

The Factors of Gender Inequity in Employment in the A/E/C Industry in Taiwan: Report-Reflexive Evidences from a Survey

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Presented by: Dr. Zheng-Yun Zhuang



IN ALMOST ALL EAST ASIAN COUNTRIES,
FEMALE IS A RELATIVELY SMALLER GROUP IN
THE A/E/C INDUSTRY

AGENDA

- 0. Introduction
- 1. The Survey and Data
- 2. Spectrum Analyses
- 3. Compared to the Reports
- 4. Discussions
- 5. Conclusion



INTRODUCTION

- This paper:
 - Reveals the results after revealing *the facts for* and analysing *the factors behind* the current situation of ...
 - Gender inequity in employment (GIE)
 - In the architecture, engineering and construction (A/E/C) industry
 - Subject to the East Asian culture





The Survey and Data

The investigations

The Survey

- Survey conducted based on a thorough survey on/after 2020 ('after' because of the pandemic)
 - Sponsorships (Survey Project):
 - Ministry of the Interior, Taiwan (ROC)
 - Ministry of Science and Technology, Taiwan (ROC), 108-2221-E-992-007; 108-2221-E-992-008-MY3
- The real questionnaire designed and used:
 - A 'superset' of the question items and answers analysed in this work ...
 - Language: In Chinese (traditional)



Survey Channels

- LINE, via:
 - Official blogs for institutions
 - Friend groups
 - One-by-one chatting
- Web-based questionnaire
 - Use an existing tool and releasing the URL
- Physical Channels (face-to-face interviews or mail)
 - By research team members (on-site employees)
 - By authorised labour union leaders
 - Mail deliveries/roundtrips of paper copies
- E-mails: with URL and file attachment



SAMPLED RESPONDENTS (1,349/1,387)



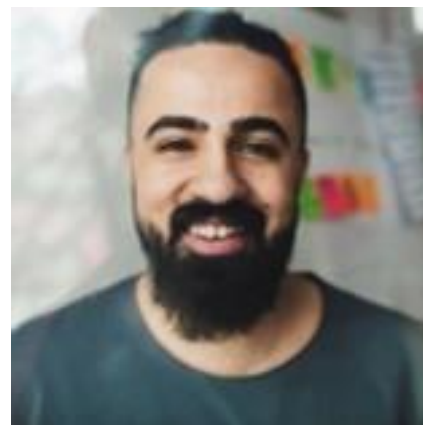
FEMALE

Group A: 385



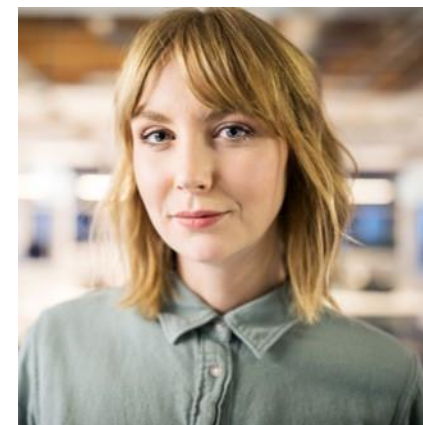
MALE

Group B: 712



TECHNICIANS

Group D: 140



EMPLOYERS

Group C: 112

LINE
Channel



Web-based
Channel



Face-to-Face
Channel



E-mail
Channel



SAMPLE



Effective Sample



Female
Workers



Male
Workers



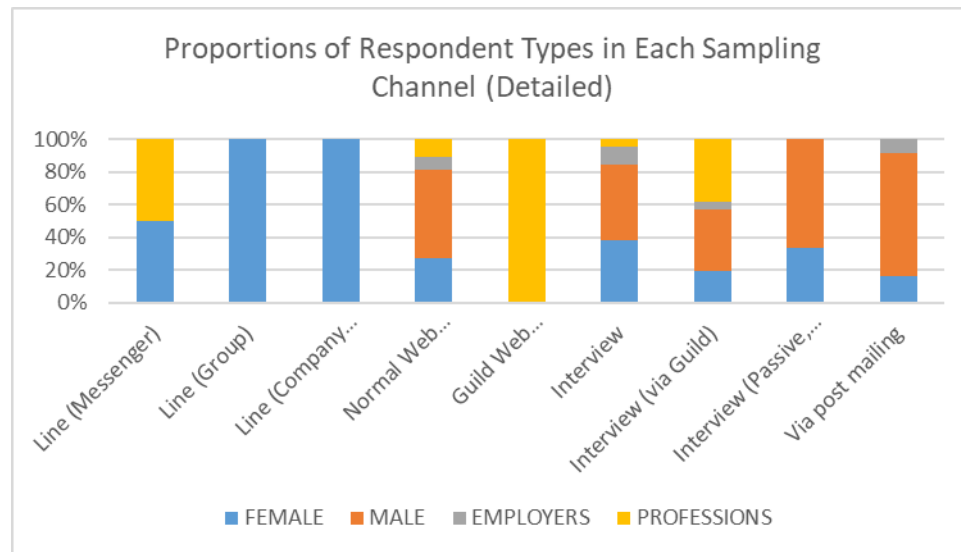
Employers
(Bosses)



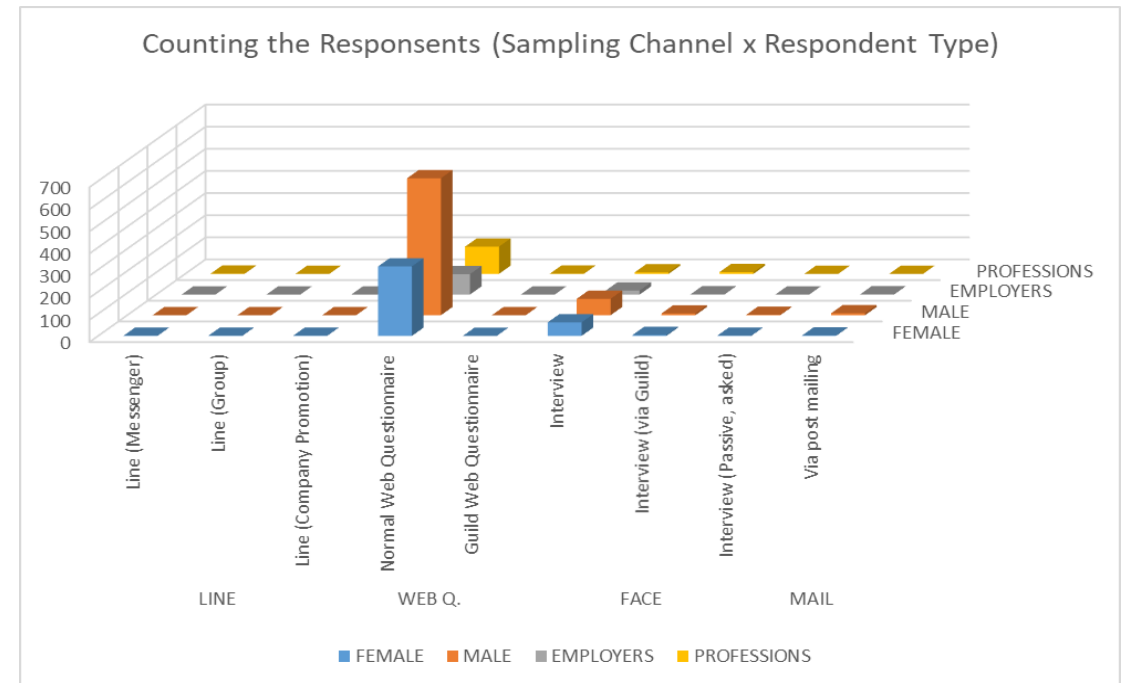
Technicians
Consultants

RESPONDENT ANALYSIS: CHARTS

Each channel's sample composition by respondent group (de-scaled)



