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A Measurement of the Level of Development of Female Youth in Brunei Darussalam

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Abstract

The purpose of this paper is to discuss the level of development of female youth based on data obtained from the Brunei Youth Development Index (2018) - the YDI 2018. The YDI 2018 was conducted towards the formulation of the Brunei Darussalam's National Youth Strategy and Policy 2020–2035 (NYSP 2020-203). This paper is a benchmark measurement of the level of development amongst female youth in Brunei Darussalam, covering the domains of Self-Development, Leisure Activities, Health, Self-Potential, Community Integration, Social Issues, Political Integration, and Employment and Opportunity. Although there are no significant gender disparities in Brunei Darussalam, the study argues that the level of development of female youth is not yet at a well-developed level and should be further improved if Brunei Darussalam is to meet its Wawasan Brunei 2035 target of having a high standard of living. Key improvements proposed are to formulate more gender-specific policy initiatives to accelerate the development of Brunei female youth, and to prioritize on policies relating to the 'empowerment of women'.

Keywords: *Youth development, women empowerment, National Youth Strategy and Policy 2020-2035, Wawasan Brunei 2035*

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1.0 Introduction

Human development is the process of enlarging people's choices, allowing them to lead a long and healthy life, be educated, to enjoy a decent standard of living, and realise their potential. Youth development is a process that prepares a young person to meet the challenges of adolescence and adulthood and achieve his or her full potential. As the agents of change and the future of a nation, youth play an important role in realising a country's aspiration and to drive development. Hence investing in youth development is key to achieve this.

Universally accepted principles of human rights have set the standard for equality between males and females. Yet, gender disparities persist in many aspects of human development, despite the tremendous economic and social progress that has been accomplished and the fact that achieving gender equality and women's empowerment are crucial to achieving inclusive and sustainable development (UN Women, 2018). According to the statistics, gender inequality is a worldwide problem, but the specifics of how this problem manifests itself vary greatly between different countries (UNICEF, 2014). The world's economic growth and social development are both significantly hindered by the unequal treatment of men and women. Because of gender differences, male and female adolescents confront distinct sets of obstacles throughout the course of their growth. The inequality that girls experience can start as early as birth, making it more difficult for them to realize their full potential throughout their lives. Because of the challenges they confront in education, they may not have access to necessary skills and may have worse prospects in the labour market.

In today's labour market, women are still paid less than males for doing the same work, and they frequently encounter legal and other restrictions that limit the employment choices available to them. Women continue to be underrepresented in positions of authority and responsibility for making decisions. So, the unrealized potential of women to contribute to the growth of the economy is not realized. In addition, traditional beliefs, cultural norms, and gender stereotypes place different expectations on females and a bigger responsibility on their shoulders to bear unpaid work and caring responsibilities. This results in a double burden.

A current state assessment of the level of development among female youth, particularly in Brunei Darussalam, is therefore essential to evaluate if our Wawasan 2035 goals can be achieved in terms

of greater gender equality, empowerment, and inclusive growth. This present study on measuring the level of development amongst female youth acknowledges the impact that gender might have in youth development outcomes. The gender perspective looks at the impact of gender on people's opportunities, social roles and interactions. A deeper understanding on this will allow policy makers to make gender-specific policies and programs to ensure an inclusive development for all youth.

2.0 Literature Review: Gender and Youth

Gender is an intrinsic part of every aspect of the economic, social, daily, and private lives of individuals and communities, as well as the various roles assigned to men and women by society. Thus, the effect of gender cannot be overlooked while discussing human development. Gender is typically viewed as a social construct that signifies the psychological, social, and cultural differences between males and females (Giddens, 1987). Roles can be described as the expected conduct of a person holding a given status or position in a particular setting (Kessler & McKenna, 1978; Lindsey, 2011). Because of the structure of our culture, understanding development through the prism of gender becomes vital. The social institutions influence not just our basic views, but also how differently we view genders. The stages of development and transition are highly individualized and autonomous, making this an exclusive, men-only process. 'The idea of linear development towards the fully autonomous, independent individual can only be seen to 'fit' women's experiences of growing up if many aspects of women's experiences are ignored' (Wyn & White, 1997, p. 58).

In Asia, patriarchy plays an important role in shaping gender roles, although its influence varies depending on the interaction of deeply ingrained cultural norms, economic change, and government policy (Sechiyama, 2013). Although beliefs and attitudes are a component of gender ideology, it encompasses a broader worldview that perpetuates gender inequality and justifies "natural" or assumed arrangements. Hence, its construction is implicit, making its empirical evaluation challenging. We can still examine aspects of gender ideology, for example, by evaluating individual support for equal sharing sex-stereotypical behaviours and duties such as household duties, childcare and economic provision.

2.1 Definition of female youth

In Brunei Darussalam, youth are individuals between the ages of 15 and 35, defined as "a period of transition from the dependence of childhood to adulthood's independence and awareness of our interdependence as members of a community" (UNESCO, 2019). It is frequently used to describe a person between the ages at which he or she may leave compulsory education and the age at which he or she finds his or her first employment. This latter age limit has been increasing as higher levels of unemployment and the cost of establishing an independent household put many young people into a more prolonged period of dependency (UNESCO, 2019).

Due to globalization and technology advancements, young people in Brunei Darussalam, particularly their counterparts from other countries, are experiencing a rapidly shifting landscape. These trends and emerging challenges have a high impact on the health and wellbeing of female youth and their career prospects in the future. Being one of the country's most valuable assets and agents of change, the empowerment and development of young women in Brunei Darussalam are important in the country's continued efforts to achieve its Wawasan 2035 goals. It is especially so as 152,529 or 34.6% of the country's population consists of young people between the ages of 15 and 34 (JPES, 2021)[1].

2.2 Female youth development in Brunei

Brunei Darussalam has made significant progress in improving and enhancing the development of females in the country with full access to education, healthcare, employment, company ownership, and other benefits. Creating more opportunities for young women will lead to greater gender equality, economic independence, and empowerment to realize their full potential. Equality for women and girls is not only one of the most essential human rights but also a crucial component of sustainable social and economic development. The Government of Brunei Darussalam is also committed to ensuring that females are prioritised on the national agenda. With an estimated population of 440,715 (JPES, 2021)[2], the contribution of Bruneian females, who make up 47.3% of the country's population, has been recognised as necessary to drive Brunei Darussalam in achieving sustainable and inclusive growth. Wawasan Brunei 2035 emphasises

[1] Brunei Population and Housing Census 2021.
[2] Brunei Population and Housing Census 2021.

equal opportunities for females in the workforce and national development. Brunei Darussalam is also a signatory of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and is fully committed to implementing the Beijing Declaration and Platform for Action. Brunei Darussalam is also committed to implementing the 2030 Agenda for Sustainable Development and the Sustainable Development Goals or SDG (Ministry of Finance and Economy, 2020), whereby gender equality and women empowerment is one of the 17 Sustainable Development Goals under SDG5 (UN General Assembly, 2015). While Bruneian girls outperform males at all educational levels (from primary to tertiary)[3], this has not translated into better work opportunities for them. Brunei Darussalam has a significantly lower female labour participation rate by international standards[4] despite their education and skill attainments. There is also a high level of unemployment amongst our females by international standards at 11.2% compared to 10.3% among men. Thus, the full potential of female contributions has not been realized.

In 2019, the Centre for Strategic and Policy Studies (CSPS), in partnership with the Ministry of Culture, Youth, and Sports, conducted a needs analysis measuring the level of youth development in Brunei Darussalam (the YDI 2018) as part of the National Youth Survey (NYS 2018). Brunei Darussalam's National Youth Strategy and Policy 2020–2035 (NYSP 2020-2035) was developed based on data collected from the NYS 2018. The measurement in the YDI 2018 covers domains of young people's quality of life which are in line with the nation's aspired development objectives for its youth namely Self-Development, Leisure Activities, Health, Self-Potential, Community Integration, Social Issues, Employment Opportunity and Political Integration.

Based on the YDI 2018, the overall YDI score for Bruneian youth is 65.1 which is classified as 'Good'. If Brunei is to meet its Wawasan targets of high standards of living, then, we should aim to achieve an overall YDI of 'Very Good' scores (75 and above). The only domains that achieved 'Very Good' scores are the domains of Health and Social Issues. Hence there is room for improvement for the domains of Self Development, Self-Potential, and Employment Opportunity

[3] The gross graduation ratio for females in Brunei is 30% with a GPI of 1.82, indicating that the number of female graduates is significantly higher than the number of male graduates.
[4] Bruneian female labour force participation at 90,600 is only 40.5% of the country's total labour force of 223,300 (JPES, 2021).

which all score 'Good' only. The domains of Leisure Activities, Political Integration, and Community Integration in particular require urgent policy attention as these are classified at the lower levels, at the borderline between 'Average' and 'Good' and are the 3 lowest scoring domains, indicating a lack of development in these areas.

