

BRAIN DRAIN OF ENGINEERS IN SRI LANKAN IT INDUSTRY: CAUSES AND COUNTERMEASURES

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AGENDA


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2. PROBLEM STATEMENT
3. MAPPING DIAGRAM
4. RESEARCH METHODOLOGY
5. LITERATURE REVIEW
6. CONCEPTUAL / THEORETICAL FRAMEWORK
7. DEVELOPMENT OF HYPOTHESES
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10. DISCUSSION
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BACKGROUND

 Sri Lankan IT industry is the **3rd highest exporter** of the country with a **workforce of over 150000** (SLASSCOM, 2023)

 Due to higher attrition, IT companies are facing skill-shortage while **only 10000 are available to fill-in the 20000 jobs** created annually (Ministry of Technology, 2022)

 Stats indicate a significant increase in migration of highly-skilled individuals in the recent past where **over 120000 migrated during year 2022** alone. (CBSL, 2022)

PROBLEM STATEMENT

What are the significant contributing factors leading to the migration of Engineers within the Sri Lankan IT industry and what countermeasures can be taken to mitigate the impact?



RESEARCH OBJECTIVES

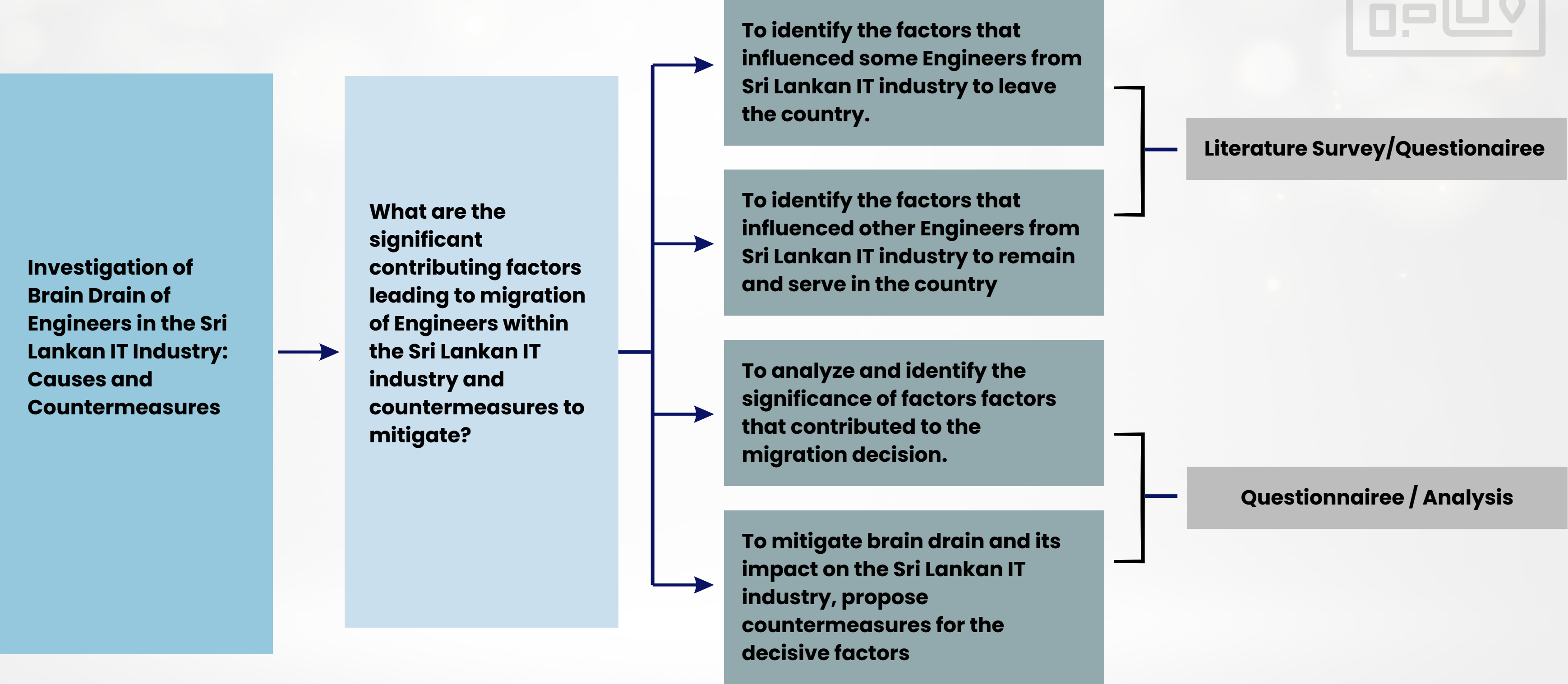
To identify the factors that influenced some Engineers from Sri Lankan IT industry to leave the country.

To identify the factors that influenced other Engineers from Sri Lankan IT industry to remain and serve in the country

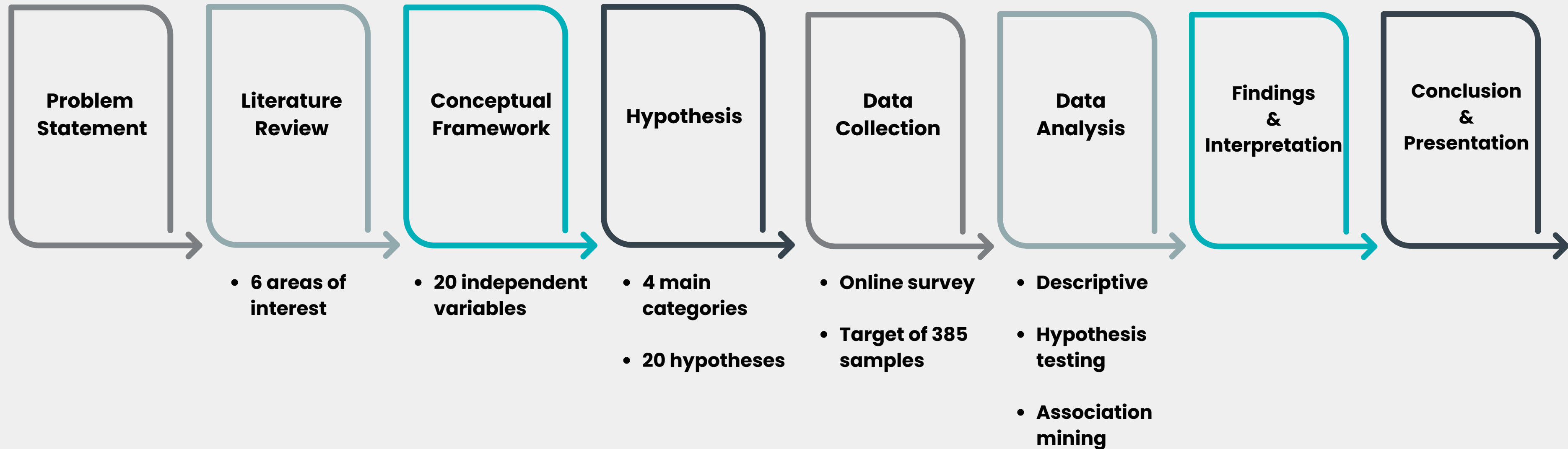
To analyze and identify the significance of factors factors that contributed to the migration decision.

To mitigate brain drain and its impact on the Sri Lankan IT industry, propose countermeasures for the decisive factors