Each channel's sample composition by respondent group (with scale)



RESPONDENT ANALYSIS: TABLE

CATEGORY	TYPE	FEMALE	MALE	EMPLOYERS	TECHNICIANS	SUBTOTAL
LINE	Line (Messenger)	1	0	0	1	2
	Line (Group)	1	0	0	0	1
	Line (Company Promotion)	1	0	0	0	1
WEB Q.	Normal Web Questionnaire	314	619	92	123	1148
	Guild Web Questionnaire	0	0	0	1	1
FACE	Interview	61	74	18	7	160
	Interview (via Guild)	4	8	1	8	21
	Interview (Passive, asked)	1	2	0	0	3
MAIL	Via post mailing	2	9	1	0	12
	Subtotal	385	712	112	140	1349



Spectrum Analysis

Results from descriptive analyses according to the properties of answers

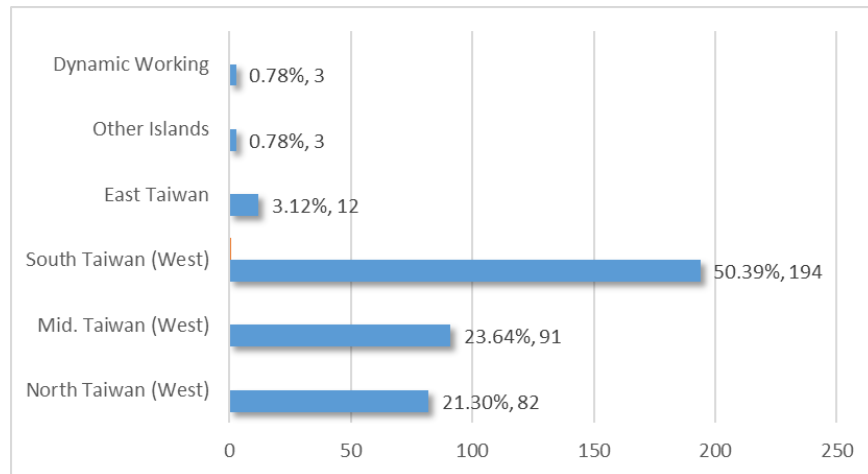
Here, we present the results from analyses for ...

- Respondent Profile
 - Basic profiles
 - Advanced work-relevant features
- Reasons for Women's Labour Participation
 - Positive reasons
 - Negative reasons
- Other Mental Factors of Interest
 - The 'source of self-esteem' factor
 - The 'work companions' factor (set through field observation; established through analysis)