3.0 Methodology

This section describes the methodology used in the study including the sampling method, the data gathering technique, the survey instrument used, and the procedure for calculating the YDI 2018.

3.1 The present study

The purpose of this paper is to measure the level of development of female youth in Brunei Darussalam in order to determine whether gender differences necessitate gender-specific policies to further support the development of female youth in Brunei Darussalam, taking into account the country's socio-cultural context.

3.2 Population and sample of female youth

This paper utilizes data that were collected in the YDI 2018. The population of interest for this paper are Bruneian female youths aged between 15 and 40. The sample used for this paper comprises of all female respondents that participated in the YDI 2018. In total, the weighted sample consisted of 1,118 female youth respondents. The weighted sampling distribution by demographics is shown in Table 1. The weighed sampling distribution by educational background is shown in Table 2.

Table 1.
Weighted Sampling Demographic Distribution

Demographic Background Variables and Subgroups	% of Sample
Age group	
15-19	20.3%
20-24	21.8%
25-29	20.1%
30-34	18.2%
35-40	19.6%
Ethnicity	
Malay (Brunei Malay, Tutong, Belait)	86.8%
Indigenous (Kedayan, Dusun, Bisaya, Murut)	10.3%
Chinese	1.6%
Others	1.3%
Marital Status	
Single	69.1%
Married	27.6%
Divorced/Widowed	3.3%
Per Capita Household Income	
1st Quartile (<=B$214.71)	26.3%
2nd Quartile (>B$214.71 & <= B$501.00)	24.7%
3rd Quartile (> B$501.00 & <= B$1095.60)	24.9%
4th Quartile (> B$1095.60)	24.1%
Number of Occupants Per Bedroom	
1 or Less (Does Not Need to Share Bedroom)	28.0%
More than 1 (Sharing At Least 1 Bedroom)	72.0%
District	
Belait	15.2%
Brunei-Muara	70.1%
Temburong	2.5%
Tutong	12.3%
Housing Scheme	
Government Housing	45.0%
Non-Government Housing	55.0%

Demographic Background Variables and Subgroups	% of Sample
Employment Status	
Employed	49.2%
Unemployed	21.4%
Inactive	3.7%
Student	25.8%
Employment Sector	
Public Sector	72.5%
Private Sector	27.5%
Parent's Education	
Father	
- Secondary Level Up to Form 5 & Below	63.9%
- Secondary Level Up to Form 6	13.7%
- HND & Above	22.4%
Mother	
- Secondary Level Up to Form 5 & Below	70.2%
- Secondary Level Up to Form 6	11.8%
- HND & Above	18.0%
Parent's Occupation	
Father	
- High Skilled Occupation	41.0%
- Medium Skilled Occupation	43.0%
- Low Skilled Occupation	3.3%
Mother	
- High Skilled Occupation	56.4%
- Medium Skilled Occupation	33.3%
- Low Skilled Occupation	8.9%

Table 2.
Weighted Sampling distribution by Education Background

Education Background Variables and Subgroups	% of Sample
Highest Level of Education	
Secondary Level (Up to Form 5) and Below	28.8%
Diploma and Secondary Level (Up to Form 6)	15.6%
Bachelor's Degree	40.8%
Postgraduate Diploma and Above	14.8%
Completed Studies Overseas (Diploma or Higher)	
Overseas	28.7%
In Brunei	71.3%
Scholarship Student (Diploma or Higher)	
Scholarship Student	74.0%
Self-Funded Student	26.0%
O Level Credits	
5 Credits or More	64.9%

Education Background Variables and Subgroups	% of Sample
Less than 5 Credits	35.1%
O Level Results (Malay)	
Credit	95.4%
No Credit	4.6%
O Level Results (English)	
Credit	70.1%
No Credit	29.9%
O Level Results (Mathematics)	
Credit	65.2%
No Credit	34.8%
Involvement in Associations	
Not Involved in Any Associations	54.8%
Involved In At Least 1 Association	45.2%

3.2 The YDI 2018 Sampling technique

The YDI 2018 uses non-probability sampling, but a minimum quota was set for each of the 4 districts of Brunei to ensure that the sample was stratified across the districts. The sample was generated through invitations to forums and roadshows at schools and higher learning institutions. Any Bruneian youth aged between 15-40 could participate in the forums or roadshows. Some forums are targeted for a specific audience such as rural youths and unemployed/underemployed youths while other forums were open to the general youth public.

To address the non-randomness of the sample, sampling weights were used to ensure that, as much as possible, the sample of female youths being studied reflected the true underlying female youth population.

3.3 Data gathering technique

Participants of the forums and roadshows were guided to answer the survey by a trained enumerator to ensure that understanding of the survey questions was consistent and responses were internally valid.

3.4 Survey instrument

The YDI 2018 is a measurement using a specially designed questionnaire that covers domains of young people's quality of life that align with the nation's aspired development objectives for its youth, based on Wawasan Brunei 2035. Furthermore, the YDI makes it possible to compare the

status and well-being of Bruneian youth across different socio-demographic groups, between males and females, as well as capture the importance of youth development programmes in improving their well-being. The YDI domains were selected based on the current state of the country and what is considered essential to youth development.

Universiti Brunei Darussalam conducted an earlier and the first YDI for Brunei Darussalam in collaboration with MCYS in 2008 (YDI 2008). It contained eight domains: Self-Development, Leisure Activities, Values and Identity, Health, Self-Potential, Multimedia Exposure, Community Integration, and Social Issues. The Commonwealth compiled the Global YDI in 2016 (Global Commonwealth YDI 2016) with five domains: Education, Health and Well-being, Employment and Opportunity, Civic Participation, and Political Participation. ASEAN conducted the third YDI for Brunei Darussalam in 2017 (ASEAN YDI 2017) with four domains: Education, Health and Well-being, Employment and Opportunity, Participation and Engagement. YDI 2018 is the fourth YDI for Brunei Darussalam. It was formulated by CSPS in collaboration with MCYS in 2018 and is based on eight domains: Self-Development, Leisure Activities, Health, Self-Potential, Community Integration, Social Issues, Employment Opportunity, and Political Integration.

Brunei YDI 2008 and YDI 2018 were tailored and made for Brunei Darussalam and covered more domains than the Global Commonwealth YDI 2016 and the ASEAN YDI 2017. In addition, Brunei YDI 2008 and Brunei YDI 2018 use individual-level primary data, whereas the Global Commonwealth YDI 2016 and the ASEAN YDI 2017 use country-level secondary data. The additional domains, and the level of disaggregation allow Brunei YDI 2008 and YDI 2018 to provide more extensive coverage of the level of youth development necessary for setting comprehensive development policies and programmes for female youth.

While the Brunei YDI 2008 and YDI 2018 are similar in terms of measurement methodology, there are differences in their domains. The YDI 2018 omits the Multimedia Exposure domain and Values and Identity domain, given the social and cultural context of Brunei Darussalam. Necessary indicators from the Multimedia Exposure domain and the Values and Identity domain have been subsumed in relevant domains of the YDI 2018 instead. Table 3 summarises the domains of the YDI 2018 and their indicators.

Table 3.
Summary of Brunei YDI 2018 Domains and Indicators (CSPS, 2018)

Domain	Indicators
Self-Development	Self-concept, assertiveness, self-control, positive outlook, and no depression.
Leisure	Sports and exercise, clubs and associations, recreational activities, and self-enrichment activities.
Health	Physical health, and healthy lifestyle.
Self-Potential	Entrepreneurship, leadership, creativity, communication skills, organisational skills, and conflict management.
Community Integration	Community spirit, interpersonal relations, family responsibility, education, youth associations, economic behaviour, and tension areas.
Social Issues	Truancy and loitering, sexual problems, bullying, violence and discrimination, alcohol and drugs, crime and vandalism, and poverty.
Political Integration	Loyalty to the country, and political participation.
Employment Opportunity	Not in education, employment, or training (NEET), and unemployment rate.

3.5 Calculation procedure

The procedure for calculating the YDI 2018 follows the standard Commonwealth formula.

The YDI 2018 contains eight domains, each containing several relevant indicators. Additionally, under each indicator, there are several items. For example, the domain 'Self Development' contains five indicators, one of which is 'Self Concept'. Under the indicator 'Self Concept', there are three items.

Items can be statements for which a respondent states whether he/she strongly agrees, agrees, disagrees, or strongly disagrees with it. If the statement is positive (e.g., "people usually like me"), a respondent that strongly agrees with the statement will attain the highest response value of 4; those that agree will attain a value of 3; those that disagree will attain a value of 2, and those that strongly disagree will attain the lowest response value of 1. If the statement is negative (e.g., "I get angry easily"), the response values are reversed.