MAPPING DIAGRAM

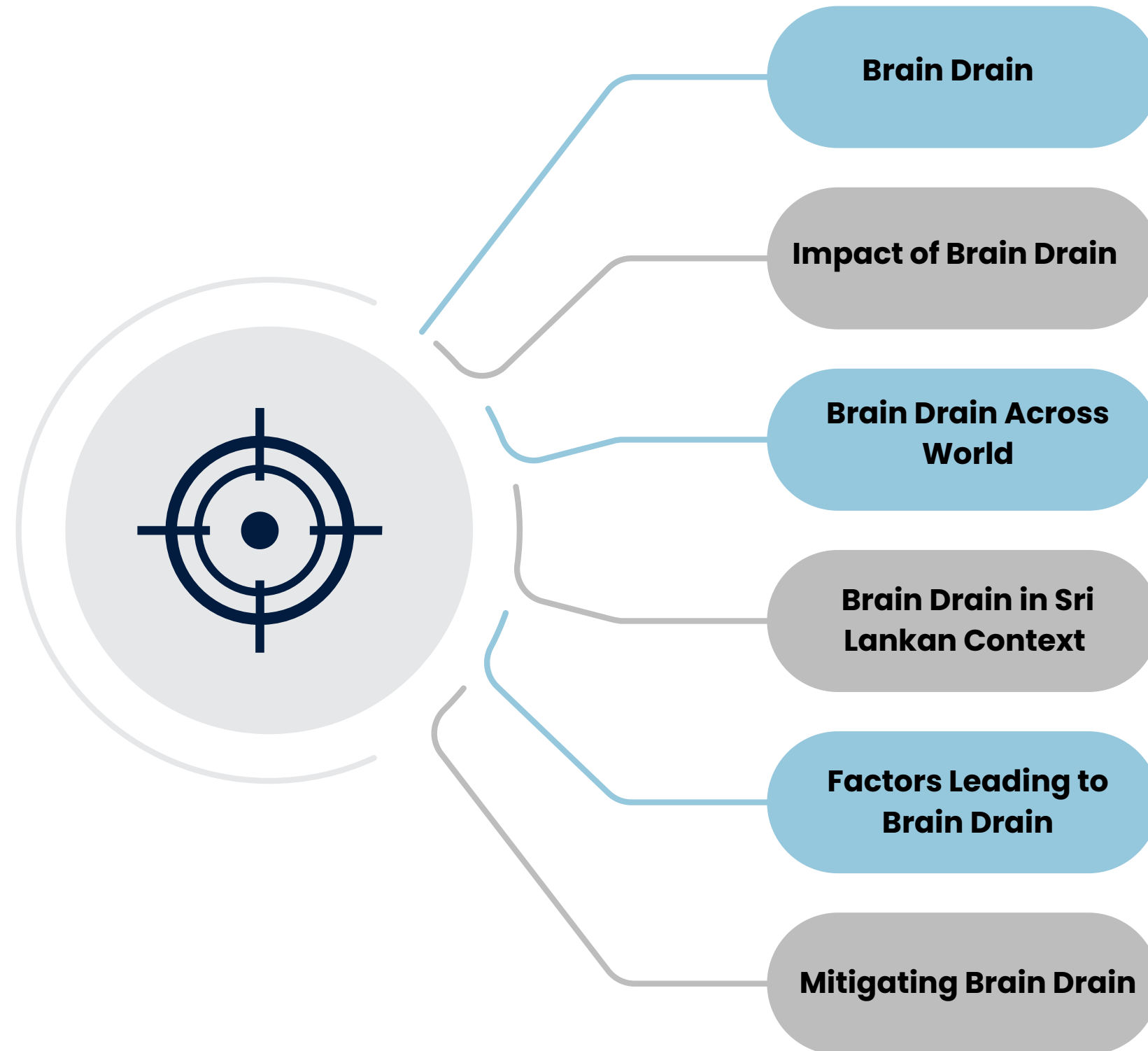


RESEARCH METHODOLOGY



LITERATURE REVIEW

AREAS OF INTEREST



LITERATURE REVIEW

SUMMARY

- The definition of “Brain Drain” varies across literature based on characteristics.
 - Brain drain is the departure of most skillful experts at noticeable and alarming rates. (Lawan et al. ,2013)
 - Emigration of a nation’s most highly skilled individuals (Gibson and McKenzie, 2011)
 - Transfer of knowledge and skilled human capital through migration (Karaduman and Coban,2019)
 - Transfer of resources spent on imparting education and nurturing technical skills (Iravani, 2011)
- Characteristics to identify brain drain can be following, (Iravani, 2011)
 - Numerous flow of skilled persons from developing to developed countries.
 - Sectors dominated by engineers, medical personnel, and scientists
 - Indicates a rapid increase in recent years
 - Higher the level of skill, the higher the likelihood to migrate
- Effects of brain drain are visible in both home and host country (Joel et al., 2018)
 - **Host** : gains of filling labor shortages without paying the cost of education
 - **Home** : drop in the quality of service in critical sectors like health, and technology; low quality of education; foreign remittance (positive)
- In numbers, 3.6% of the world’s population were international migrants by 2020, an increase from 247Mn to 281Mn from 2015 and estimated to rise further (World Migration Report, 2022)
- Historical occurrences have triggered skilled migration; compared to February 2021, every 1 in 4 OS developers moved out of Russia by November 2022 after the invasion of Ukraine. (Wachas, 2023)
- Continents like Africa indicate higher outflow for longer periods, stats indicate the presence of more African Engineers in the US, than in the whole continent (Joel et al., 2018)



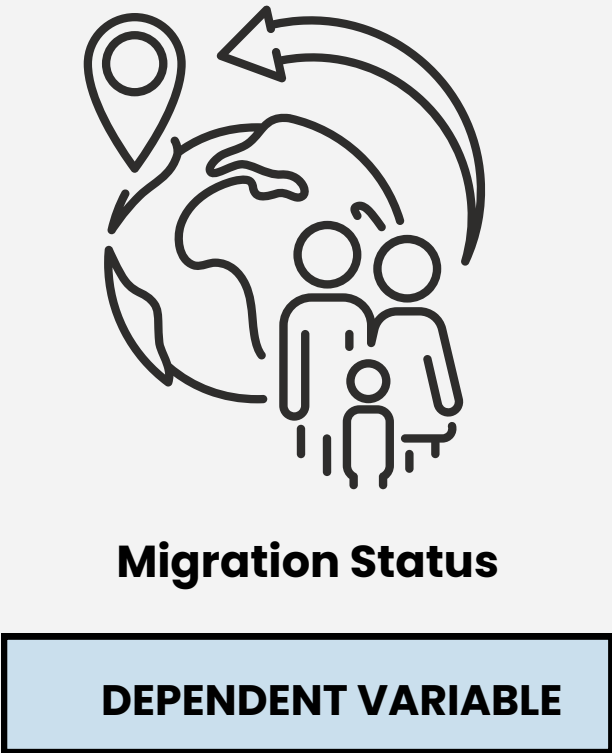
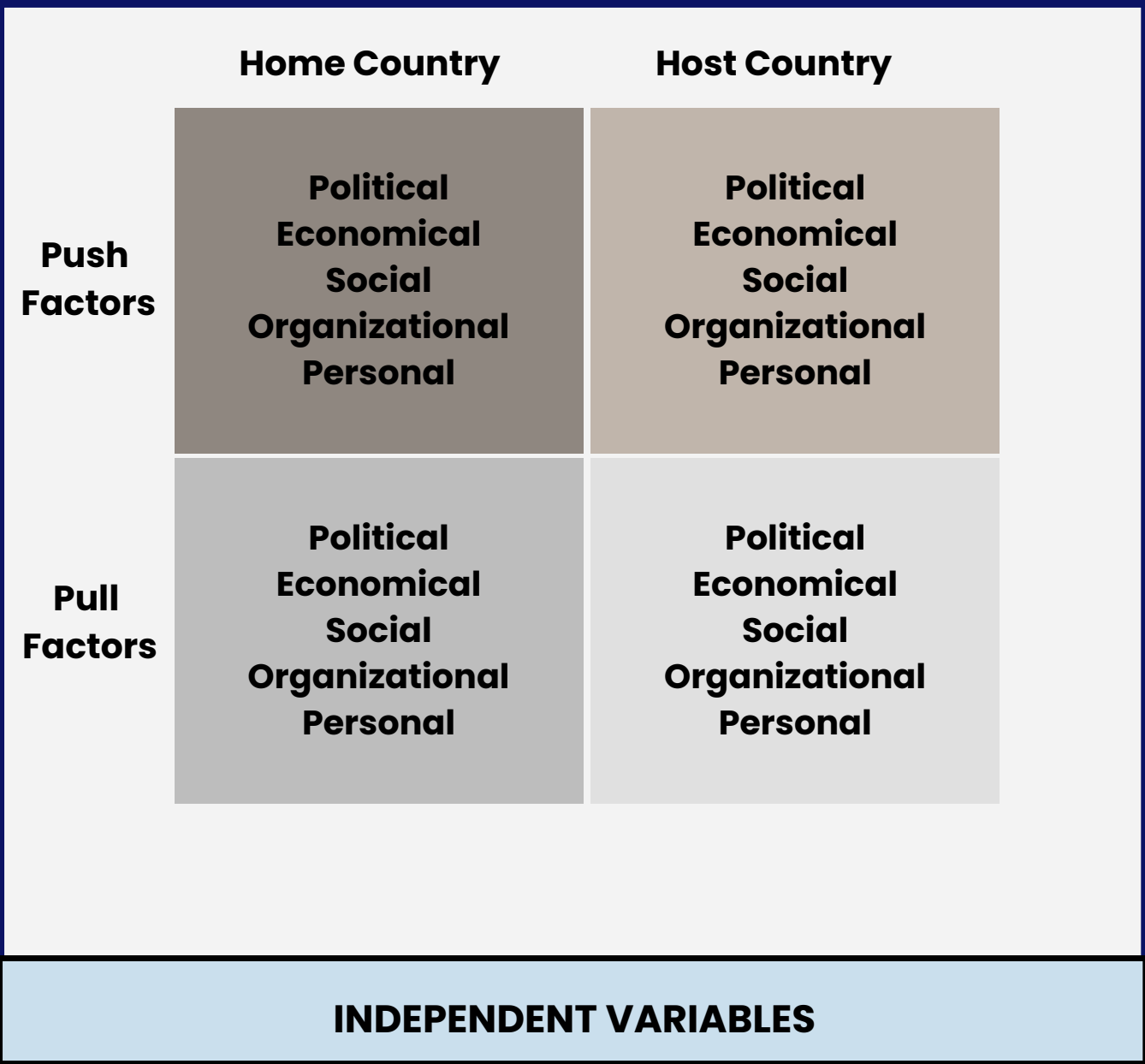
LITERATURE REVIEW

SUMMARY

- Decision to migrate occurs from the interaction between two sets of factors. (Lawan et al. , 2013)
 - **Push** : factors that motivate individuals to leave the emigrating country. (low wages, political instability, lack of facilities, misplacement of talent, corruption discrimination)
 - **Pull** : factors that attract individuals to immigrating countries. (higher salary, better career expectations, better opportunities, political stability, availability of funding for research)
- Determining factors are based on regions, desires and circumstances. (Lawan et al. , 2012)
- Studies from European countries indicate that pull factors indicate greater effect than push factors. (Mariusz, 2022)
- Sri Lanka is ranked 20th in the world and 4th in Asia based on brain drain index points with a rating of 7.6 (The Global Economy, 2023).
- The concept of “Six Rs” elaborates on six types of policies that can be implemented to address brain drain; Return, Restriction, Recruitment, Reparation, Resourcing, and Retention. (Lowell and Findlay,2001)
- Mitigation strategies in discussion within the current Sri Lankan context are, (You, 2019)
 - State-led interventions and border control through migration restrictions.
 - Dual citizenship
 - Encourage return migration through incentives.
 - Influencing based on moral oblige
 - Addressing the issue through host countries