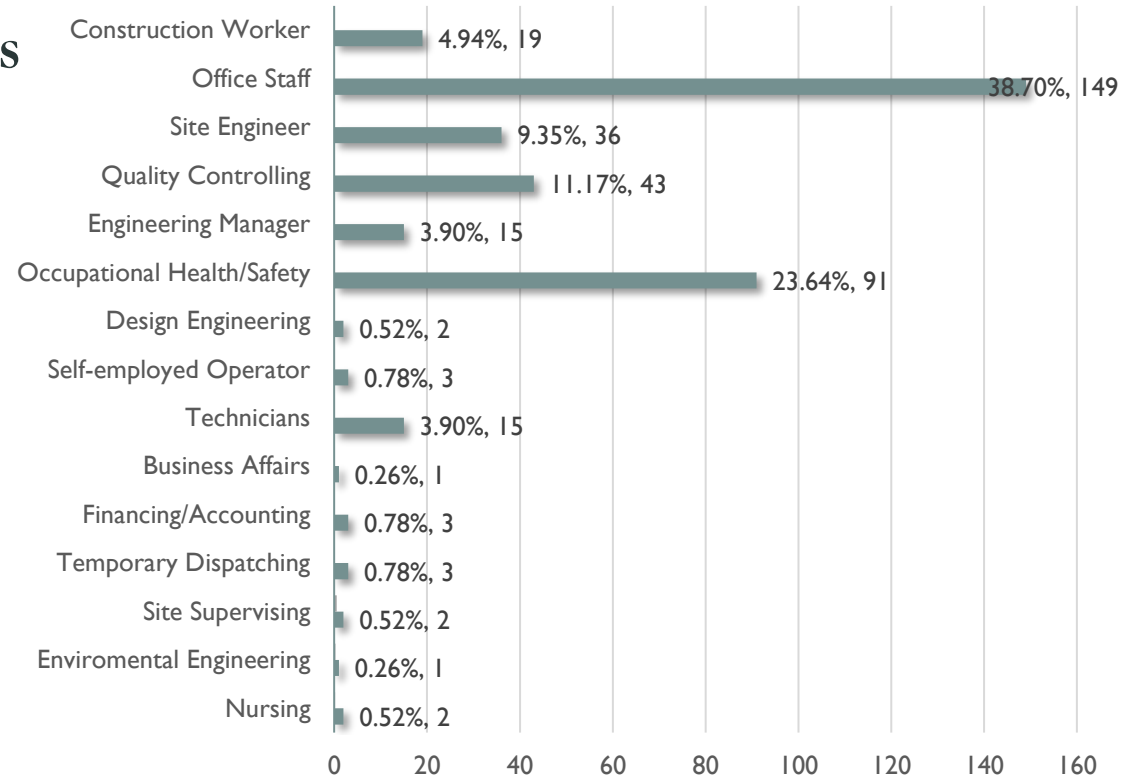


PROFILE: BASIC PROFILES

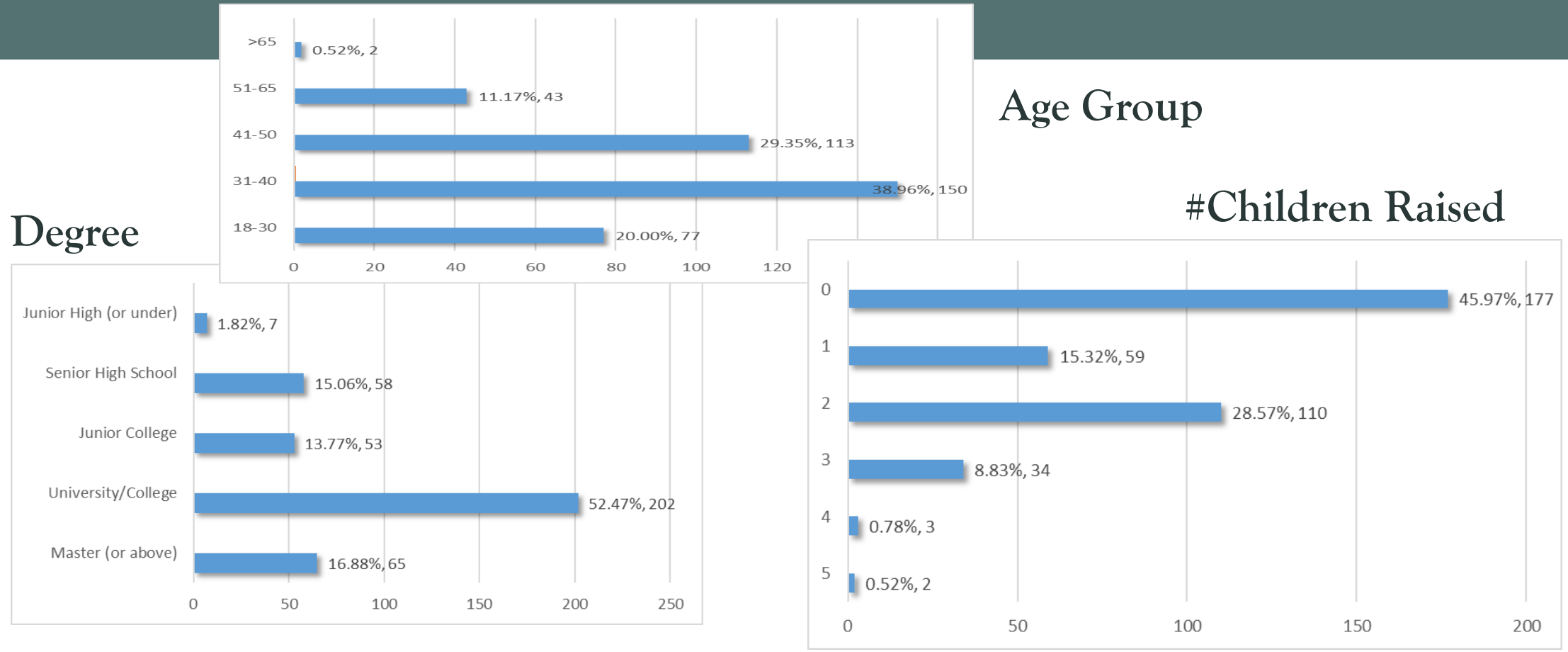
Working Location



Occupations

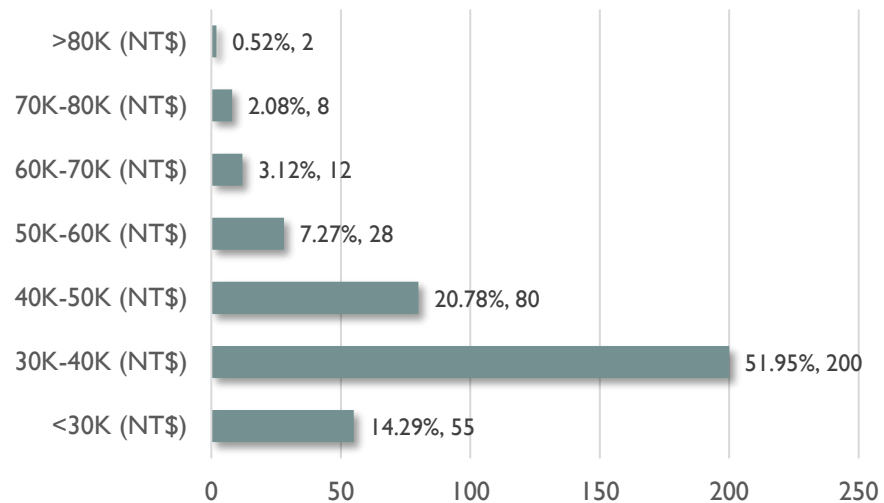


PROFILE: BASIC PROFILES (CONT')