Items can also be activities respondents state whether they participate in very often, often, sometimes, or never/rarely. For example, if it is a positive activity (e.g., "reading books"), a

respondent that carries out that activity very often will get the highest response value of 4; a respondent that does it quite often will get a value of 3; a respondent that does it sometimes will get a value of 2, and a respondent that does it never or rarely will get the lowest response value of 1. The opposite is true for negative activities (e.g., "smoking").

3.5.1 Procedure for Calculating the Indicator Score

Consider only a single indicator. Let there be K items contained in the indicator and N respondents.

Firstly, calculate each item's score by taking the average response value of overall respondents. For item 'i', the item score is calculated as:

$$M_i = \frac{\sum_{n=1}^{N} R_n^i}{N}$$

Then, rescale the item scores to be between 0 and 100 by using the formula:

$$\overline{M_i} = 100\, x\, \frac{(M_i - M_i^{min})}{(M_i^{max} - M_i^{min})}$$

Where 'M_i^{min}' is the minimum response value for item 'i' (in most cases it is 1) and 'M_i^{max}' is the maximum response value for item 'i' (in most cases it is 4).

The indicator score is the simple average of the item scores over all items.

$$I = \frac{\sum_{k=1}^{K} \overline{M_k}}{K}$$

3.5.2 Procedure for Calculating the Domain Score and the YDI

Consider only a single domain. Let there be S indicators.

The domain score is the simple average of the indicators scores over all indicators.

$$D = \frac{\sum_{s=1}^{S} I_s}{S}$$

An item/indicator/domain score between 0 and 24 is considered as 'Not Good'; between 25 and 49 as 'Average'; between 50 and 74 as 'Good'; and between 75 and 100 as 'Very Good'.

The YDI is then calculated as the simple average of the domain scores over all domains:

$$YDI = \frac{\sum_{i=1}^{8} D_i}{8}$$

Evaluation of the Brunei YDI was ranked into four quartiles: 'Not Good' (0-24), 'Average' (25-49), 'Good' (50-74) and 'Very Good' (above 75). Therefore, if Brunei Darussalam is to meet its Wawasan Brunei 2035 target of having a high standard of living, Brunei Darussalam should aim for a 'Very Good' classification, which indicates that the status of female youth is well developed. Similarly, for this present study, female youth should aim for a 'Very Good' classification in all of the selected domains of development.

4.0 Findings

The tables below report the YDI scores for females across various demographic and socioeconomic groups. A '+' next to the domain score shows that the domain score is significantly higher than the mean at the 5% significance level and a '- 'shows that the domain score is significantly lower than the mean at the 5% significance level. A blank shows that the score is not statistically significantly different from the mean. This way, domain scores can be compared across demographic and socioeconomic subgroups (e.g., males and females). It must be noted that the tables below compare domain scores of subgroups relative to each other. Thus, even if certain demographic subgroups score relatively lower than other subgroups, they may still have a high domain score (i.e., categorised as 'Good' or 'Very Good').

As shown in Table 4, the overall YDI for Males is 65.2 and for females is 65.1. However, the difference is not statistically significant. Males scored significantly higher in the domains of Leisure than Females (52.4 for Males; 45.3 for Females). Meanwhile, Females score better in the domains of Health (86.9 for Females; 84.6 for Males) and Social Issues (89.8 for Females; 86.0 for Males). The following sub-sections look at female's development level only to see if there are any significant demographic and socioeconomic correlations across female youth.

4.1 YDI by gender

Table 4.
YDI Scores by Gender

	Male		Female	
OVERALL YDI	**65.2**		**65.1**	
Self-Development	63.8		64.4	
Leisure	52.4	+	45.3	-
Health	84.6	-	86.9	+
Self-Potential	69.2		69.9	
Community Integration	50.2		50.6	
Social Issues	86.0	-	89.8	+
Political Integration	50.4		49.1	

4.2 Female youth YDI by ethnicity

Table 5.
Female YDI Scores by Ethnicity

	Malay		Indigenous		Chinese		Others
OVERALL YDI	**65.1**		**65.5**		**65.4**		**63.2**
Self-Development	64.2		64.3		65.9		64.2
Leisure	44.5		47.0		49.9		39.3
Health	86.8		86.0		88.7	+	86.4
Self-Potential	70.1		69.6		69.0		69.8
Community Integration	50.8		50.8		49.2		48.6
Social Issues	89.6		90.5		91.6		87.6
Political Integration	49.8	+	50.6	+	43.6	-	46.3

Table 5 shows that the overall YDI score is not statistically significant across the ethnic subgroups. However, Chinese females score significantly higher than the mean for the Health domain (88.7) but have a lower-than-average score for the Political Integration domain (43.6). On the other hand, Malay females and Indigenous females score significantly higher than the mean for the Political Integration domain (49.8 and 50.6, respectively).

4.3 Female youth YDI by residence

Table 6.
Female YDI Scores by Location of Residence

	Brunei Muara		Belait		Tutong		Temburong	
OVERALL YDI	**65.3**		**64.1**		**65.8**	**+**	**63.5**	
Self-Development	64.7		63.9		63.6		63.1	
Leisure	45.3	+	45.5		47.2	+	33.9	-
Health	87.0		85.7	-	87.5		87.1	
Self-Potential	70.4		68.1		69.2		69.4	
Community Integration	50.7		48.8	-	51.8		53.3	+
Social Issues	89.7		88.8	-	91.5		91.8	
Political Integration	49.4		48.1		49.9		46.1	

As shown in Table 6, females living in the Tutong district have a significantly higher overall YDI score (65.8). Regarding the YDI domains, females living in the Tutong district score significantly higher than the mean for the Leisure domain (47.2). Similarly, females living in the Brunei Muara district score significantly higher than the average for the Leisure domain (45.3). On the other hand, females living in the Temburong district score significantly below average for the Leisure domain (33.9) but higher than average for the Community Integration domain (53.3). Females residing in the Belait district scored significantly below average for three domains which are Health (85.7), Community Integration (48.8), and Social Issue (88.8). Nevertheless, their overall YDI score is similar to the mean.

4.4 Female youth YDI by household income per capita

Table 7.
Female YDI Scores by Household Income Per Capita

	1st Quartile <= B$214.71		2nd Quartile >B$214.71 & <= B$501.00		3rd Quartile > B$501.00 & <= B$1095.60		4th Quartile > B$1095.60	
OVERALL YDI	**64.0**	**-**	**64.4**	**-**	**65.8**		**66.6**	**+**
Self-Development	63.9		62.3	-	65.5		66.1	+

Leisure	41.0	-	43.1	-	46.1		51.9	+
Health	86.0	-	86.4		86.8		88.3	+
Self-Potential	70.0		69.3		70.1		69.9	
Community Integration	51.3		50.9		51.5		48.7	-
Social Issues	87.5	-	88.8	-	91.9	+	91.6	+
Political Integration	48.2		49.8		49.1		50.1	

Table 7 shows the female YDI scores by household income per capita quartiles. Females from households in the lowest two income quartiles have significantly lower YDI scores (64.0 and 64.4, respectively), whereas females in the highest income quartile have significantly higher YDI scores (66.6). Those in the lowest income quartile score below average for the Leisure domain (41.0), Health domain (86.0), and Social Issues domain (87.5). Those in the second lowest income quartile score significantly below average for the Self-Development domain (62.3), Leisure domain (43.1), and Social Issues domain (88.8). Females in the third income quartile score significantly higher than average for the Social Issues domain (91.9). Meanwhile, females in the highest income quartile score significantly higher than the mean for the Self-Development domain (66.1), Leisure domain (51.9), Health domain (88.3), and Social Issues domain (91.6). However, they score significantly lower than average for the Community Integration domain (48.7).

4.5 Female Youth YDI By Parental Education

Table 8.
Female YDI Scores by Father's Education

	Form 5 Below		**Form 6**		**HND Above[5]**	
OVERALL YDI	**65.0**		**65.8**		**65.7**	
Self-Development	65.1		64.7		64.0	
Leisure	44.1	-	46.8		49.9	+
Health	86.5		87.5		87.6	
Self-Potential	70.0		70.5		69.6	
Community Integration	50.3		51.0		49.7	
Social Issues	89.5		90.4		90.7	
Political Integration	49.8		49.8		48.2	

[5] HND means Higher National Diploma.