CONCEPTUAL/THEORETICAL FRAMEWORK



HYPOTHESES

Set 1₀ : Push factors (political, economic, social, organizational, and personal) of the **Home** country have no relationship with the migration status

Set 2₀ : Pull factors (political, economic, social, organizational, and personal) of the **Home** country have no relationship with the migration status

Set 3₀ : Push factors (political, economic, social, organizational, and personal) of the **Host** country have no relationship with the migration status

Set 4₀ : Pull factors (political, economic, social, organizational, and personal) of the **Host** country have no relationship with the migration status

HYPOTHESES

Set 1 : Home-Push Factors

H(1A)₀ : Political push factors of the home country have no relationship with the migration status

H(1B)₀ : Economic push factors of the home country have no relationship with the migration status

H(1C)₀ : Social push factors of the home country have no relationship with the migration status

H(1D)₀ : Organizational push factors of the home country have no relationship with the migration status

H(1E)₀ : Personal push factors of the home country have no relationship with the migration status

Set 2: Home-Pull Factors

H(2A)₀ : Political pull factors of the home country have no relationship with the migration status

H(2B)₀ : Economic pull factors of the home country have no relationship with the migration status

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H(2E)₀ : Personal pull factors of the home country have no relationship with the migration status

Set 3: Host-Push Factors

H(3A)₀ : Political push factors of the host country have no relationship with the migration status

H(3B)₀ : Economic push factors of the host country have no relationship with the migration status

H(3C)₀ : Social push factors of the host country have no relationship with the migration status

H(3D)₀ : Organizational push factors of the host country have no relationship with the migration status

H(3E)₀ : Personal push factors of the host country have no relationship with the migration status

Set 4: Host-Pull Factors

H(4A)₀ : Political pull factors of the host country have no relationship with the migration status

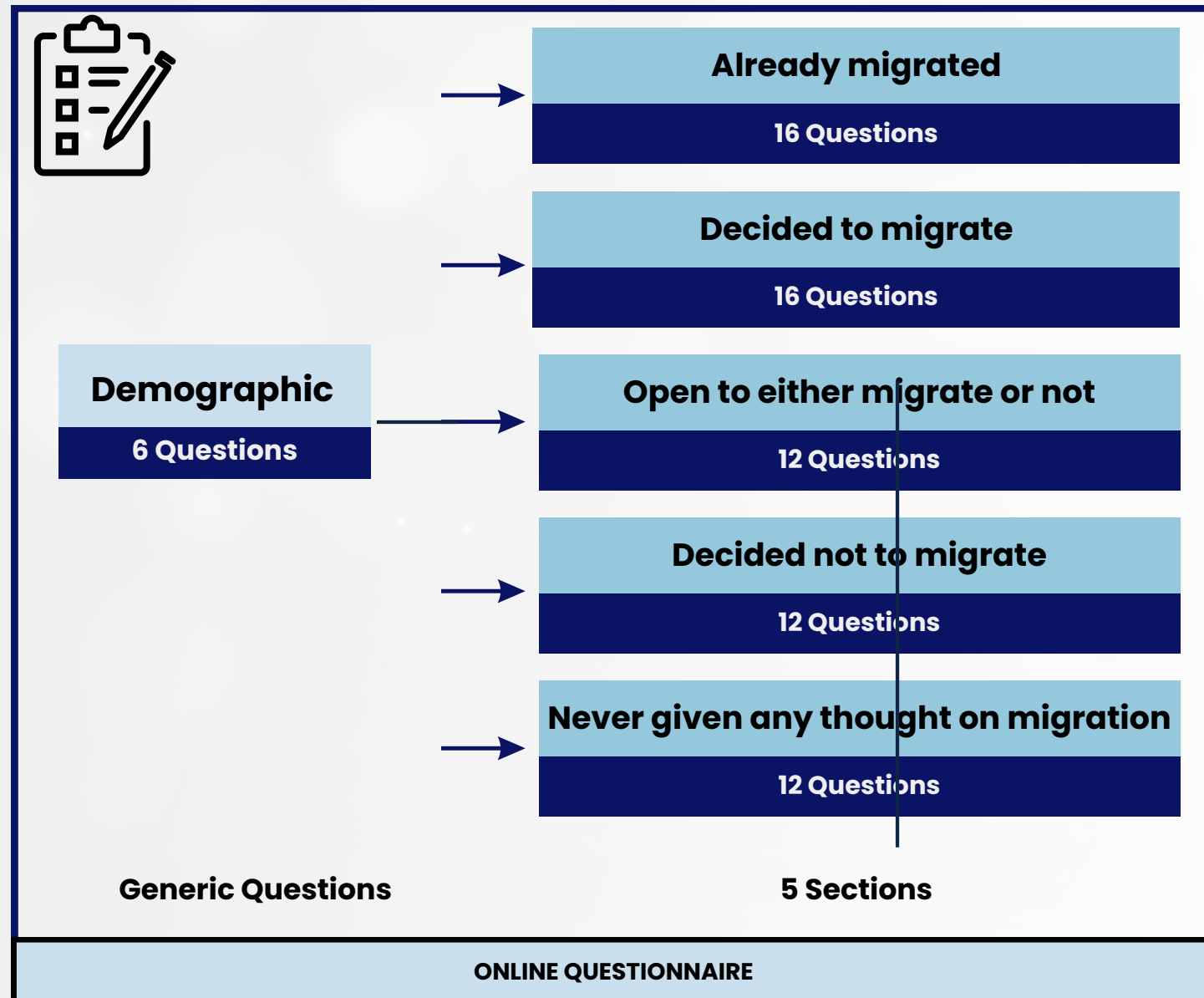
H(4B)₀ : Economic pull factors of the host country have no relationship with the migration status

H(4C)₀ : Social pull factors of the host country have no relationship with the migration status

H(4D)₀ : Organizational pull factors of the host country have no relationship with the migration status

H(4E)₀ : Personal pull factors of the host country have no relationship with the migration status

DATA COLLECTION



- Generic questions to cover basic demographic spread.
- Targeted set of questions for all categories covering push-pull factors of both home and host country.
- Questions on the level of contribution to the migration decision to be answered through a likert scale.
- Additional questions to first two categories on relevant demographic areas.
- Opinion on factors to improve in Sri Lanka



A sample of **385** was targeted from the population of 150,000 with 95% confidence following Krejcie and Morgan's method (Krejcie and Morgan, 1970)

DATA ANALYSIS

PREPARATION AND RELIABILITY CHECK

Data Preparation

- A total of 394 responses collected
- 393 samples were selected for analysis after removing inaccuracies
- Weights ranging from 1 to 5 were assigned to Likert scale values from “Extremely Low” to “Extremely High”