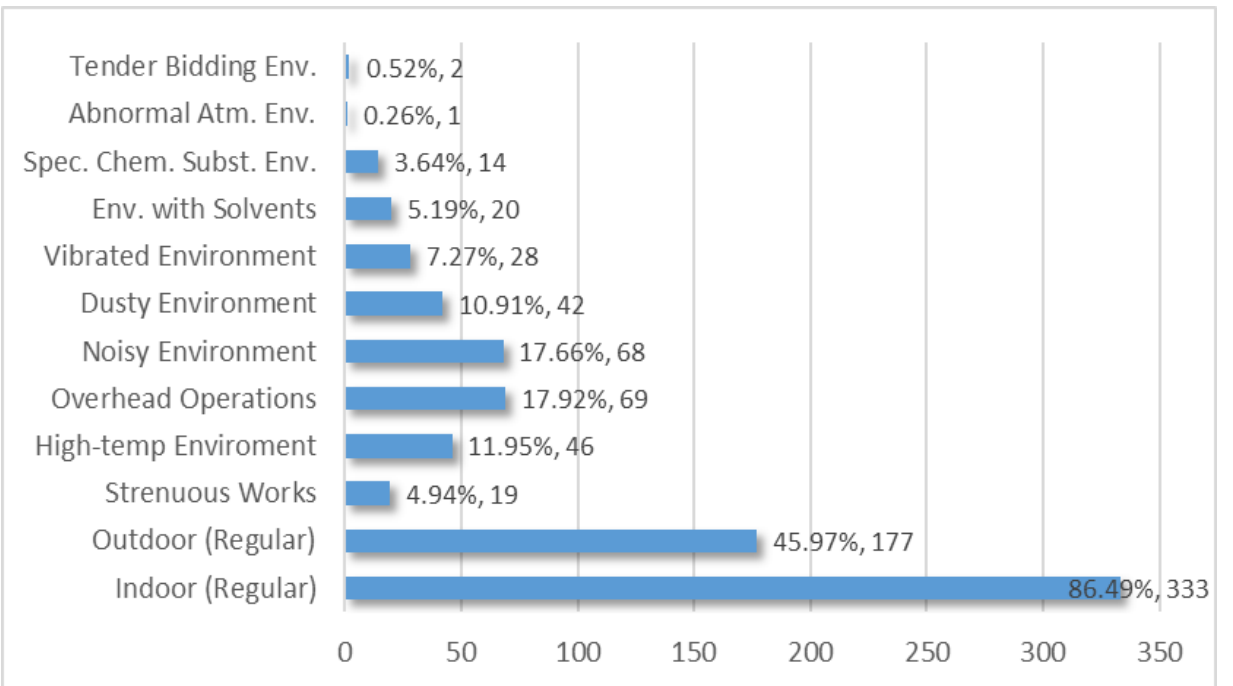


ADVANCED WORK-RELEVANT FEATURES

Wage



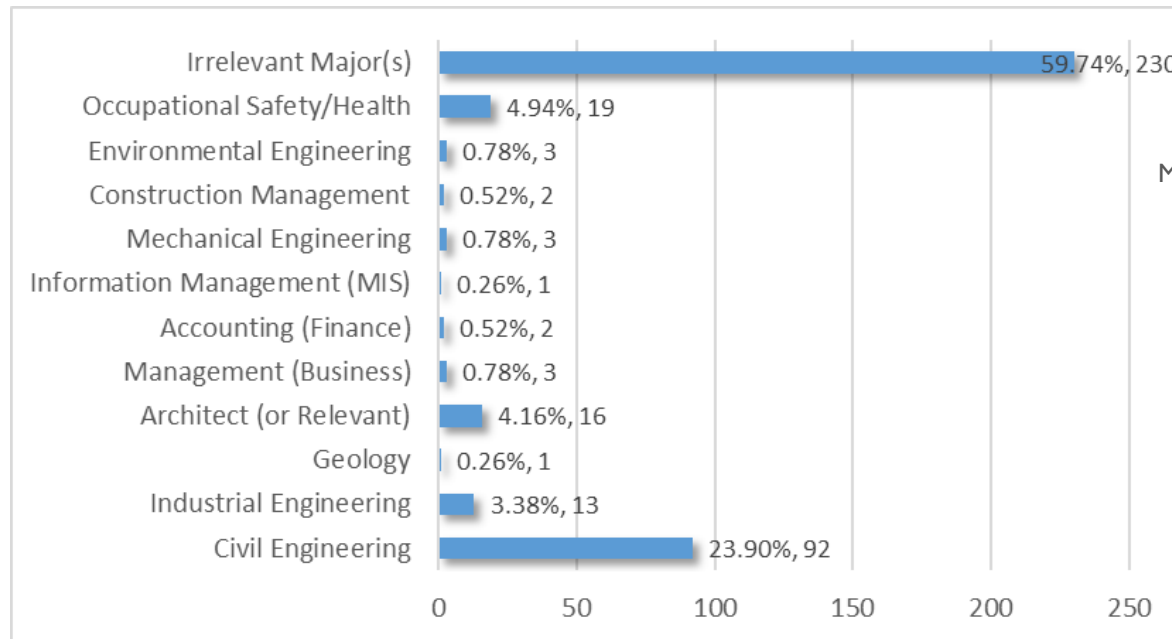
Workplace



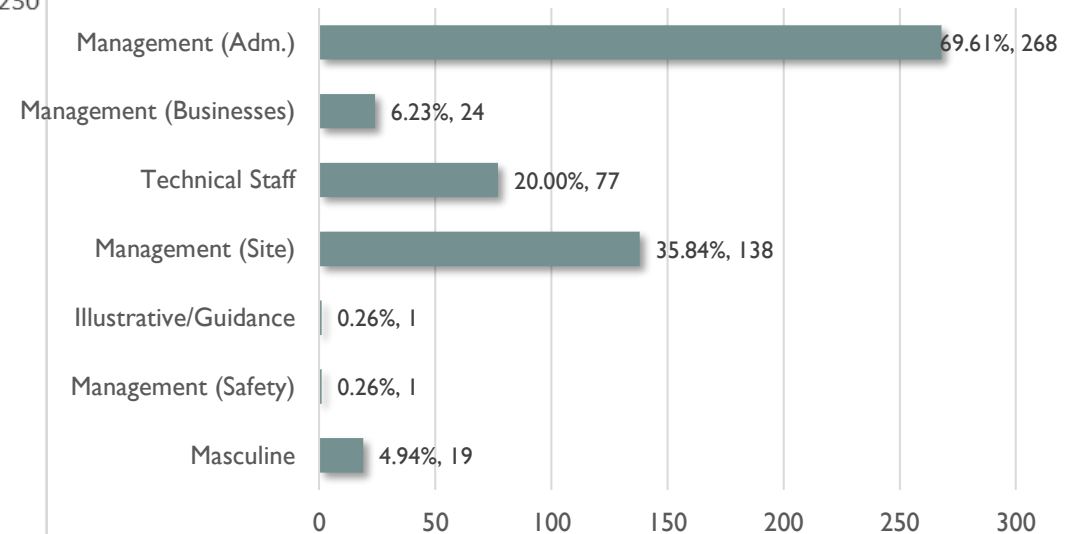
ADVANCED WORK-RELEVANT FEATURES (CONT')