Table 9.
Female YDI Scores by Mother's Education

	Form 5 Below		Form 6	HND Above	
OVERALL YDI	**65.1**		**64.9**	**65.9**	
Self-Development	64.7		63.7	64.7	
Leisure	44.8		44.7	49.3	+
Health	86.6	-	87.8	87.7	
Self-Potential	69.9		68.9	69.3	
Community Integration	50.1		50.4	51.0	
Social Issues	89.7	-	90.6	91.3	
Political Integration	50.1	+	48.1	47.8	

Table 8 presents the YDI scores for females by their father's highest level of education, whereas Table 9 presents the YDI scores for females by their mother's highest level of education. The two tables show that the overall YDI scores are similar for females, regardless of their parent's education level. Females with fathers with an education level of form 5 or below score significantly lower than average for the Leisure domain (44.1). Conversely, females with fathers with at least an HND score significantly higher than average (49.9). It is also evident for females with mothers with at least an HND where they score significantly higher than average for the Leisure domain (49.3). Females with mothers with an education level of form 5 or below score significantly lower than average for the Health domain (86.6) and Social Issues domain (89.7). However, they score significantly higher than the mean for the Political Integration domain (50.1).

5.0 Discussion and Policy Implications

The findings from the YDI 2 form the basis of the Government's (MCYS) formulation of the National Youth Policy and Strategy 2019-35 (NYPS 2019-35), which contains the priority areas and directions for Brunei Darussalam's intention to address youth issues. To reach its goal and realize the Youth Vision: 'Values-driven world-class youth, who are future-ready agents of change for national development, rooted in inclusivity', four core strategies (Core Strategy: 1 Whole of Nation Collaboration, Core Strategy 2: Culture of Oneness, Core Strategy 3: Education, Employability and Decent Work, Core Strategy 4: Youth Empowerment) and 16 policy initiatives (PI) were formulated (CSPS, 2019), taking into consideration critical contemporary

issues impacting youth development. These initiatives are cross-cutting and require a whole-of-nation approach.

As explained previously, a 'Very Good' classification (75 and above) must be attained for our Youth Vision. Also, as shown in Table 2, Bruneian Youth has only achieved an overall score of 65.1 in the YDI (Good only). Although there are no statistically significant differences between gender, our data analysis of the YDI amongst female youth showed that only two domains, namely Health and Social Issues had achieved the 'Very Good' classification with many improvements required in the remaining domains.

In the leisure domain, the study findings showed that our female youth need to do better. The score could be more satisfactory and is, in fact, the domain where the female youth scored significantly lower than the male youth, 45.3 compared to 54.4. This domain requires urgent policy attention as these are only classified as 'Average', which indicates a lack of development. Female youth have been less active than males in all leisure activities, particularly youth clubs and associations. Leisure activities have the potential to affect all other domains positively and should be leveraged to help female youth in reaching their full potential. The two other domains where female youth also scored the lowest are Community Integration (50.5) and Political Integration (49.1). These domains require urgent policy attention as these are only classified as 'Average' and borderline 'Good', which indicates a lack of development. In the Self-Development domain, female youth only scored 64.4%, which is reasonable but has room for improvement. In the self-potential domain, female youth could have reached a better level, with a score of 69.9. In terms of health, our female youth scored 86.9% at an excellent level, higher than male youth at 84.6%. Nonetheless, it is necessary to point out that under the physical health indicator, the item score for mental health was the lowest. Because of this, it is a significant issue that deserves the attention of policymakers. While female youth achieved a 'Very Good' level (89.8) in the Social Issue domain, policy attention is required for the indicator with the lowest score, which is the No Poverty indicator.

The following policy initiatives are proposed to further support the development of female youth in Brunei Darussalam:

- Expand youth-centred leisure opportunities to facilitate the participation of female youth in meaningful activities, positively impacting their personal development.
- Expand existing STEM-related initiatives to attract more female youth to STEM-related education and careers.
- Expand programs to improve education levels, employability, skills, and levels of self-potential of at-risk and NEET female youth.
- Promote community programs that foster leadership skills for female youth.
- Promote female youth in leadership and decision-making roles at all levels.
- Enhance programs that promote young girls' social and emotional development.
- Encourage female youth to engage in entrepreneurship.
- Establish programs to improve the health and well-being of female youth, with a focus on sexual health, mental health, and personal safety.
- Expand preventive and supportive measures against gender-based violence.

Other general policy recommendations could include the following:

- Apply gender mainstreaming approaches in all stages and processes of policy-making.
- Improve the availability, quality, and use of gender data.
- Address adverse gender norms and stereotypes.
- Enhance women's workplace support for a healthy work-life balance, including childcare facilities, flexible working arrangements, and protection against gender violence at work.
- Encourage men to take an active role in domestic work and childcare.

6.0 Conclusion

Our study is a benchmark measurement of the level of development amongst female youth in Brunei Darussalam, covering the domains of Self-Development, Leisure Activities, Health, Self-Potential, Community Integration, Social Issues, Political Integration, and Employment and Opportunity. Inclusive development is a key strategic thrust in the NYSP 2020-2035. Further key improvements implicated in this paper would be to formulate more gender-specific policy initiatives to accelerate the development of our Bruneian female youth. Overall, our research indicates that there are no significant gender disparities in Brunei Darussalam. Optimistically, the level of development amongst female youth in terms of mental, educational and physical

development is at the satisfactory or ‘good’ level and above, as illustrated in their scores for the ‘Self-development’, ‘Health’, ‘Self Potential ‘and ‘Social Issues’ domains. The overall YDI for female youth does need to be uplifted towards a ‘very good’ level if we are to achieve Wawasan 2025 objectives. Finally, what needs focussing and policy prioritising now in particular are the domains that relate more towards the notion of development in terms of ‘empowerment of females’ as illustrated by lower scores (not satisfactory - ‘not good’ or ‘average’ level) amongst females in terms of the ‘Leisure’, ‘Community Integration’ and ‘Political Integration’.

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Korea's Smart City Development and its Implications for Brunei Darussalam

Yeoul Hwangbo & Norhayati Hamzah

Abstract

This paper deals with (i) Korea's smart city policies and programmes, and salient features, and (ii) the implications of Korea's smart city for Brunei Darussalam, with particular emphasis on citizens engagement in the policy-making process. Industry 4.0 as the 4th industrial revolution is recently expected to be replaced by the forthcoming Industry 5.0, implying a paradigm shift from technology-driven innovation to people-driven innovation. In the context of smart city initiatives, the citizens engagement approach becomes more important to construct smart cities to fulfill the residents' requirements and new methodologies such as 'living lab' and 'design thinking' have accordingly been adopted in Korea. However, these approaches have been facilitating citizens engagement in the policy formulation stage only, and are unlikely to fully support the whole policy-making process. To tackle this challenge posed by citizens engagement, this study proposes a policy academy through collaboration with local communities and an institute of higher education (IHE), in such a way that (i) the IHE provides the training courses to enhance capacity-building for citizens to be equipped with relevant skills and knowledge to proceed with the smart nation, (ii) citizens are able to untangle difficult problems posed by regional and district offices, and (iii) bolster efforts to achieve UN SDG 11 (sustainable cities and communities). Smart city testbeds are also recommended to be put in place to lay the foundation of infrastructure for industrial diversification in Brunei Darussalam in the global value chain (GVC).

Keywords: *Citizen Engagement, Design Thinking, E-government, Industry 5.0, Living Lab, Policy-Making Process, Smart City, Smart Nation, Sustainable City, Urban Development*

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1.0 Introduction

The UN has estimated that the population of the world would be on the rise from 5 billion to 9 billion – there would be an 80 per cent increase –, with the urbanisation rate reaching around 70% by 2050 (United Nations, 2018). Urban life is expected to become increasingly more attractive than has historically been the case. The Asia region has been more urbanised than other regions. Likewise, rapid urbanisation has continued to cause densely populated areas in cities. excessive resource consumption, and various social problems such as traffic congestion, water shortage, disasters, and infectious disease, adding up to serious threats to a city's sustainability.

Korea is confronted with several challenges because of rapid urbanisation: while the world's average urban level is 54 %, that of Korea has reached 82.5 % as of 2017 (Seoul, 2020). Additionally, there has been an increasing demand from the government for innovative arrangements to solve a variety of technical, physical and social problems. Associated with the innovative arrangements, the smart city is transforming urban lifestyles. The continuous increase of city populations and the complexity of city management have been driving governments towards the strong use of technologies to support a higher quality of urban spaces and a better offering of public services. Countries around the world are paying attention to their smart cities as a new vehicle for solving urban problems and making efforts to develop smart cities in line with the fourth industrial revolution. Meanwhile, Korea's smart cities have not only fulfilled the UN's sustainable development goals (SDGs), but they have also been gradually expanding and evolving to adapt to changes in circumstances to fully exploit the potential of technologies such as big data, the Internet of Things (IoT), and artificial intelligence (AI) (Korean Government, 2019). Such developments are taking place all over the world. For example, Saudi Arabia is striving to transform Makkah into the first smart city in the Islamic world (Zawa, 2022).