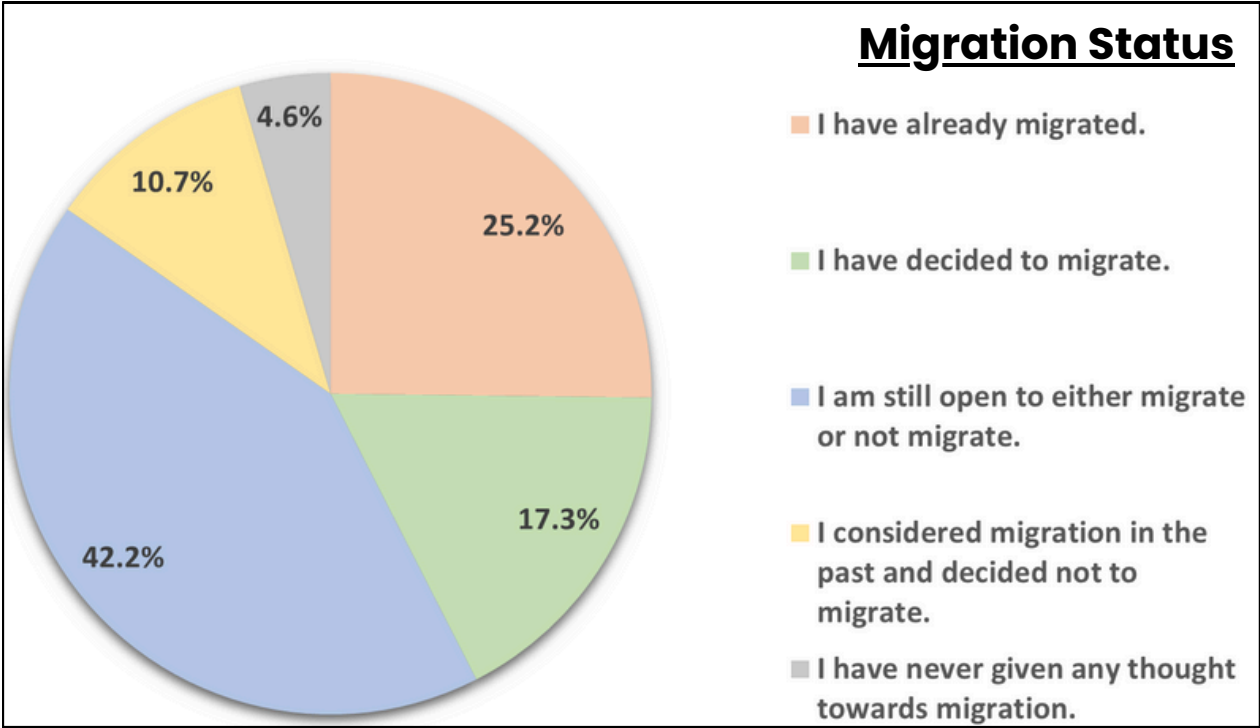
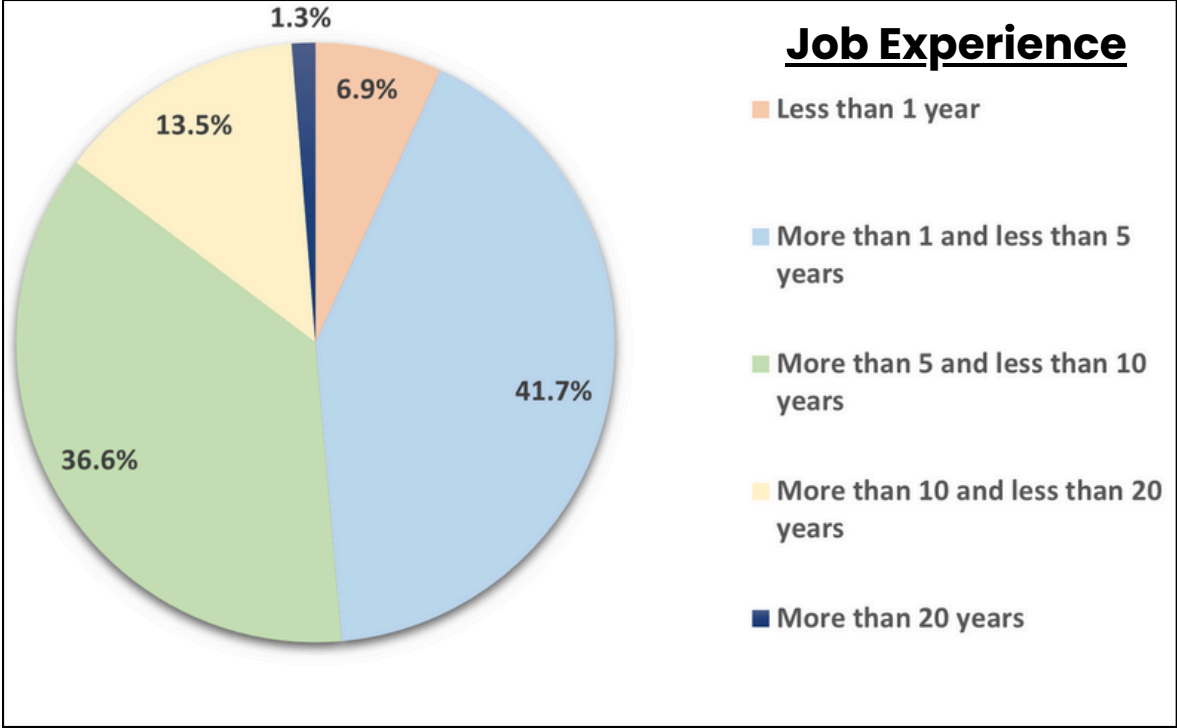
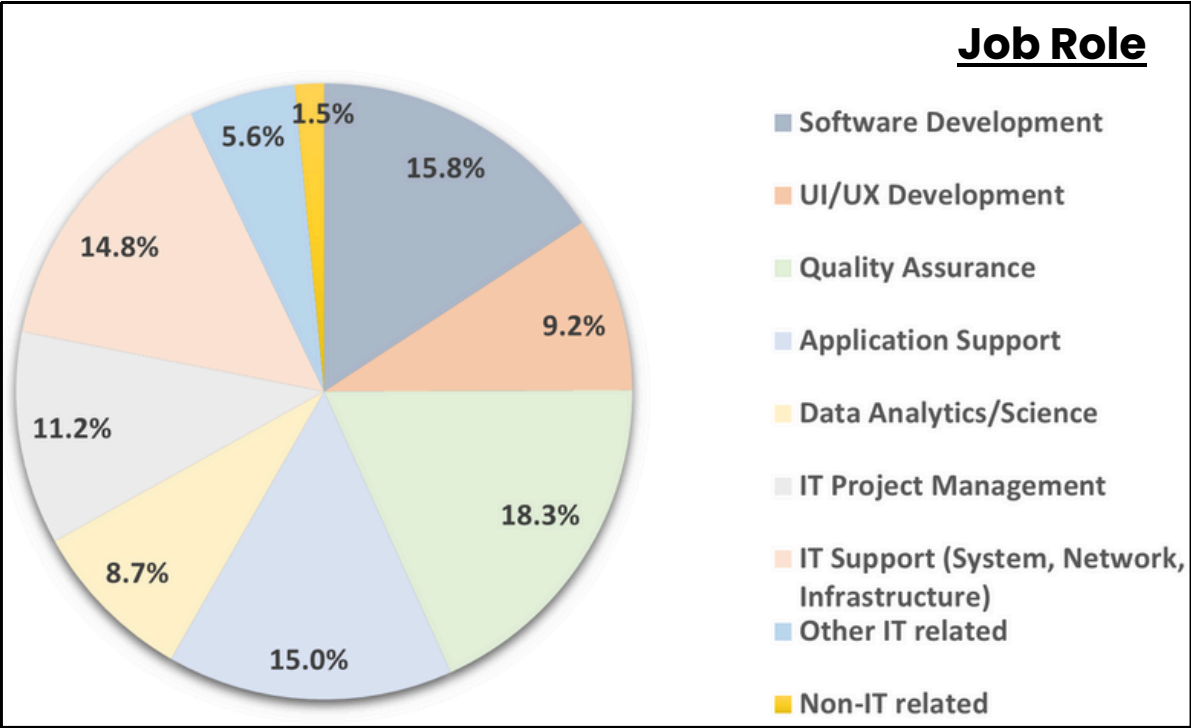