THE WORK-RELEVANT FEATURES, OR
PATTERNS OF WORK, IS KEY

Major

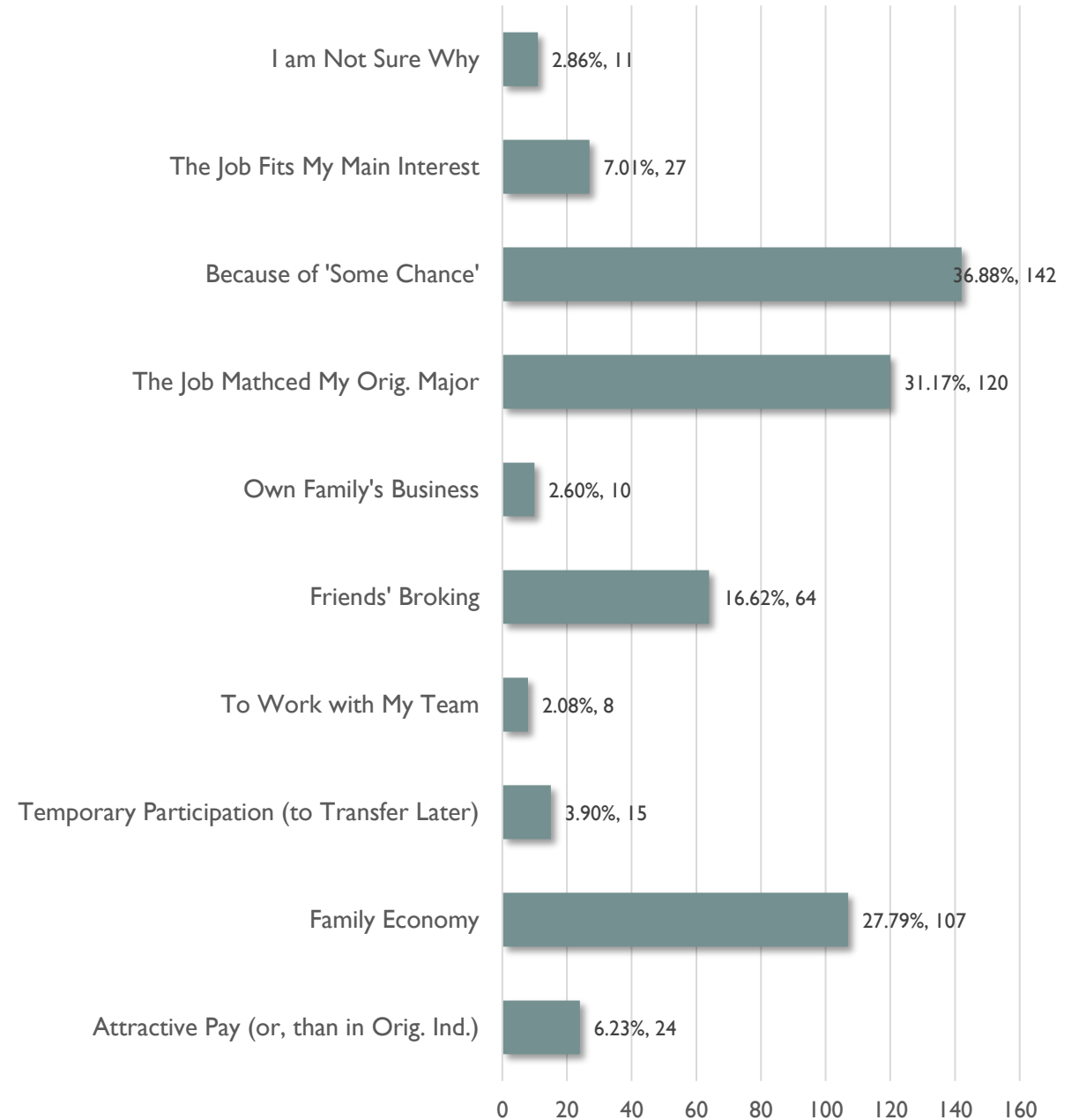


Functional Role in Institution



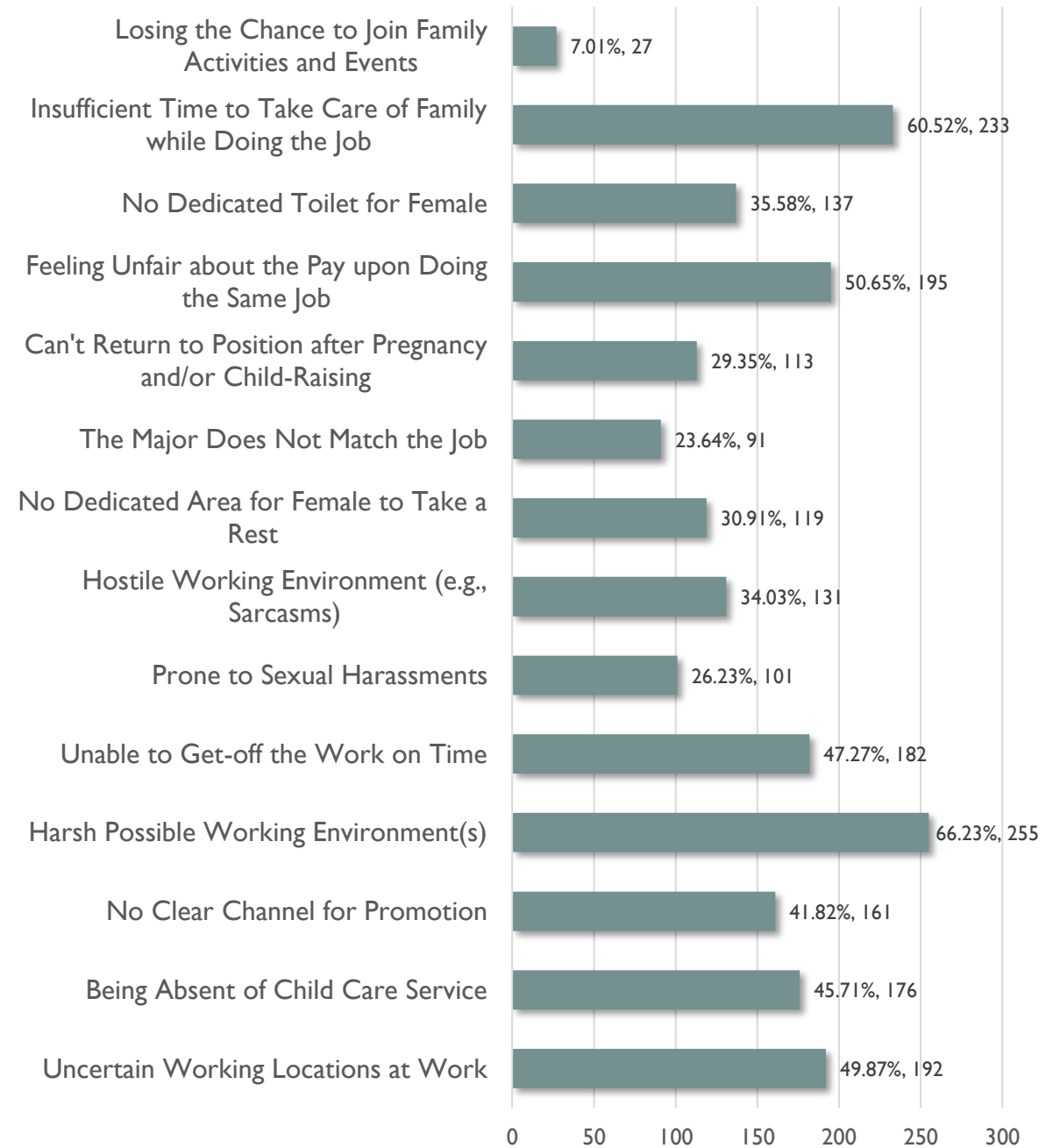
(Perceived) Positive Reasons for Female's Labour Participation

Among 10 Reasons



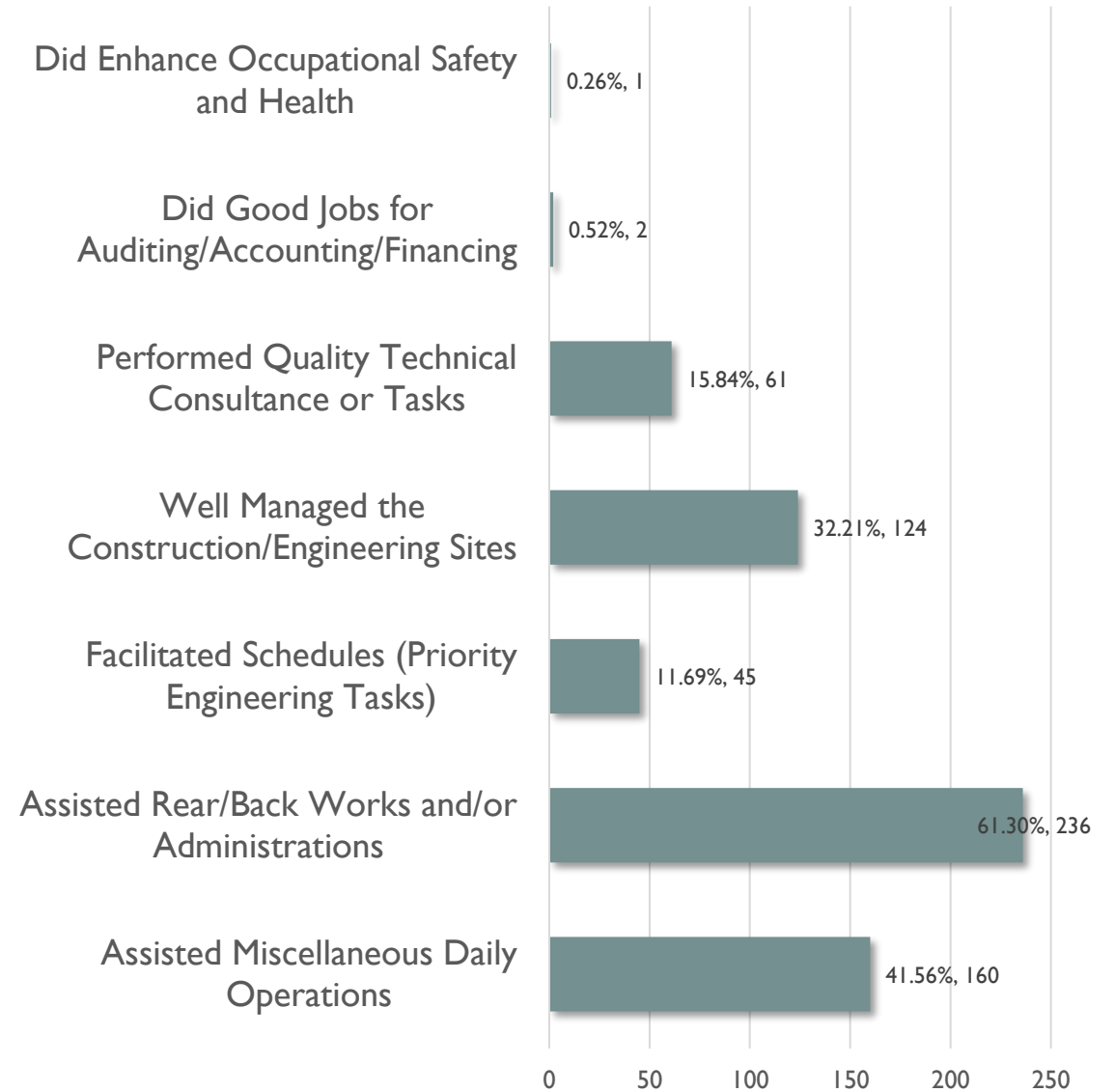
(Perceived) Negative Reasons for Female's Labour Participation