Industry 5.0 was recently brought to the fore: people-driven innovation can be highlighted in Industry 5.0, whereas technology-driven innovation is prevalent in Industry 4.0 (European Commission, 2021). In the innovation context, smart city development has increasingly been putting an emphasis on a people-driven approach. As part of a people driven approach, living lab and design thinking methodologies have been adopted and applied at the level of Korea's local government to enhance citizen-centric smart city development.

Recognising and identifying the highlighted topic above, which explores the importance of citizens' involvement in smart city policy, the paper raises four research questions: (i) how have Korea's smart city policies and programmes proceeded? (ii) what are the characteristics and challenges of Korea's smart cities? (iii) how are Korea's citizen engagement approaches evaluated? and (iv) what are the implications of Korea's experience for Brunei Darussalam's development of a smart nation or smart city in the country?

2.0 Controversy over Smart City

2.1 Definitions of Smart City

There are no universal smart city guidelines and indicators that are internationally agreed. As a result, the lack of a shared definition of a smart city has made it difficult to understand the smart city in a holistic manner. Different countries and organisations are likely to have different definitions of a smart city: a smart city has been defined in various ways to describe the particular terms reflecting their circumstances, with a wide spectrum ranging from new city development to urban regeneration in defining a smart city.

- OECD defined a smart city as an initiative or approach that leverages digitalisation to boost citizen well-being and deliver more efficient, sustainable and inclusive urban services and environments as part of a collaborative multi-stakeholder process (OECD, 2018). On the other hand, the International Institute for Management Development (IMD) outlined a smart city as an urban setting that applies technologies to enhance the benefits and diminish the shortcomings of urbanisation for citizens.

The UN sustainable development goal 11 (SDG 11) (United Nations, 2022) is to achieve sustainable cities and communities with the aim of making cities and human settlements inclusive, safe, resilient and sustainable (UN, 2022), which brings the largest investment opportunity and most significant potential to positively impact human lives. Added to this, the UN Department of Economy and Social Affairs (DESA) views smart city initiatives from the perspective of local e-government: local governments are creating "smart cities", harnessing and leveraging cutting-edge technologies to accelerate sustainable development (UN DESA, 2020).

- ASEAN formed the ASEAN Smart City Network (ASCN) as a platform for cities across ASEAN to work together towards the common goal of smart and sustainable

urbanisation, whose primary goal is to improve the lives of ASEAN citizens, using technology as an enabler, with aims to (i) promote cooperation on smart city development among ASEAN cities, (ii) develop commercially viable projects together with private-sector solution providers; and (iii) facilitate the collaboration with ASEAN's external partners, through funding and other avenues of support (ASEAN, 2018).

- Brunei Darussalam publicised the vision of the ***Smart Nation*** through digital transformation with the mission to drive and enhance Brunei Darussalam's socio-economic growth through digital transformation (Digital Economy Council Brunei Darussalam, 2020).

- Korea defined a smart city as a platform to (i) improve the quality of life for citizens, (ii) enhance the sustainability of cities, and (iii) foster new industries by utilising innovative technologies in the era of the 4th Industrial Revolution (Ministry of Land, Infrastructure and Transport, 2020). Article 2, Section1 of the Act on the Promotion of Smart City Development and Industry in Korea states that "the term 'smart city' means a sustainable city wherein various city services are provided on the basis of city infrastructure constructed by converging and integrating construction technologies, and information and communications technologies to enhance its competitiveness and livability."

- Yeoul Hwangbo has identified three components, which encompass (i) technologies, (ii) services and applications, and (iii) legislation, regulation and policy (Hwangbo, 2021).

2.2 Industry 5.0 replacing Industry 4.0

Humankind has made several breakthroughs that have dramatically changed industry structure, working ways, and human lifestyles through several industrial revolutions since '1784', comprising the 1st industrial revolution (characterized by mechanical production), the 2nd industrial revolution (enabling mass production), the 3rd industrial revolution (opening the era of information, telecommunications technology), and the 4th industrial revolution (effectively interconnecting offline and online: O2O). In particular, Industry 4.0 equivalent to a fourth

industrial revolution, has formed a new paradigm of the digital economy and digital transformation that facilitates new emerging businesses with disruptive technologies, cases of which are (i) platform-based electronic commerce, (ii) digital government, (iii) logistics, (iv) data industry and (v) smart city. In particular, smart cities have been harnessing and exploiting the fruits of Industry 4.0.

Industry 5.0 has recently been brought to the forefront from a fresh perspective: Industry 5.0 sheds light on people-driven innovation, whereas technology-driven innovation has been prevalent in Industry 1.0, Industry 2.0, Industry 3.0, and Industry 4.0. In particular, Industry 4.0 pursues more disruptive technological innovation such as digital transformation than ever before. Businesses originating from Industry 4.0, have been commonly adopted by governments, businesses, and decision-makers (European Commission, 2021), Industry 5.0 aims to achieve overall human-centric, sustainable, and resilient goals, which are pertinent to a diverse society based on respect for basic human rights as otherwise multifaceted problems that has negative technology effect on society might arise.

Figure 1 shows that emerging Industry 5.0 as a People-Driven Innovation might be a substitute for a Technology-Driven Innovation, ranging from Industry 1.0 (the first mechanical loom by water and steam power), industry 2.0 (the first assembly line by mass production), industry 3.0 (the first programmable logic controller by electronics and IT system) to Industry 4.0 (Cyber-Physics System using IoT, AI, Big Data, and Cloud Computing). It is worth noting that Industry 5.0 is characterised by a pursuit of human-centric, sustainable, and resilient innovation, which provides justifications for the need for citizens engagement in the smart city programme, given critical success factors (CSFs) are contingent on people. As such, a smart city's outcome can be obtained by concerted efforts, and a new type of collaboration in a 'people, private, public, partnership (PPPP)' might be effective in the forthcoming era of Industry 5.0.

3.0 Korea's Smart City Initiated by the Government

Earlier than the smart city initiative, Korea has been implementing e-government and the ubiquitous city, which have laid the foundation for Korea's current smart cities. As such, Korea launched e-government programmes in 2001, and eleven e-government projects were implemented in the areas of Government to Government (G2G), Government to Business (G2B)

and Government to Citizen (G2C). After completing 11 projects, the e-government projects were expanded to thirty-one projects in 2003 with the objectives to (i) innovate the way the government works, (ii) innovate civil services, (iii) innovate resource management, and (iv) reform the legal system. Support from high-level politicians proved to be crucial to carry out inter-agency e-government programmes. Korea's e-government has been ranked the first among UN member states since 2008 according to the UN survey (United Nations, Department of Economic and Social Affairs, 2008-2020). Meanwhile, Korea has been able to accumulate sufficient experiences enough to implement government-driven smart city projects during the long journey of e-government programmes.

The ubiquitous city (hereafter, U-City) was designed to provide information services anytime, anywhere, on any devices, when and where needed, and can thereby improve the convenience of life, enhance security, and generate new business.

As such, the U-City harnessed integrated technologies that combine urban services with ICT. The infrastructure consisted of a broadband network, sensor technologies and the urban integrated operation centre, and contributed to establishing a technology platform for the smart city in Korea, as the U-City set the focus on technology infrastructure itself. As such, the U-City was the initiative as the preliminary stage of the smart city in Korea and was implemented by focusing on building the infrastructure in a cost-efficient way. Technology-oriented U-City development was implemented from the perspective of a supplier, but the lack of citizens' perceived usefulness made it difficult to ensure sustainable innovation. It is thus required to institutionalise citizens engagement in the smart city initiatives so that citizens can play a role in creating innovative ideas or feedback as a consumer. Korea's smart city programmes have been implemented in relatively short periods since the smart city act was legislated in 2018. Eleven e-government projects started in 2001, and U-City programmes began in 2009. U-City and part of e-government were incorporated into the smart cities' initiatives in Korea.

Figure 1.