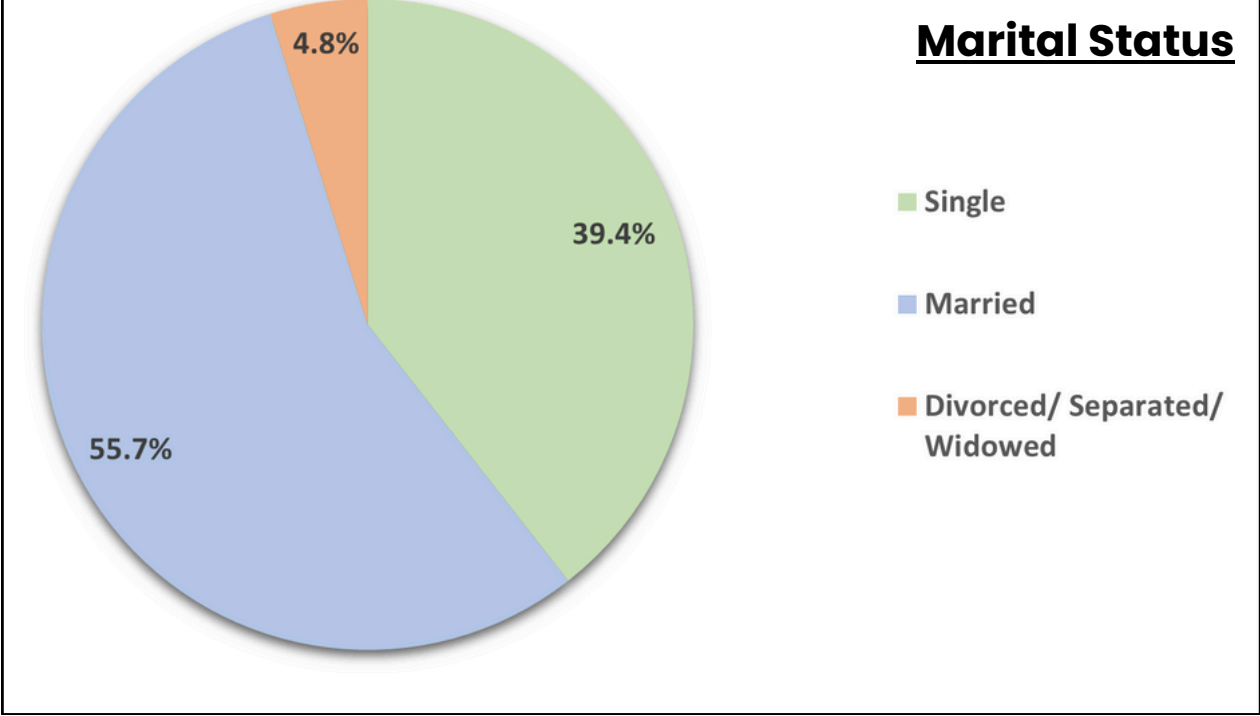
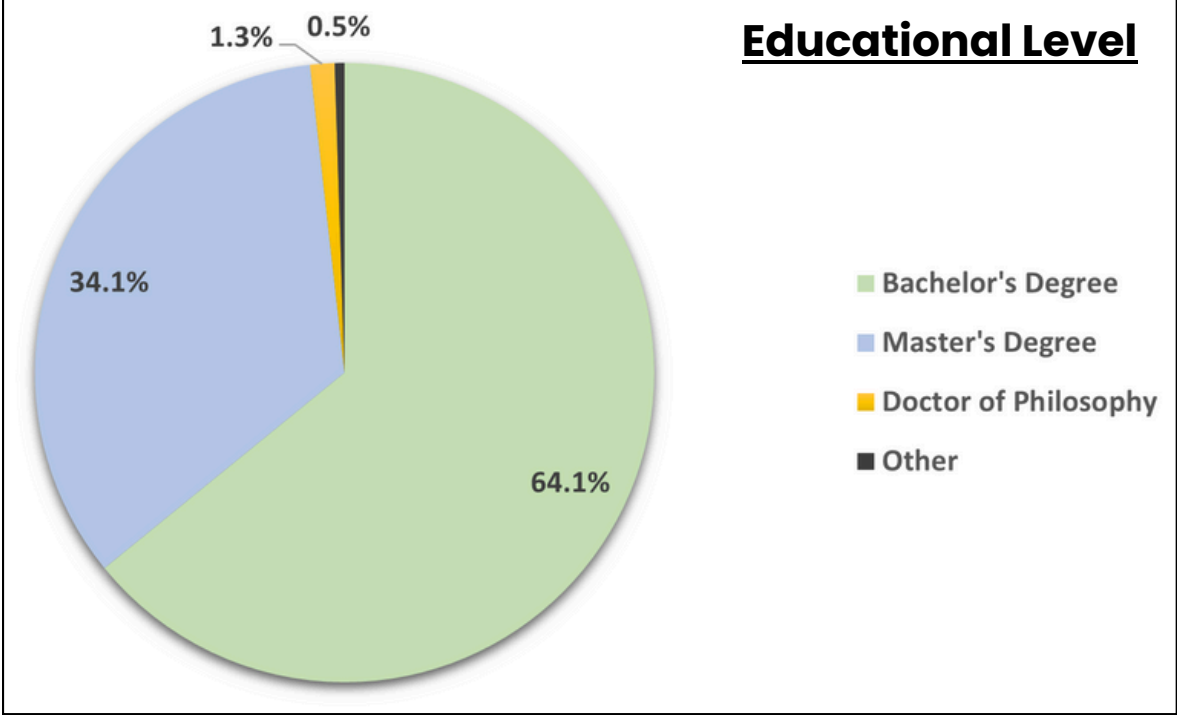
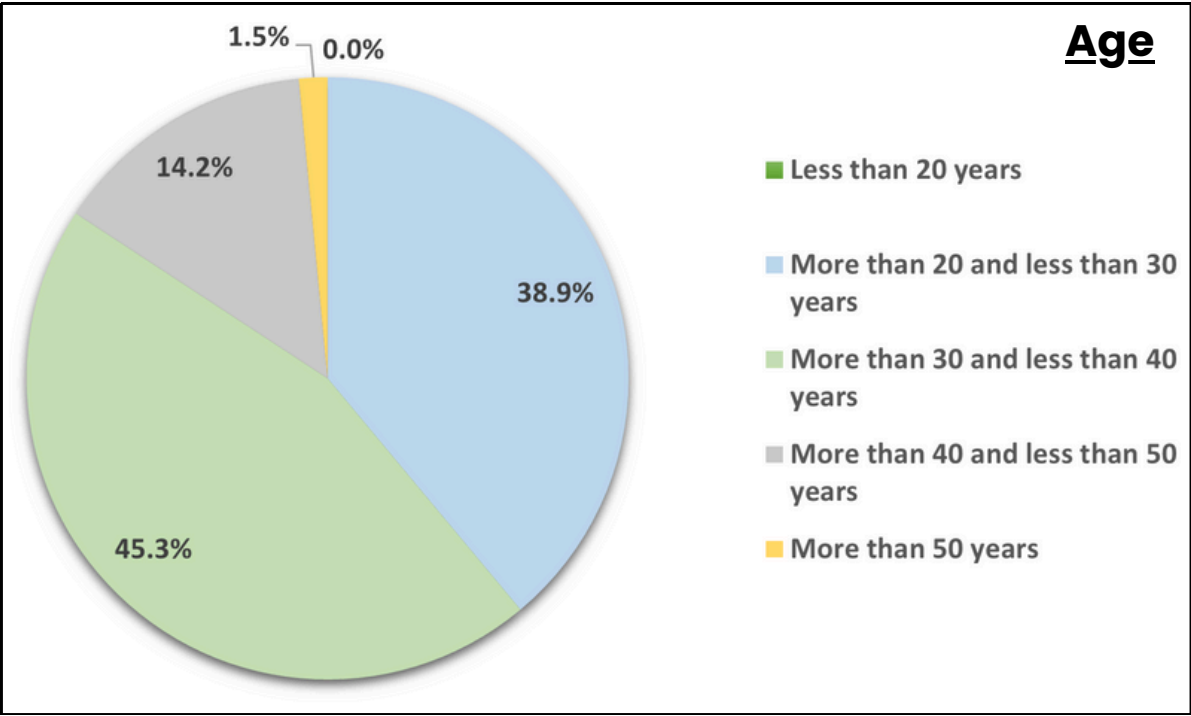
Reliability Check

