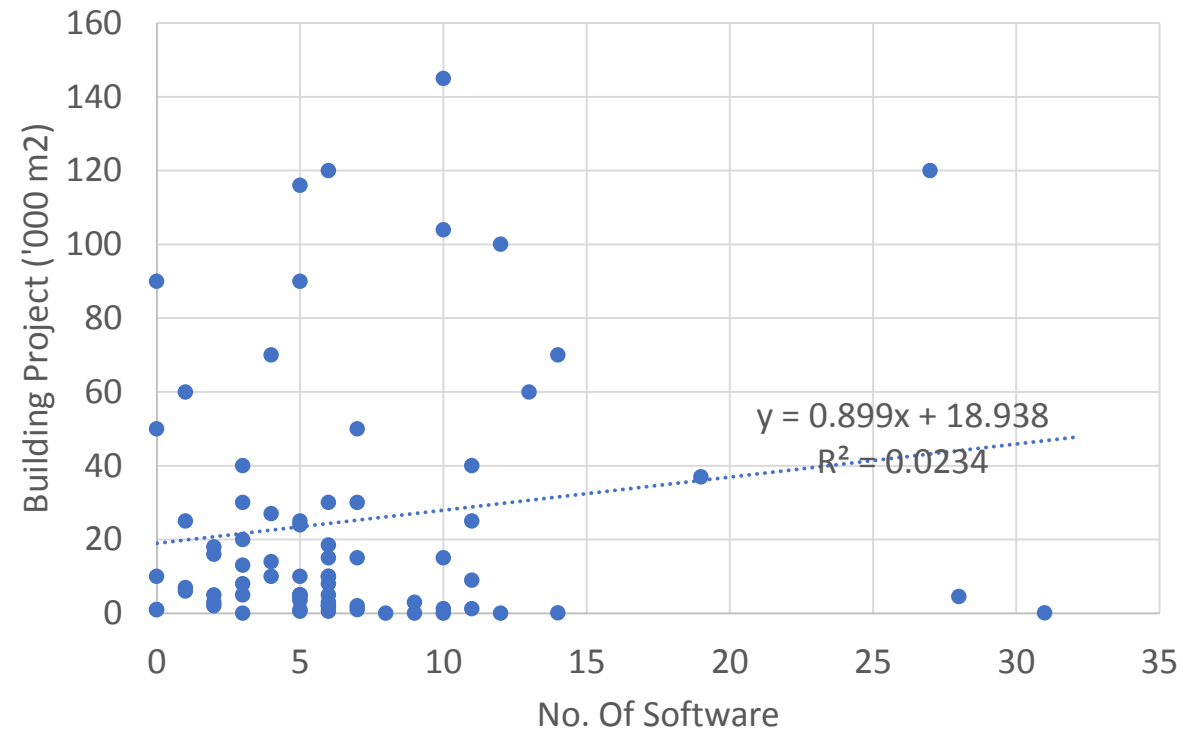
Relation of Number of Specialties and Office Practice



Relation of Office area and Office Practice



Software vs and Office Productivity



Conclusions

- 63% of the registered offices are practicing the profession in one field and 29% of them practicing the profession in two fields while only 8% practice more than two disciplines.
- Only 18% of the registered offices are consulting offices/companies.
- Around 50% of registered engineering in consulting offices are working in supervision services
- Building construction and structural engineering are the most common practiced disciplines.
- Around 42% of the respondents stated that they have worked outside Jordan and 64% of consulting companies practiced working abroad.
- 60% of the participant in the survey were involved in residential and hotel projects and 55% of them report working in commercial and civil offices. One-of-four subjects worked in one or more of the nine listed building project types.

Conclusions

- Built-up building area produced by engineering entities are not statistically related the office years of experience, number of engineers or the allocated spaces. Number of software used seems related to number of registered specialities and types of Projects.
- The study showed that on average there are 7.6 engineer, 2.6 head of speciality per engineering entities that occupy 153 m² and uses 7 software.
- The study showed that during the last three years and on each engineering entities produced 21 project with a total area of 32000 m², which means that the average area per project is 1470 m².
- Prokon, Autocad, google earth, Etabs, Revits and geotechnical analysis are most common software.