Emerging Industry 5.0 as People-Driven Innovation

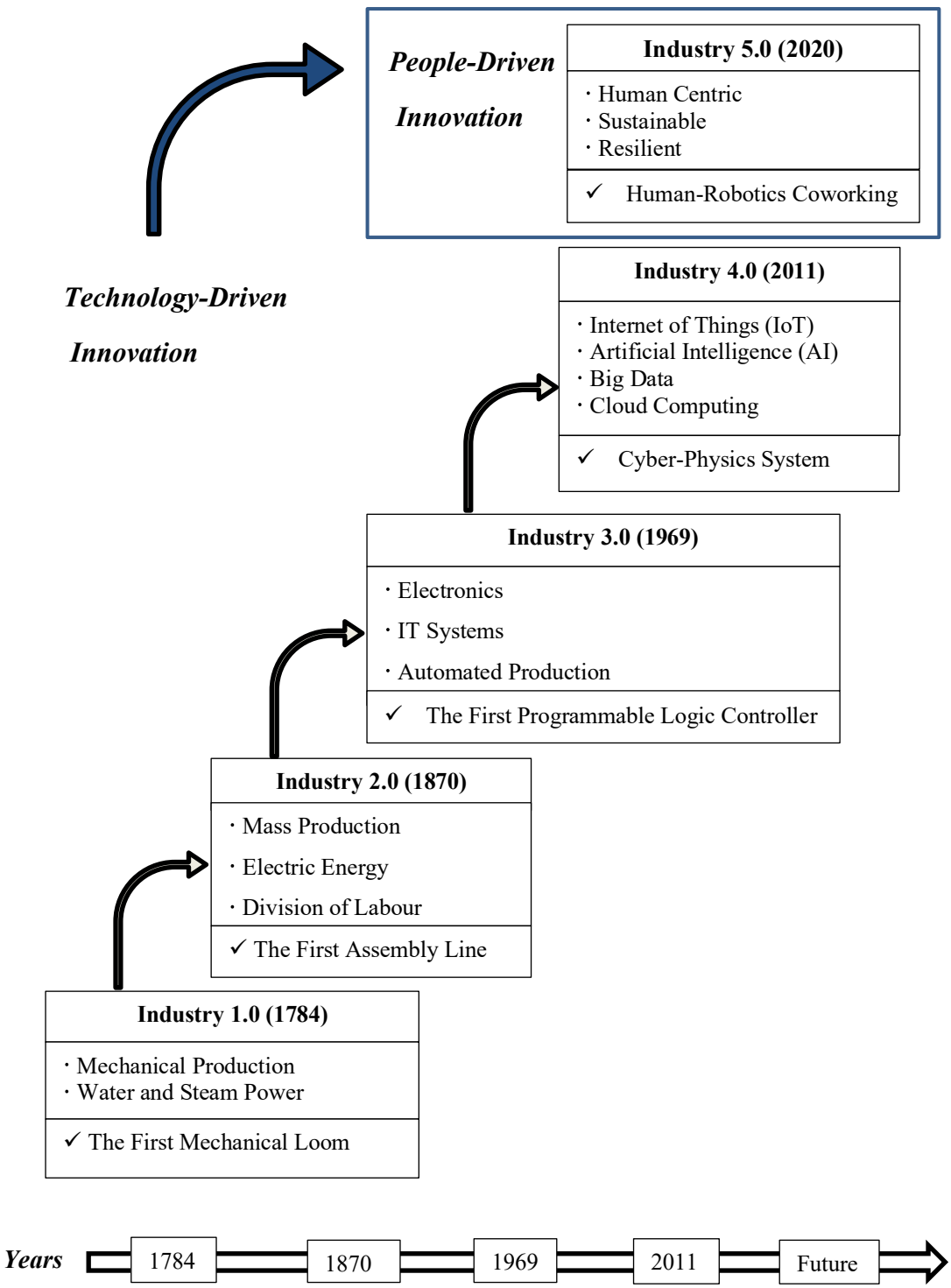


Table 1.

Development Journey of Korea's Smart City

	1st Stage (2001-2013)	2nd Stage (2014-2018)	3rd Stage (2019-2023)
Law and Policy	• Act on Ubiquitous City Development • The First Ubiquitous City Plan • Electronic Government Act Legislated	• Amended Act on Ubiquitous City Development • The First Ubiquitous City Plan	• Act on the Promotion of Smart City Development and Industry • Smart City Strategies
Initiated by	• Ministry of Land, Infrastructure, and Transport • Ministry of the Interior and Safety	• Silo Ministries, • Some Local Government	• Collaboration with ministries • Expanded Local Government
Targeted Cities	• New City (over 1,650,000 m^2)	• New City + Some Existing Citites	• New City + Expanded Existing City
Strategies	• Top-down	• Top-down	• Bottom-Up
Programmes	• Physical Infrastructure Establishment: • Integrated Operation Centre • Network	• Integrated Public Platform • Interoperability • Standardisation	• National Pilot Smart City • Open Call Projects

Korea has successfully implemented large-scale smart cities (OECD, 2020) with the salient features of Korea's smart city being to (i) conduct Research and Solution Development (R&SD), (ii) nurture smart solution providers, (iii) introduce a sandbox for deregulation to promote innovative technology and business models, and (iv) facilitate citizens engagement initiated by local government. The first stage (2001-2013) and the second stage (2014-2018) were carried out in accordance with a top-down approach that is much less important in the third stage (2019-2023). The third stage set a high priority on the bottom-up approach.

For the governance of the smart city initiative in Korea, the smart city special committee was formulated under the 4th Industrial Revolution Committee in November 2017 to enhance inter-agency collaboration (Korea's Presidential Committee for the 4th Industrial Revolution, 2018). The smart city programmes have been designed by consorted inter-ministerial efforts in

major areas where silo agencies might otherwise pose challenges over value-added smart city services.

Korea's smart cities were classified as three types of smart cities in accordance with the stages of urban growth. Three types include (i) new city development, (ii) city operation stage for existing cities, and (iii) declining cities (MOLIT, 2020).

3.1 Smart City Classification in Korea

- ***Ministry of Land, Infrastructure and Transport in Korea (MOLIT)*** has been in a position to play a leading role in developing smart cities and has accordingly been pushing for deregulation to support and drive innovation toward smart cities: 'Smart City Act' has been amended twice between 2018 and 2019 to activate smart city projects and roll out its service s in existing cities. MOLIT, as the champion ministry for the smart city initiatives in Korea, put the integrated platform for city operation/management in place and built the national smart city testbeds in Sejong City and Busan City.

- ***Ministry of Science and ICT*** (hereafter ***MSIT***) taking the responsibilities of the 4th industrial revolution and promotion of science, technology and ICT, enacted the Fundamental Intelligence Information Act in February 2018 and enhanced nation-wide R&D on integrated solutions using big data, AI, and IoT, which are dominant technologies in the smart cities. Likewise, MSIT provided technologies needed for the smart city programmes and promoted the smart leading public service promotion programmes in the areas of intelligence informatisation of traffic, security, industry, environment and public facilities.

- ***Ministry of the Interior and Safety*** (hereafter ***MOIS***) is in charge of Korea's e-government, enhances public data and has been providing e-government services to the public. Citizens are accordingly ready to embrace the services of the smart city, recognising the usefulness of the government-initiated e-government services.

- ***Ministry of Trade, Industry and Energy*** (***MOTIE***) has been developing energy-related technologies such as the smart meter (AMI), energy management system (EMS), and energy storage system (ESS), which have been vital elements for smart cities.

- ***Ministry of Environment*** (***MOE***) has been contributing to smart cities by managing water resource operations and spreading eco-friendly electronic motor vehicles (EMV).

- ***Local Governments*** with legal status as local autonomous entities, have responsibility for implementing smart cities. Seventy-eight local governments across the country have formulated dedicated organisations for smart cities, and a total of sixty-seven local governm ents are participating in the MOLIT's support programmes as of 2019 (MOLIT, 2021). Local governments are stepping up efforts to develop a smart city that fits its local characteristics.

4.0 Korea's Smart City Initiated by Citizens

Korean local governments have accordingly adopted two methodologies such as living lab and design thinking that are mutually connected in terms of consumer-based innovation: an increasing number of local governments in Korea have used the living lab and design thinking methods to co-create smart city programmes as well as its environments in collaboration with the public sector, the private sector, and the citizens, who are expected to play an active responsive role in identifying, developing and conducting the smart city services and solutions.

4.1 Living Lab and Design Thinking Approaches

A ***Living Lab*** is defined as the consumer-initiated model under open innovation: it places focus on end-users from the outset of the initial stage of developing products and services. Different applications have different living lab methodologies with various definitions and components in accordance with particular fields. A living lab is driven by two main ideas: (i) involving users as co-creators on equal grounds with the rest of the participants and (ii) experimentation in real-world settings (Almirall et al, 2012).

A ***Design Thinking*** approach (i) begins with a user-centric perspective, (ii) converts various data and information into new real information, and (iii) enables development of solutions in a rapid and efficient way, making it possible to achieve creative innovation by taking a human-centric approach and enhancing sympathy among users (Auernhammer, 2021) Design thinking has usually been processed in such a way that it comes up with various innovative ideas by concentrating on in-depth discussions. The design thinking approach has flexibly been proceeding repeatedly rather than sequentially in the several stages, making sure to facilitate common innovation. Design thinking adopted fiction characters via ***Personas*** concept which were created to represent the different user types, helping to understand users' needs, experience, behaviours and goals (Interaction Design Foundation, 2022).