- Cronbach’s Alpha values were calculated for the independent variables to check the reliability of the data.
- All values were higher than 0.6 which was sufficient to confirm reliability (Daud et al., 2018; Robertson and Evans, 2020)
- Inter-item correlation values were obtained to further validate



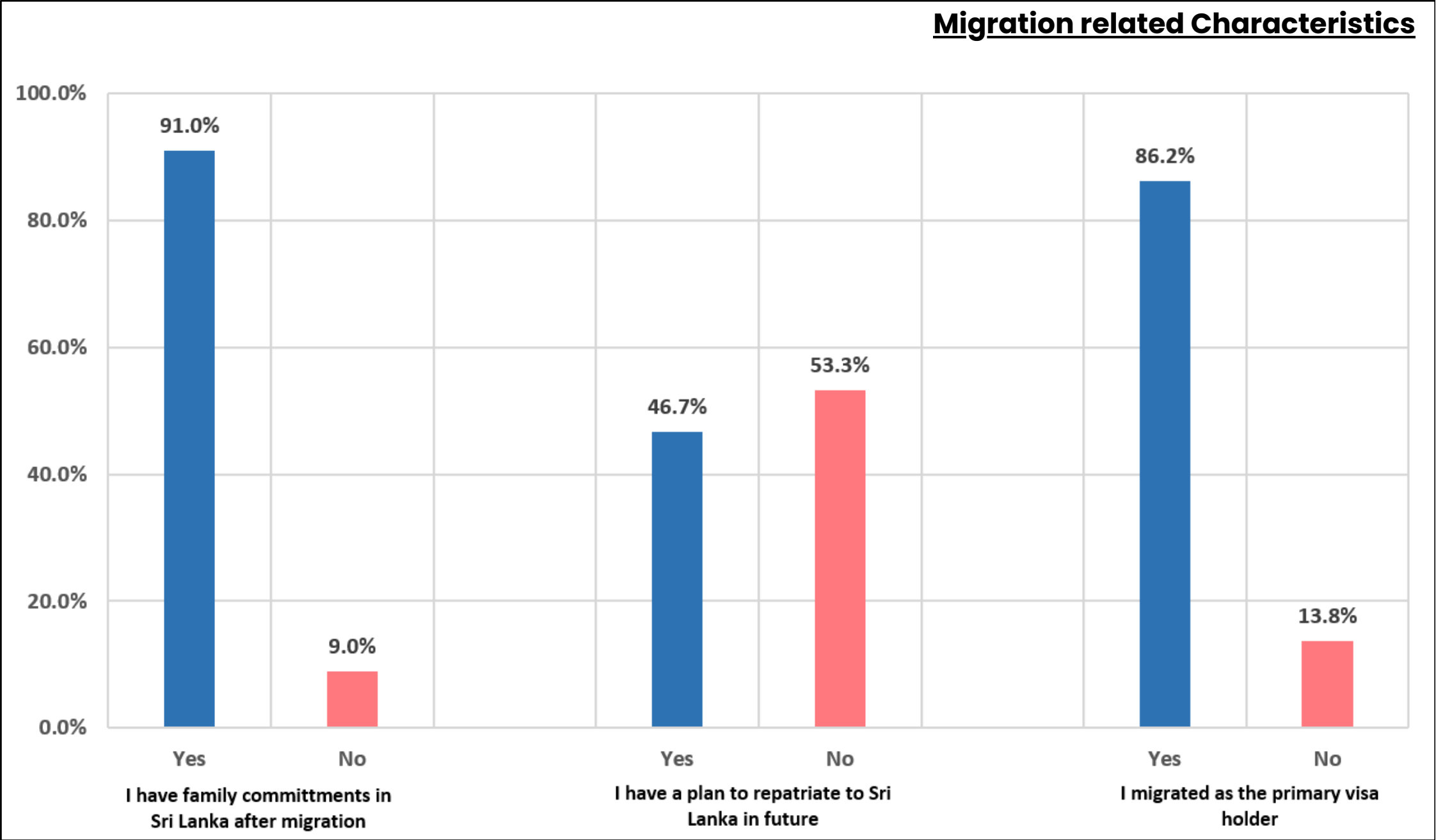
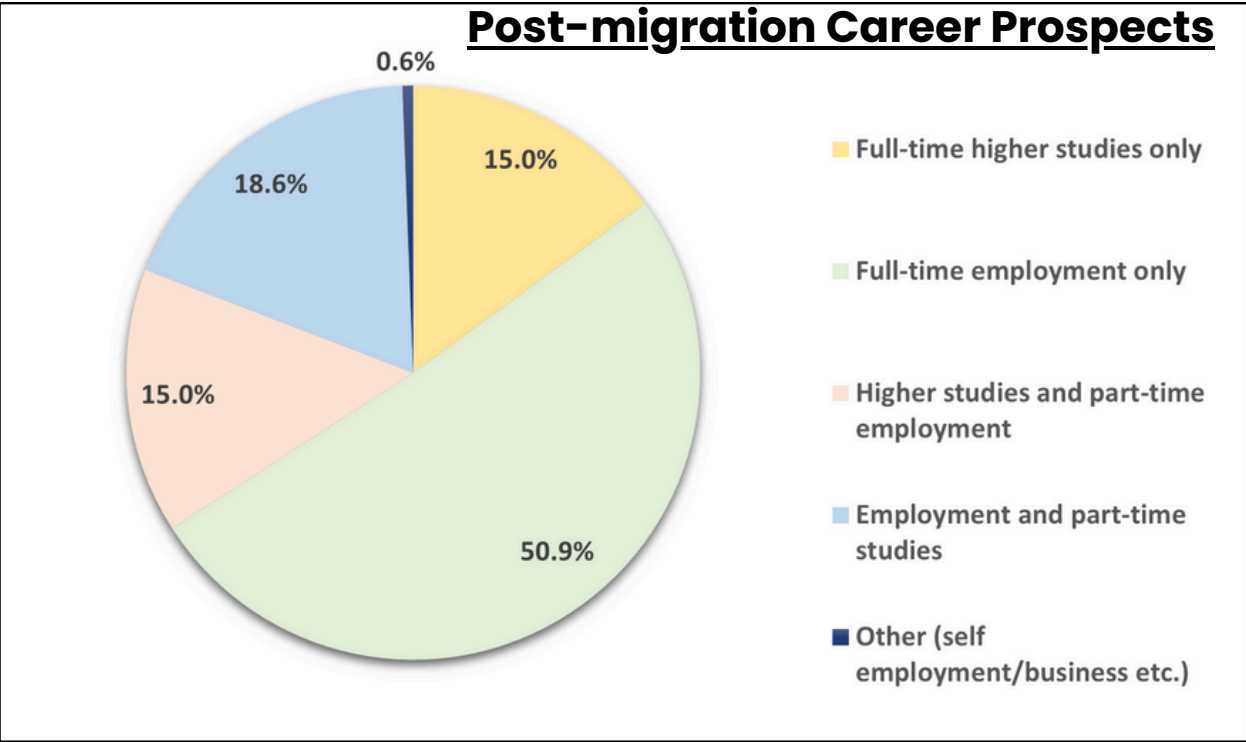
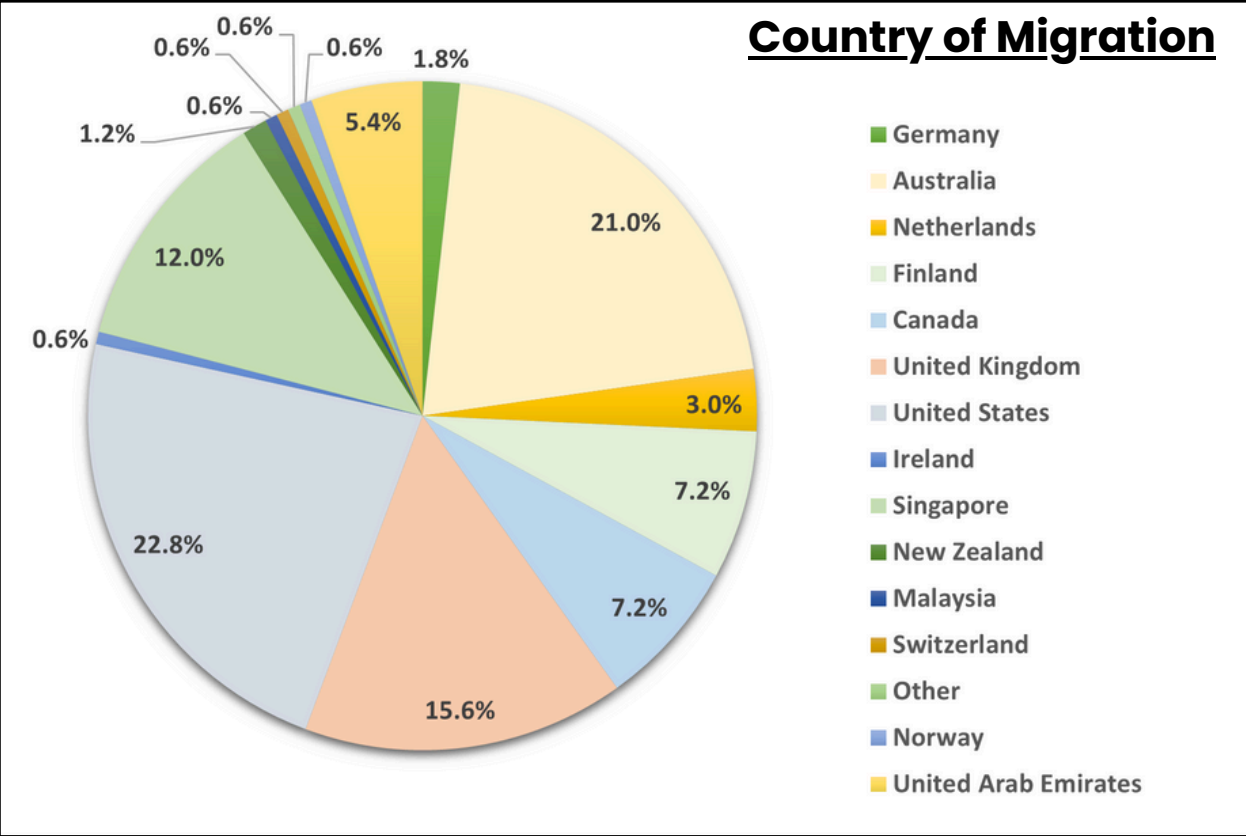
DATA ANALYSIS

DESCRIPTIVES



DATA ANALYSIS

DESCRIPTIVES



DATA ANALYSIS & RESULTS

HYPOTHESIS TESTING

Set 1 : Home-Push Factors

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- H(4E)₀ : Personal pull factors of the host country have no relationship with the migration status

DATA ANALYSIS & RESULTS

HYPOTHESIS TESTING

Independent Variable	Null Hypothesis Acceptance	Relationship with Migration Status	Correlation Value
Home-Push-Political(H-1A)	Rejected	Yes	0.376
Home-Push-Economic(H-1B)	Rejected	Yes	0.358
Home-Push-Social(H-1C)	Accepted	No	-
Home-Push-Organizational(H-1D)	Accepted	No	-
Home-Push-Personal(H-1E)	Accepted	No	-
Home-Pull-Political(H-2A)	Accepted	No	-
Home-Pull-Economic(H-2B)	Accepted	No	-
Home-Pull-Social(H-2C)	Rejected	Yes	-0.338
Home-Pull-Organizational(H-2D)	Rejected	Yes	-0.331
Home-Push-Personal(H-2E)	Rejected	Yes	-0.262
Host-Push-Political(H-3A)	Rejected	Yes	-0.347
Host-Push-Economic(H-3B)	Rejected	Yes	-0.284
Host-Push-Social(H-3C)	Rejected	Yes	-0.219
Host-Push-Organizational(H-3D)	Rejected	Yes	-0.113
Host-Push-Personal(H-3E)	Accepted	No	-
Host-Pull-Political(H-4A)	Rejected	Yes	0.217
Host-Pull-Economic(H-4B)	Rejected	Yes	0.261
Host-Pull-Social(H-4C)	Rejected	Yes	0.245
Host-Pull-Organizational(H-4D)	Rejected	Yes	0.227
Host-Push-Personal(H-4E)	Accepted	No	-

- Hypothesis testing was conducted using Pearson Correlation Coefficient values to quantify the strength.
- As 20 hypotheses were tested, the Bonferroni correction method was used to adjust the significance level to avoid type 1 errors.
- In summary, 13 out of the 20 null hypotheses were rejected and 7 were accepted.
- All push factor-related independent variables indicated a positive correlation whereas all pull factor-related variables indicated a negative correlation with migration status.
- Home-Push-Political and Home-Push-Economic factors indicated the highest correlation with migration status in terms of strength.

DATA ANALYSIS

ASSOCIATION MINING

Rule	Age (Years)	Marital Status	Educational Level	Work Experience (Years)	Migration Status	Confidence Level
1	20-30	-	Bachelors	1-5	Open	92%
2	20-30	Single	Bachelors	1-5	Open	91%
3	30-40	-	-	5-10	Open	84%
4	30-40	Married	-	-	Migrated	81%
5	-	Married	Masters	5-10	Migrated	89%
6	30-40	Married	Masters	-	Decided	62%
7	-	Married	Bachelors	5-10	Decided Against	48%