Among 14 Reasons



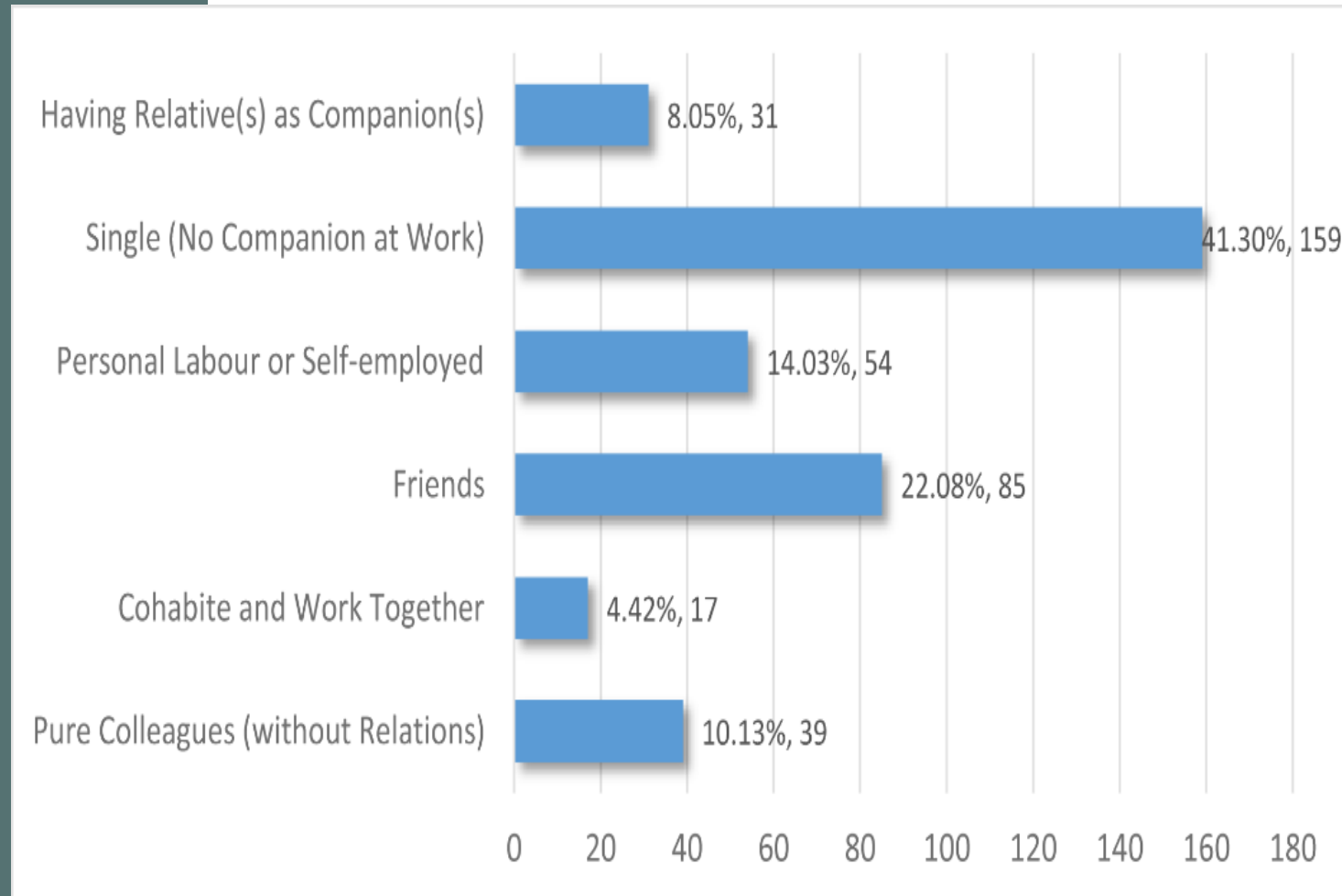
The Source of Self-Esteem Factor

*Votes for the 7 Sources of Self-Esteem
Which a Currently Employed Female
Worker May Feel during Work*



As for the 'Working Companions' Factor

*6 Types of Working Companions
to Investigate the Effects of
Companions Attracting Female's
Labour Participation*



QUESTIONS

1- A B C D

2- A B C D

3- A B C D

4- A B C D

5- A B C D

6- A B C D

QUESTIONNAIRE



ANSWERS



Respondent
Profile

Basic Profile 
Work Relevant Features



Reasons for
Labour
Participation

Positive Drivers 
Negative Reasons



Other
Mental
Factors

Sources of Self-Esteem
Work Companions



Improvement
Initiatives





Compared to the Reports

*The Survey Results
Compared to the Reports
or What They Claim*

As for the Public Reports

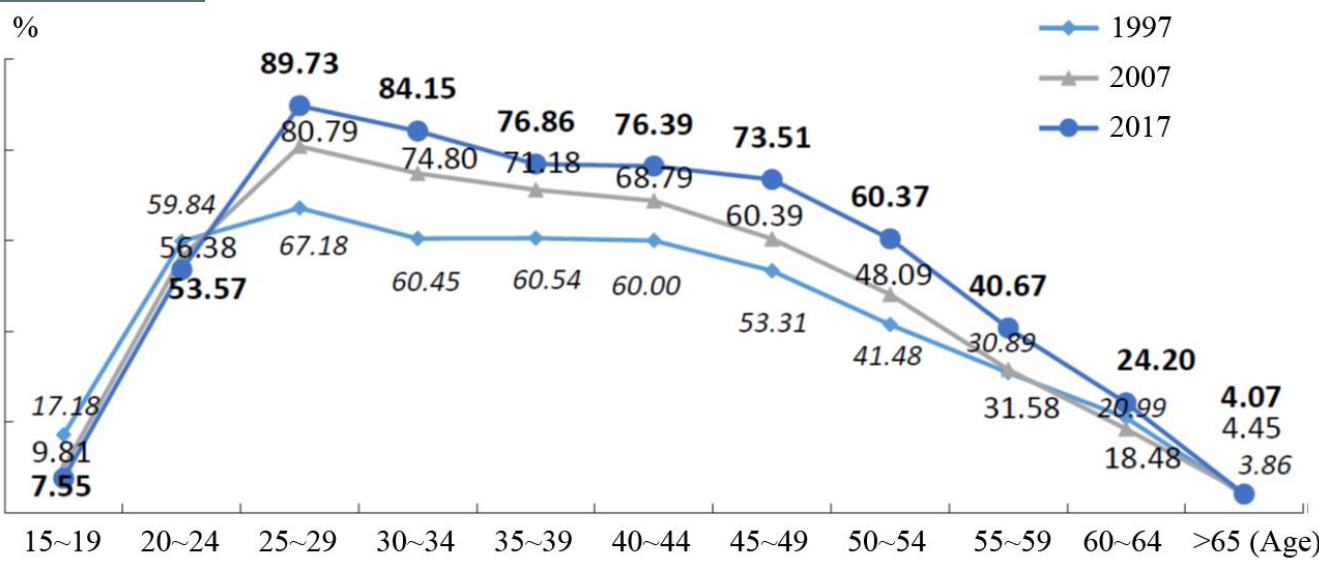
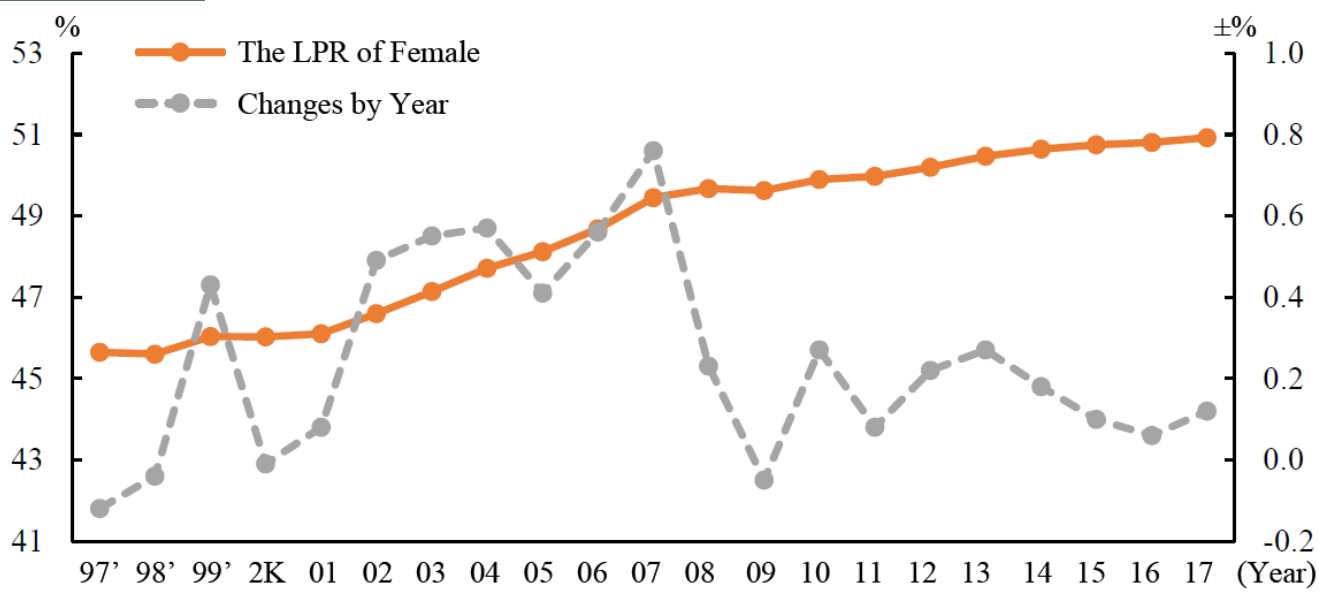
- The government or public (OSF) reports or conclusions are adopted from:
 - National Statistics, ROC (Taiwan)
 - Chinese Institute of Engineers, ROC (Taiwan)
 - Directorate-General of Budget, Accounting and Statistics, Executive Yuan, ROC (Taiwan)
- These:
 - Shows credible ‘facts’
- Comparing our results with these:
 - Shows the factors behind the facts
 - Validates the facts