Design thinking as a new thinking method to resonate with participants who are in different situations has adopted interdisciplinary knowledge and skills - comprising psychology, behavioural science, communication, and design – and thereby challenges the existing policy-making or decision-making theory and practices. Citizen participation in urban governance has established itself as a paradigm, promising empowerment and more cost-effective public service delivery against the backdrop of increased urban conflicts (Kumar et al., 2016). In this respect, design thinking and human-centric design have become the buzzwords of choice to describe "putting people first" approaches that promise to develop solutions tailored to citizens' needs (Schliwa, 2019).

Likewise, design thinking could be a solution to solve social problems using various tools, including collective intelligence and facilitation tools in order to (i) form an empathetic relationship with participants, (ii) scratch ideas to solve the problem, (iii) develop prototypes, (iv) conduct tests, and (v) continue to improve products and services. Those stages are inclined to be reiterated and replicable rather than proceeding in an orderly way, in order to tackle the problems that have not yet been fully resolved. The following Figure 2 shows that a design thinking method is exploited to identify Smart City Applications and achieve a consensus that has been commonly agreed upon at some reasonable point, in the case of Suwon City in Korea.

Figure 2.

Design Thinking Method for the Smart City of Suwon, Korea

4.2 Canonical Citizen Engagement

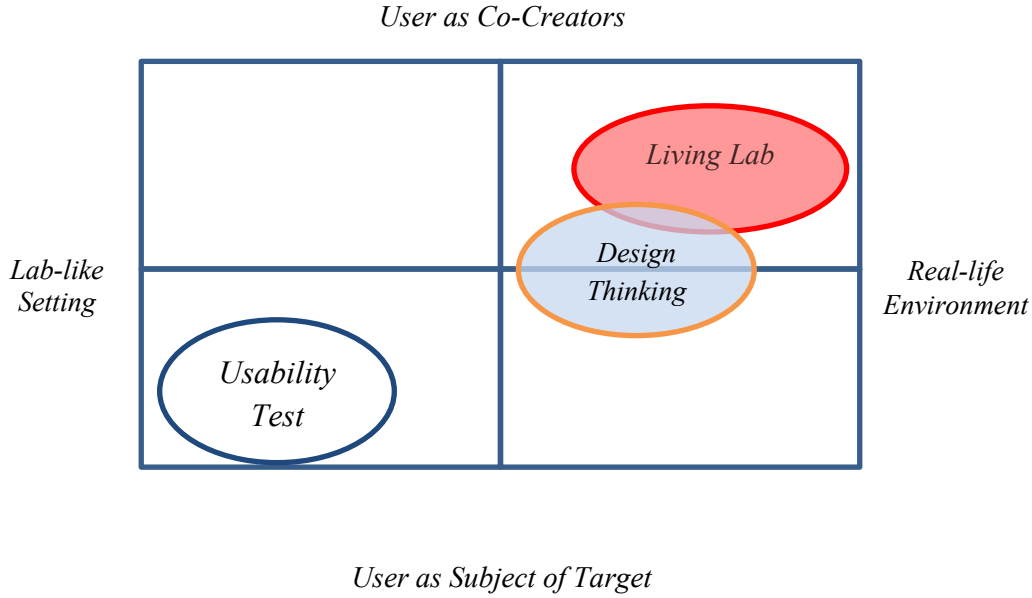
The degree of Citizens Engagement is dependent on (i) the level of real or lab-like environment and (ii) the level of citizens' participation as users. The formula is expressed as follows:

Canonical Citizen Engagement (CCE) = {citizen (creator, target); environment (lab, real life)}

The positions of living lab and design thinking as realistic ways to engage people are shown in Figure 3: the living lab methodology considers users as co-creators rather than the subject of studies, and has been more applied in real-life situations than that of design thinking. However, both methods are unlikely to be classified by rigorous definitions. The two above-mentioned methodologies should ultimately be capable of ensuring that consistency may potentially be possible at some reasonable point in citizens engagement in the policy process.

Figure 3.

Positions of Living Lab and Design Thinking



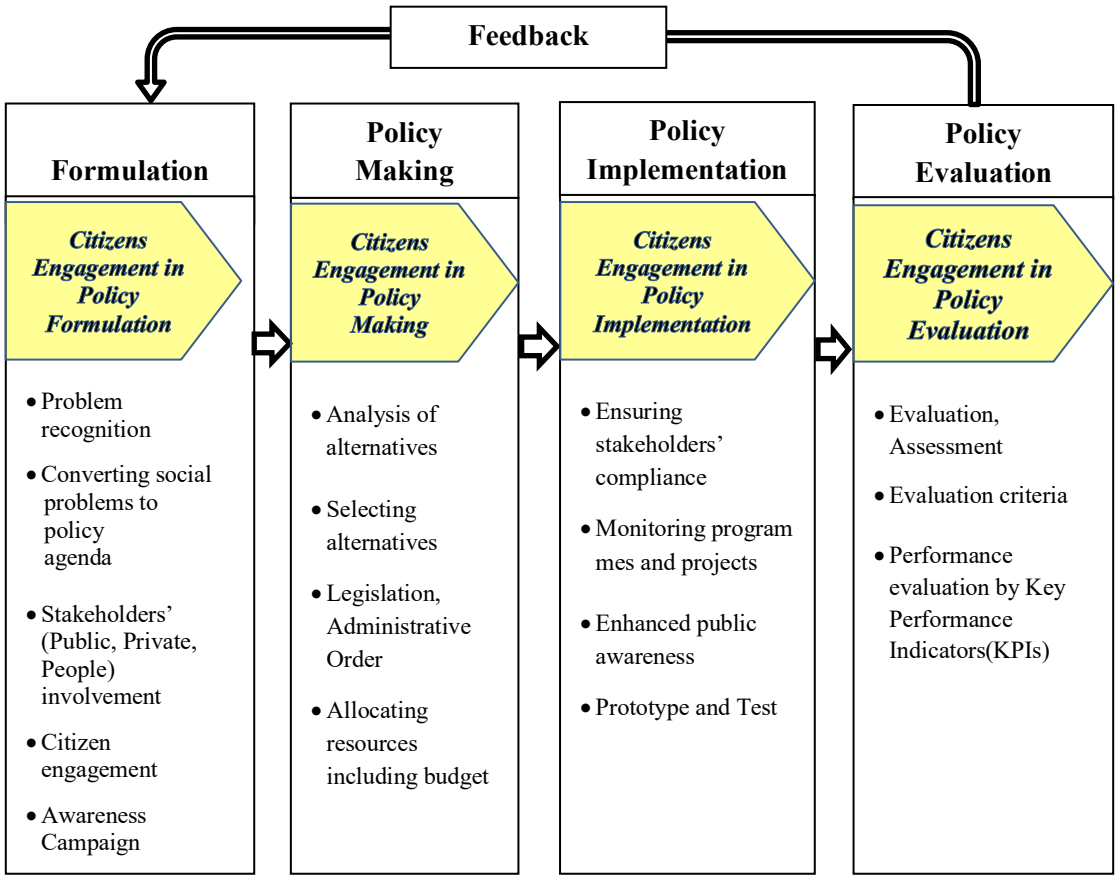
Source: modified from Almirall et al (2012)

5.0 From the Perspective of Citizens Engagement in the Policy Process

The policy-making process is theoretically and empirically comprised of four stages including (i) policy formulation, (ii) policy making, (iii) policy implementation, and (iv) policy evaluation (refer to Figure 5). In this study, Korea's local governments are titled ***district offices*** (called ***GU,*** in Korean) or ***cities*** with the legal status as a local autonomous entity, which carries out the functions that are bestowed by related acts including 'Local Autonomy Act'. Moreover, community activities can instill in its residents a sense of civic pride. Citizens engagement in the policy process fosters better policy making and resolves social challenges, paying specific attention to citizens feedback.

- ***Policy Formulation Stage*** is to (i) recognise social problems, (ii) convert the social problems into a policy agenda, (iii) facilitate citizens engagement, and (iv) create awaren ess among citizens.
- ***Policy-Making Stage*** is to (i) officially decide smart city projects that have the potential to improve citizens' quality of life and promote the local economy in their district or city, and (ii) allocate government resources according to priorities and criteria.
- ***Policy Implementation Stage*** is mainly related to compliance with various stakeholders. Local governments have continuously been creating and enhancing the awareness of smart cities to get support from citizens through a press release, permanent exhibition establishments, and onsite training. Given smart city projects may require huge costs, local government needs to (i) have close collaboration with central government agencies to get support, with particular emphasis on the central government subsidy for local government, and (ii) engage the private sectors - equipped with up-front funds, technologies, business models - in implementing smart city projects.
- ***Policy Evaluation Stage*** is to conduct monitoring and assessments in a cooperative manner to encourage citizens participation in not only reviewing the implementation of smart city projects but also proposing new smart city projects from the perspective of citizens. It is worth noting that the government ought to put Key Performance Indicators (KPIs) in place to perform appropriate monitoring and evaluation., Although they may cause potential burdens as well as the lack of interoperability between/among other ministries and local governments, local governments ought to put their own KPIs into practice, due to the fact that standard KPIs have not been developed at the national level.