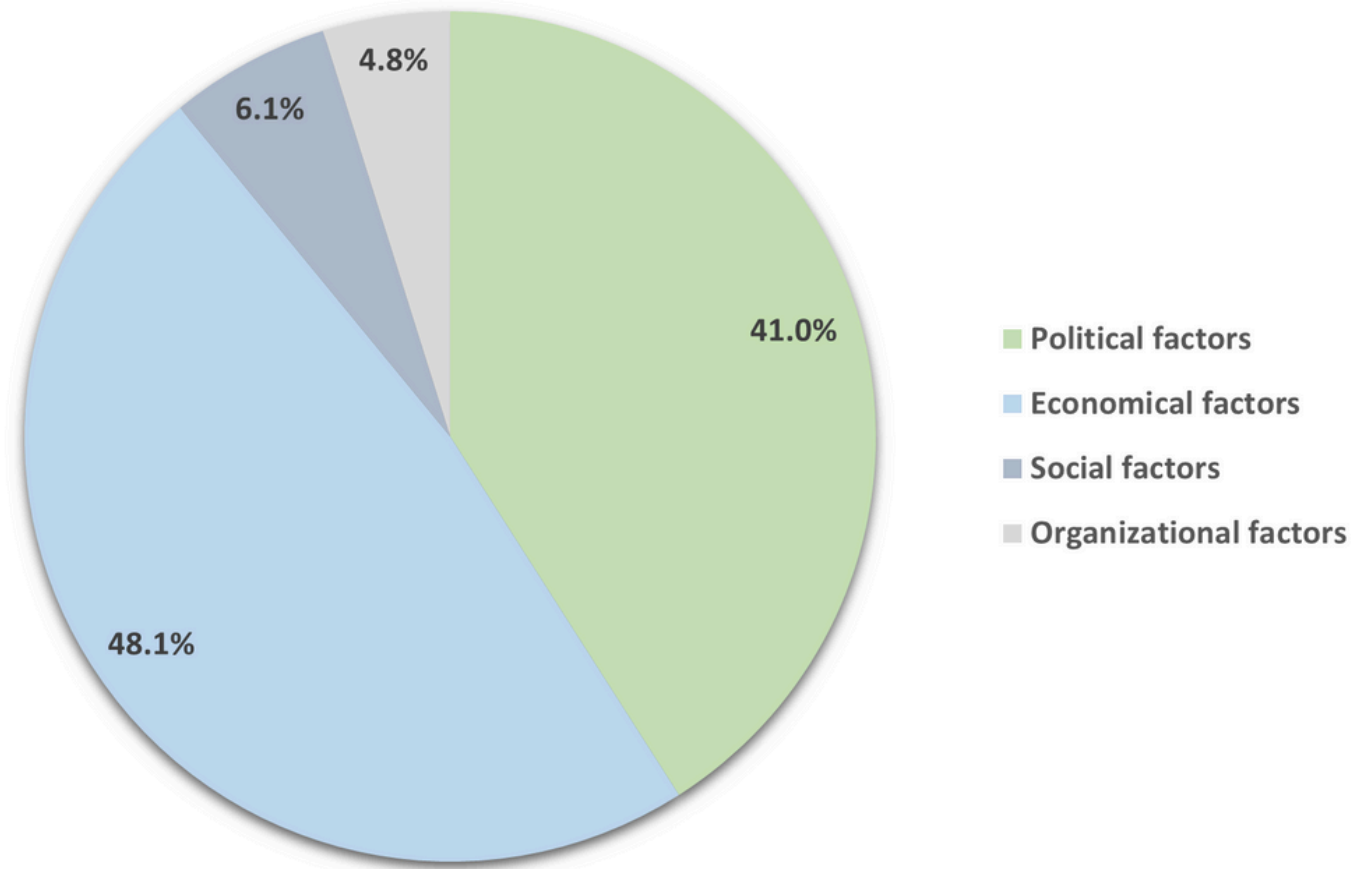
- Interpretation of Rule 1 : Individuals who are between the ages of 20 and 30 with a Bachelor's degree and with work experience between 1 to 5 years are 92% likely to have a migration status of "open to either migrate or not migrate".

- Association mining was conducted using apriori algorithm to find out frequent occurrences in the data set.
- For initial mining, a confidence level of 80% and a support level of 0.1 were used.
- The first 5 rules are the ones with the highest confidence level
- Rules 6 and 7 are the best association that could be obtained for the mentioned categories in terms of migration status
- The majority of the rules were observed around migration status of "open" under the set levels of parameters.

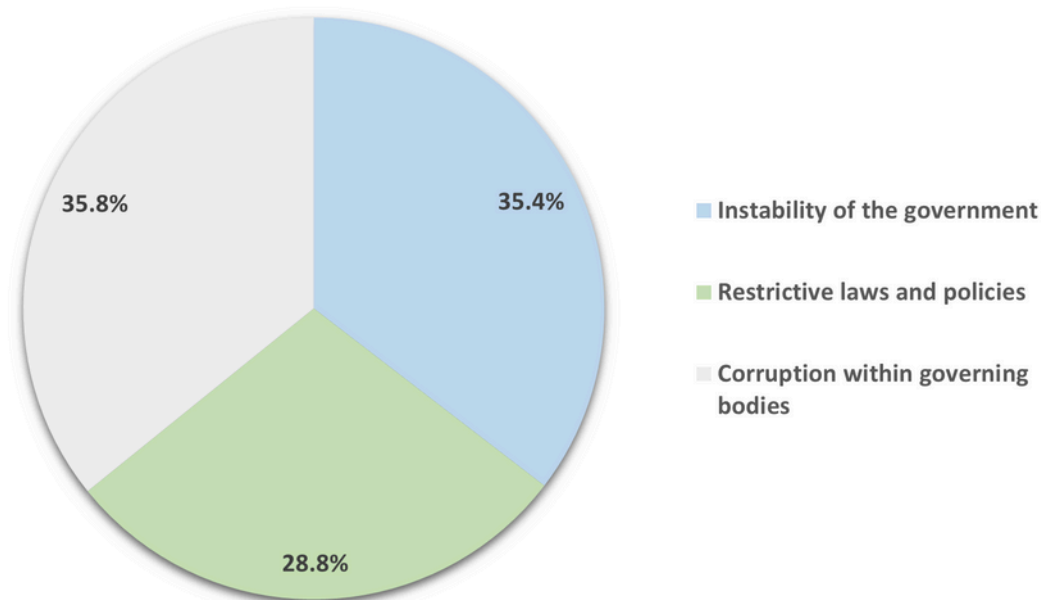
DATA ANALYSIS

COUNTERMEASURES

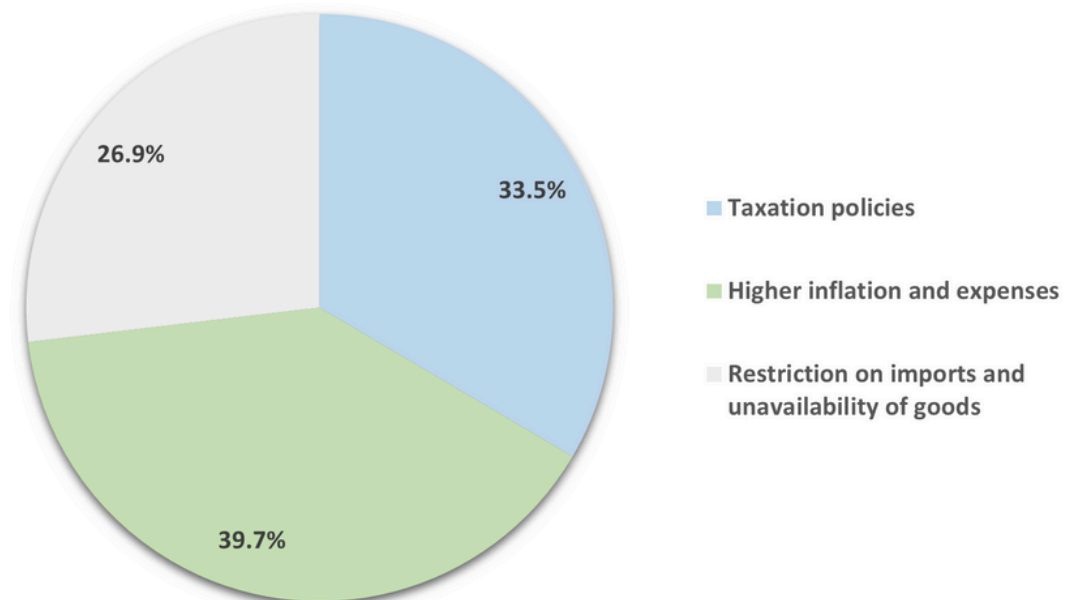
To remain in the country, what factor of Sri Lanka would you prefer to see improved?



Political factors to be addressed



Economic factors to be addressed



- Two approaches to identify factors of Sri Lanka that require attention
 - The outcome of hypothesis testing: Political and Economic
 - Direct survey responses: Economic and Political
- Additional insights obtained through responses given to each sub-category within major factors
 - Political – Corruption within governing bodies
 - Economic – Higher inflation and expenses
 - Social – Rate of crime and poor safety
 - Organizational – Career opportunities
- Personal factors were not considered as only external countermeasures were targeted.

DISCUSSION

CAUSES

	Home	Host	Overall
Push Factors	Political Economic	Political Economic	Home-Political Home-Economic
Pull Factors	Social Organizational	Economic Social	Home-Social Home-Organizational
Overall	Political-Push Economic-Push	Political-Push Economic-Push	Home-Push-Political Home-Push-Economic Host-Push-Political Home-Pull-Social Home-Pull-Organizational

- Considering the home country
 - The effect of push factors is more significant than that of pull factors
 - Political and economic push are the two most significant
 - Social and organizational are significant considering the pull factors
- Considering the host country
 - The effect of push factors is more significant than that of pull factors
 - Political and economic push are the two most significant
 - Economic and social are significant considering pull factors.

DISCUSSION

COUNTERMEASURES

Political

- Continuity of vision and constitutional stability.
- Three-concept policies: durability, balance, immunity.
- Independent governing bodies.
- Active and un-biased anti-corruption commissions.
- Whistle-blower protection.

Economic

- Steady monetary policy.
- Independent financial institutes.
- Short and long-term economic reforms with goals.
- Focused attention to critical sectors like manufacturing and infrastructure.
- Strategic partnerships between government and private sector.