Overall and Annual Changes

Statistics of FLPR (Female Labour Participation Rate) in the Reports for Taiwan (ROC)

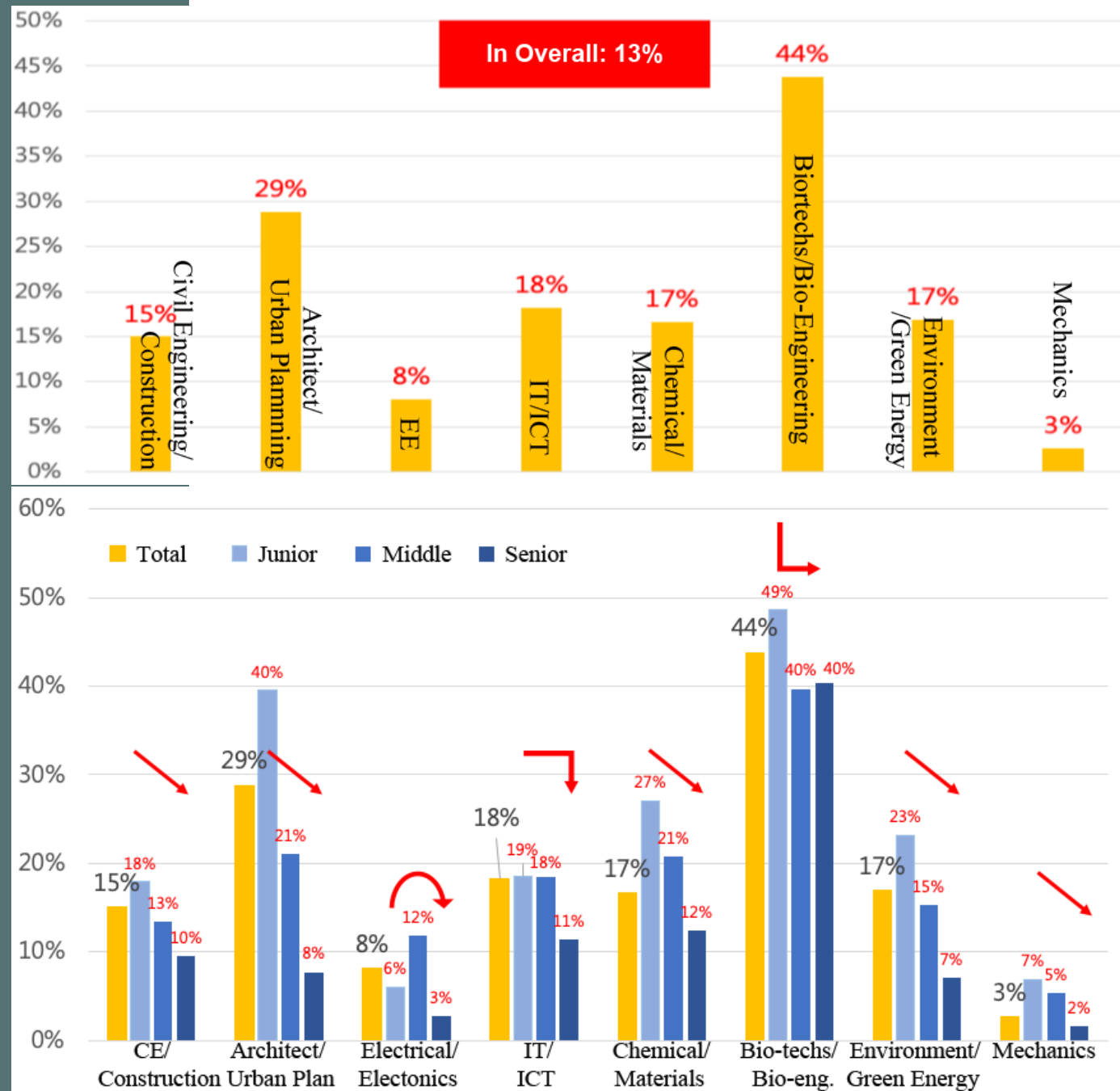
FLPR by Age Group of 10 Years



FLPR in the Science/Engineering Industry in Taiwan

Statistics of FLPR in the Reports for Taiwan (ROC)

Women Involved in the Different Occupational Levels



Statistics of Total Employment Data in the Gov. Report

Supporting evidence from checking the 'Relative LPR' from the announced formal government stats.

<i>Data</i>	<i># Persons</i>	<i>Labour Participants</i>		<i>%</i>	<i>Relative LPR</i>	
<i>Year</i>	Total	Male	Female	Cumul.	Male	Female
2001	11,042,459	6,924,291	4,118,168	100	62.71	37.29
2002	11,297,826	7,019,901	4,277,925	100	62.13	37.87
2003	11,449,514	7,106,988	4,342,526	100	62.07	37.93
2004	11,642,237	7,163,334	4,478,903	100	61.53	38.47
2005	11,794,335	7,304,377	4,489,959	100	61.93	38.07
2006	12,099,722	7,322,437	4,777,285	100	60.52	39.48
2007	12,285,858	7,465,600	4,820,258	100	60.77	39.23
2008	12,458,121	7,373,464	5,084,657	100	59.19	40.81
2009	12,628,812	7,474,416	5,154,397	100	59.19	40.81
2010	12,683,101	7,562,976	5,120,125	100	59.63	40.37
2011	13,373,384	7,831,209	5,542,175	100	58.56	41.44
2012	13,537,783	7,868,841	5,668,943	100	58.13	41.87
2013	13,990,734	8,091,948	5,898,786	100	57.84	42.16
2014	14,180,085	8,221,362	5,958,723	100	57.98	42.02
2015	14,452,129	8,292,567	6,159,562	100	57.38	42.62
2016	14,766,214	8,408,504	6,357,710	100	56.94	43.06
2017	14,973,175	8,514,559	6,458,616	100	56.87	43.13
2018	15,304,387	8,696,343	6,608,044	100	56.82	43.18
2019	15,527,634	8,681,538	6,846,096	100	55.91	44.09

And there are
also public
datasets detailing
the gap in wage
between genders

*The wage gap between gender has
only been improved by just a
little*

Year	Wage Difference (%)	Gap (#working-days)	Work Until When to Get the Same Paid
2009	17.9	66	--
2010	17.1	63	--
2011	17.1	63	3 March 2012
2012	16.5	61	2 March 2013
2013	16.1	59	28 February 2014
2014	15.3	56	25 February 2015
2015	15.0	55	24 February 2016
2016	14.6	54	23 February 2017
2017	14.6	54	23 February 2018
2018	14.6	54	23 February 2019
2019	14.2	52	21 February 2020



Discussions

*From these results, there
are so many things to
watch for*

SO MANY THINGS FOR OBSERVATION ...