Other

- Infrastructure development
- Improvement of safety
- Career opportunities

RESEARCH LIMITATIONS

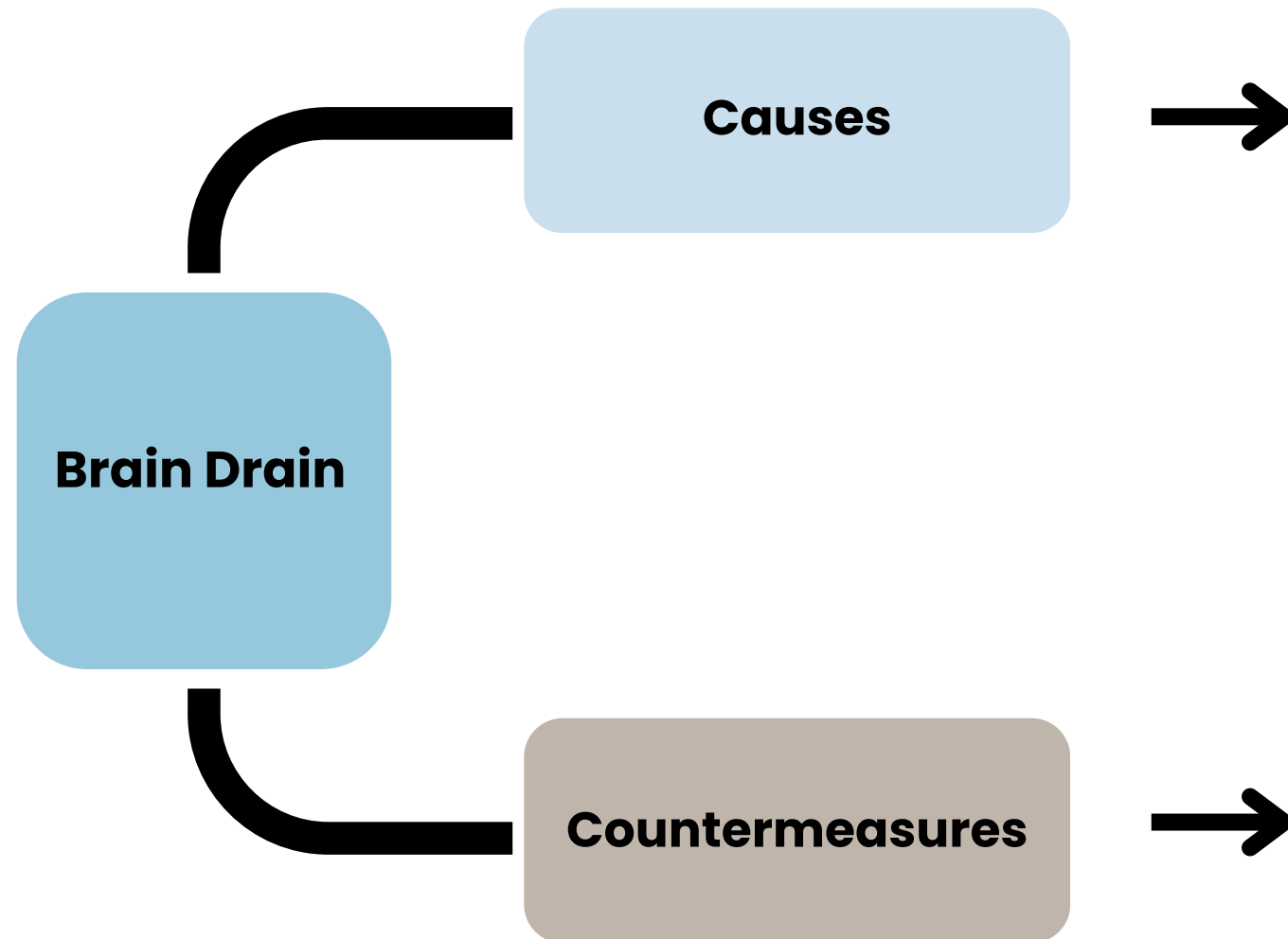
- Limited spread of sample population (only across a few companies and few countries in terms of migrated community)
- The data collection time period was after the peak in the migration trend in which circumstances might have changed.
- Both those who are in favor of migration and those who are not, believe that factors like political and economic are worse which affects correlation.



FUTURE WORK

- More comprehensive analysis can be conducted by targeting more in-depth areas of major factors.
- The scope can be extended to analyze the consequences of brain drain.
- A focused study can be conducted by selecting a popular country of interest among migrants to investigate further.

CONCLUSION



- Out of all the factors considered **Home-Push-Political is the most significant** one which is followed by Home-Push-Economic, Host-Push-Political, Home-Pull-Social, and Home-Pull-Organizational in the order of significance.
- Comparing home and host country, **home-country factors are generally more significant** than those of the host country.
- Comparing push and pull factors, **push factors are generally more significant** than pull factors.

- **Political and economic components** of Sri Lanka are the areas that require more attention out of all the factors.
- As strategies to improve the political factors of Sri Lanka, implementing **sustainable policies**, increasing **transparency** in government transactions, and reforming **anti-corruption** laws are proposed at the outset.
- As strategies to improve the economic factors of Sri Lanka, developing a **long-term economic plan**, stable **taxation policies**, and implementation and establishing **independent financial institutions** are proposed

A top-down view of a desk with a laptop, a cup of coffee, a pen, a notebook, glasses, and a plant.

THANK YOU

FACTOR TABLE

Variable				Ngoma et al.,2013	Adeyemi et al., 2018	Urbanski,2022	Jayakodi et al.,2022	Zanabazar et al.,2021	Wachs,2023	Aarhus et al.,2019	Iravani,2011	Naqvi et al.,2017	Chimenya et al.,2015
Independent Variables	Home Country	Push Factors	Political Factors	X	X	X		X	X		X		X
			Economical Factors	X	X	X		X		X	X		
			Social Factors	X	X	X		X			X	X	X
			Organizational Factors				X		X			X	X
			Personal Factors				X	X				X	
		Pull Factors	Political Factors						X		X	X	X
			Economical Factors							X	X	X	
			Social Factors								X	X	X
			Organizational Factors				X						X
			Personal Factors				X					X	

FACTOR TABLE

Variable				Ngoma et al.,2013	Adeyemi et al., 2018	Urbanski,2022	Jayakodi et al.,2022	Zanabazar et al.,2021	Wachs,2023	Aarhus et al.,2019	Iravani,2011	Naqvi et al.,2017	Chimenya et al.,2015
Independent Variables	Host Country	Push Factors	Political Factors		X				X		X		X
			Economical Factors							X	X		
			Social Factors								X	X	X
			Organizational Factors				X					X	X
			Personal Factors				X					X	
		Pull Factors	Political Factors	X	X	X		X	X		X		X
			Economical Factors	X	X	X		X		X	X		
			Social Factors	X	X	X		X			X	X	X
			Organizational Factors				X		X			X	X
			Personal Factors				X	X				X	
Dependent Variable	Intention to Migrate			X	X	X		X				X	

LITERATURE SOURCES

Title	Type of Source	Publisher	Year	No
The determinants of brain drain in developing countries	Journal Article	International Journal of Social Economics	2013	1
The effect of brain drain on the economic development of developing countries: Evidence from selected African countries.	Journal Article	Journal of Health and Social Issues	2018	2
Comparing push and pull factors affecting migration	Journal Article	Economies	2022	3
An organizational perspective on brain drain: What can organizations do to stop it?	Journal Article	International Journal of Human Resource Management	2022	4
The push and pull factors affecting the migration of Mongolians to the Republic of South Korea	Conference Paper	EDP Sciences	2021	5
Digital traces of brain drain: developers during the Russian invasion of Ukraine	Journal Article	EPJ Data Science	2023	6
Can economic freedom and reforms in developing countries reduce the brain drain?	Journal Article	International Area Studies Review	2019	7
Brain drain problem: A review	Journal Article	International Journal of Business and Social Science	2011	8

LITERATURE SOURCES

Title	Type of Source	Publisher	Year	No
Migration trends of pharmacy students of Pakistan: a study investigating the factors behind brain drain of pharmacy professionals from Pakistan	Journal Article	Indian Journal of Pharmaceutical Education and Research	2017	9
Investigating determinants of brain drain of health care professionals in developing countries	Journal Article	Journal of Business Management	2015	10
The Impact of Migration of Highly Skilled Workers on The Country's Competitiveness and Economic Growth	Journal Article	Montenegrin Journal of Economics	2021	11
Brain Drain in Turkey : An investigation on the leading motives of skilled migration	Journal Article	Eurasian Journal of Researches in Social and Economics	2019	12
Brain gain network: a proposal e-governance model to convert the brain drain into brain gain	Conference Paper	International Multi Topic Conference	2003	13
World Migration Report	Report	International Organization for Migration	2022	14
An empirical study of the factors that motivate Sri Lankan professionals to migrate to Qatar	Journal Article	Migration and Development	2019	15
Sri Lankan Out-Migration: Five Key Waves Since Independence	Article	University of Colombo Review (Series III)	2020	16

LITERATURE SOURCES

Title	Type of Source	Publisher	Year	No
Sri Lanka IT-BPM Industry : State of the Industry	Report	SLASSCOM	2020	17
Quarterly Bulletin of Workers' Remittances and Labour Migration - Quarter 3 of 2023	Report	CBSL	2023	18
Quarterly Bulletin of Workers' Remittances and Labour Migration - Quarter 4 of 2022	Report	CBSL	2022	19
Sri Lanka: Asia's emerging IT/ITeS destination	Report	ICTA	2021	20
Crisis-hit Sri Lanka's brain drain hits ICT sector's workforce	Online Article	Economynext	2023	21