Descriptive Exploratory Analysis for Survey Data

- What can be read from the profiles of female workers?
- What can be read from the work-relevant features of female workers?
- What is the importance that female employees feel for the importance of those FLPR factors, according to their own experience?
- Does the major matter?

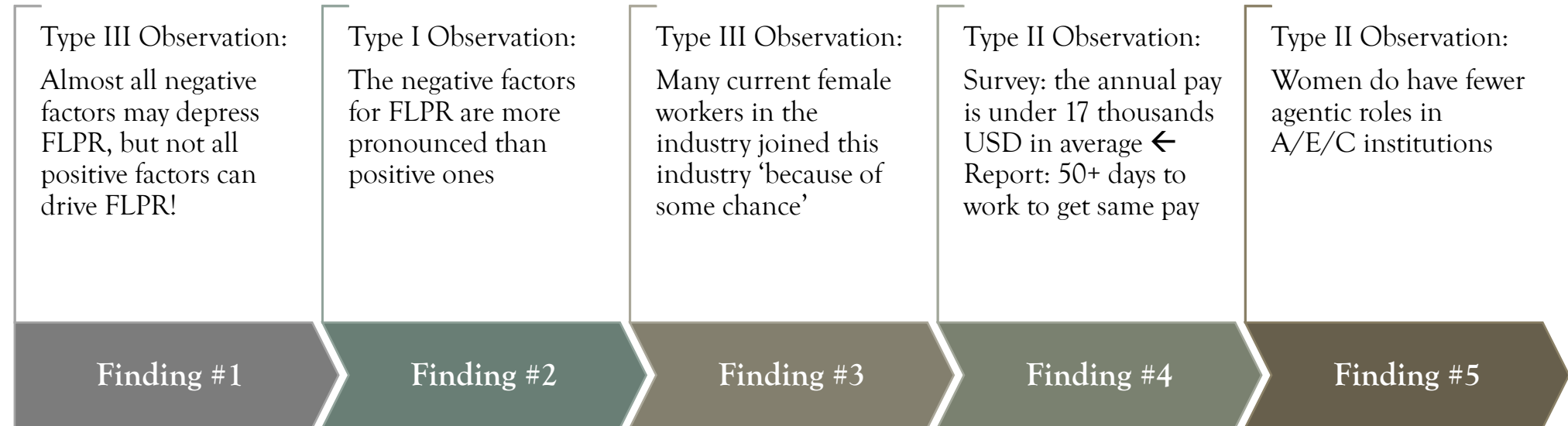
Featured Topics from the Survey Data

- Occupational status of women in the A/E/C industry
- The equivalent opportunity matter between genders
- Does the results for the 'plug-in' mental factors asked during the survey mean anything for other observables in the survey or in other known reports?
- Women play non-agentic roles?

The Survey Results Evidence the Reports or Literature

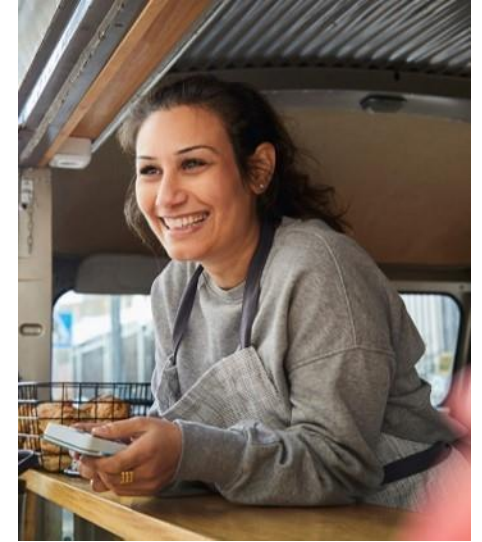
- Will the survey data reflect the gap of wage level between genders in government reports?
- Does the 'leaky pipeline' effect really exists?
- How heavy the positive/negative factors drive/depress the FLPR? Which affects (should be addressed) more?
- Is it suitable to hire female workers from connection or not?

FOR EXAMPLE



These are just some exploratory analysis examples

- *We have more to do on the lists*
- *We can also add items to that list*
- *We haven't touched a 'virgin island': The part of data investigated for improvement initiatives in the survey*



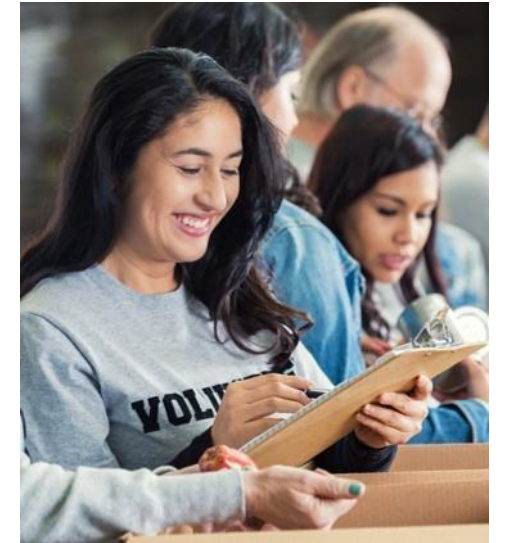
CONCLUSION

- This study organized and presented the results of a survey conducted for GIE in the A/E/C industry in Taiwan
 - Another perspective: A big social data study subject to the (North-) East Asian culture
- Several interesting exploratory analyses were made
 - Descriptive spectrum analysis method is used to justify a set of knowledge based on survey data
 - Links between the finding and the existing theories or articles are shown



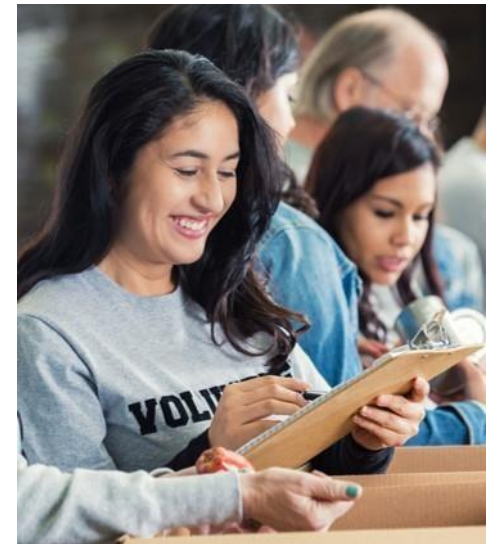
Conclusion: Future Works

- Continue on the featured topics
 - Occupational status
 - Equal opportunity
- Continue on linking the results with the field observations or concepts from industrial-practice
 - Does the major of female workers matter?
 - Does the 'leaky pipeline' effect really exists?
 - Is it suitable to hire female workers from connection? Or not?



Conclusion: Future Works

- Linking the results with existing theories/literature
 - Do women always play non-agentic roles in the A/E/C industry?
 - Do the mental factors asked during the survey mean anything for other observables in the survey or in other known reports?
- Improvement initiatives
 - Yet another part of the survey data worthy of exploration is about the improvement initiatives
 - Parametric/non-parametric tests in inferential statistics can be introduced to analyse the group opinions of 'improvement initiatives'





THANK YOU

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