Figure 4.
Citizens Engagement in the Policy Process



Source: modified from Hwangbo (2021)

Citizens engagement in Korea's smart city programmes is allowed only in the policy formulation process, but has not been put in place to serve as a holistic citizens engagement methodology in the whole government policy process, including policy formulation, policy-making, policy implementation, and policy evaluation (refer to Figure 4). A policy academy has been newly introduced and established in the ***Gangnam-gu*** district office and is expected to be positioned as a local innovation centre, which creates awareness of innovative technologies, and functions as an integrated living lab aligned with the whole policy processes.

6.0 Brunei Darussalam's Readiness for Smart City Development

Though the Government of Brunei Darussalam has not directly mentioned a smart city, a smart city-related agenda can be found in (i) WAWASAN Brunei 2035, (ii) Ministry of Development Strategic Plan 2018-2023, and (iii) E-Government Strategic Plan 2009-2014.

The Brunei Darussalam Long-term Development Plan 2035, referred to as ***WAWASAN Brunei 2035*** contains vision, mission and strategies (Jabatan Kemajuan Ekonomi Brunei, 2007). It set out the long-term vision that Brunei Darussalam will develop into a nation towards (i) its educated and highly skilled people measured by the highest international standards; (ii) quality of life and (iii) a dynamic and sustainable economy, which gains insight into a knowledge-based society in common with Korea's definition that the smart city is a platform to (i) improve the quality of life for citizens, (iv) enhance the sustainability of cities, and (iii) foster new industries by utilising innovative technologies (Ministry of Land, Infrastructure and Transport, 2020). Furthermore, smart city initiatives are able to fulfil most of the strategies of WAWASAN Brunei 2035, comprising (i) education strategy, (ii) economic strategy, (iii) security strategy, (iv) institutional development strategy, (v) local business development strategy, (vi) infrastructure development strategy, (vii) social security strategy, and (viii) environmental strategy.

The Ministry of Development Strategic Plan 2018-2023 (Ministry of Development, 2018) in Brunei Darussalam has identified six priority areas comprising (i) policy and governance framework; (ii) integrated planning and improving coordination; (iii) leveraging on information technology; (iv) optimization of resources; (v) expanding a collaborative network and leveraging private sector infrastructure, and (vi) local business development. Particularly, the strategy of leveraging information technology is related to smart city initiatives in improving e-services and digitalising information to ensure accessibility and proper databases to enhance data integration and security.

The Prime Minister's Office mapped out the E-Government Strategic Plan 2009-2014 with the guiding principle of citizen-centric services, which are further elaborated into five strategic priorities, including (i) developing capabilities and capacity, (ii) enhancing governance, (iii) strengthening security and trust, (iv) integrating the government, and (v) delivering integrated, assessable and convenient e-services. As of now, e-government and digital government are likely to be used interchangeably.

In the meantime, Bandar Seri Begawan (BSB) was designated as a pilot city in the ASEAN Smart Cities Network and the major projects are identified as (i) a resilient Kampong Ayer water village and (ii) the clean river management project (ASEAN, 2018).

The Digital Economy Council - which took over the roles of the Brunei Darussalam National IT Council (BIT Council) and the e-government Leadership Forum (EGLF) in providing the direction on digital economy initiatives for Brunei Darussalam - launched the Digital Economy Masterplan 2025 in June 2020 (Government of Brunei Darussalam, 2022). The Smart Nation is planned to be driven by three pillars, comprising Digital Government, Digital Economy and Digital Society. The Smart Nation Platform has been identified as the strategic enabler with flagship projects comprising Digital ID, Digital Payment and People Hub (Digital Economy Council Brunei Darussalam, 2020).

When analysing the above national plans, the smart city policy was not officially publicised yet in Brunei Darussalam, but can ,however, be supported by three national plans and one ASEAN agenda, which are (i) the long-term national development plan, (ii) Ministry of Development Strategic Plan 2018-2023, (iii) the E-Government Strategic Plan 2009-2014, and (iv) BSB designation in the ASEAN Smart Cities Network, and (iv) the Digital Economy Masterplan 2025, which can lay the foundation for Brunei Darussalam to proceed with smart city development as more advanced and integrated initiative of e-government programmes. A smart city has the potential to become a coherent and sustainable local e-government to be in line with WAWASAN 2035 and supported by the existing plans and the ASEAN regional initiative. It is worth noting that smart city initiatives invariably prove to have not only a direct effect on the quality of citizens' lives, but also indirect effects or ripple effects such as (i) bringing benefits for socially marginalised groups, and (ii) increasing job creation, comprising direct or indirect recruitment by startups and training institutes.

7.0 Conclusions

The paper deals with the research questions addressed: (i) Korea's smart city policies and programmes in sections 2 and 3, and (ii) Korea's citizen engagement in the policy process using living lab and design thinking in section 4. This research also draws conclusions to (i) propose a citizens engagement approach in Brunei Darussalam in a manner conducive to realising people-driven innovation of Industry 5.0, and (ii) come up with the follow-up collaborative initiative

between Brunei and Korea after signing the bilateral Memorandum of Understanding (MoU) of the smart city at the national level (BruDirect , 25th Nov 2019).

Living lab and digital thinking are currently utilised in Korea's smart city programmes for (i) identifying smart city services and applications by reaching a consensus between residents, and (ii) getting feedback on prototypes and tests promptly through citizens' tests on the view of end-users, leading to the agile development of final solutions by solution providers, including the company. These approaches - originating from the innovation of the private sector - are, however, likely to prove a limitation on the citizens engagement in the public sector. A policy academy - tentatively named - is therefore suggested to serve as a holistic citizens engagement methodology in the whole government policy process, including policy formulation, policy-making, policy implementation and policy evaluation.

To that end, the policy academy might provide fundamental education and training for citizens to be equipped with relevant knowledge and skills, so as to (i) avert negative discrepancies that can adversely have an effect on citizens' expectation of a smart city, and (ii) preempt problems occurring because of the lack of capability of new emerging technologies. In the case of the policy academy initiated by the ***Gangnam-gu*** district office in Korea, local communities including community centres and mosques are proposed to act as the smart city living lab by establishing a people-private-public partnership (PPPP) for engaging citizens or residents in the policy process for Brunei Darussalam. Recognising adapting technology to residents must coincide with training people on how to use new technology, local communities, including mosques are required to collaborate with the Institute of Higher Education Centres (IHE) such as Universiti Islam Sultan Sharif Ali (UNISSA), Universiti Brunei Darussalam (UBD), and Universiti Teknologi Brunei (UTB). The rationale for this is that (i) mosques as communities are evenly spread in the nation and provide a convenient access point for citizens, ensuring as many residents as possible can share in the benefits of the smart city; (ii) the IHE designs training courses to enhance citizens' capacity and capability building and provides expertise for the programmes for residents to be equipped with relevant skills and knowledge to proceed with the smart nation; (iii) residents supported by IHE are able to untangle difficult problems posed by their communities; and (iv) bolster efforts to achieve UN SDG 11 (sustainable cities and communities). Likewise, the collaborations between communities and IHE are thought to enhance

the opportunity for residents to contribute to the country with the amalgam of technological skills and regional characteristics.

In accordance with the diplomatic relationship between Brunei Darussalam and Korea, His Majesty the Sultan of Brunei Darussalam visited Korea and held a summit meeting with the Korean president and participated in the groundbreaking ceremony of the Busan Smart City Project on 24th November 2019. During the summit meeting, Brunei Darussalam signed the MoU for smart city development with the Republic of Korea. In the context of the bilateral agreement between Brunei and Korea, the practical cooperation for the smart city initiative is expected to materialise in such a way that a wealth of the smart city experience of Korea is transferred to Brunei Darussalam and Brunei is able to carry out best practices and good governance in a sustainable and collaborative manner, together with inward foreign direct investment (FDI) from Korea to Brunei Darussalam to gain a foothold in ASEAN. Brunei is also recommended to establish smart city testbeds, with particular emphasis on research and business development (R&BD) and research and solution development (R&SD) in the global value chain (GVC) to compete in the global market in an increasingly complex globalised economy, through the collaboration between Brunei Darussalam and Korea.

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Mind the Gender Gap: Education Trends in Brunei Darussalam

Sufrizul Husseini & Lutfi Abdul Razak

Abstract

While men have historically attained more education than women worldwide, this gender imbalance in education has reversed in most countries. This study examines gender differences and trends in enrolment rates and academic achievement in education in Brunei Darussalam. The data for the period between 2010 and 2020 were calculated and compiled from the Brunei Education Statistics of the Ministry of Education, and the Department of Economic, Planning and Statistics of the Ministry of Finance and Economy. Enrolment rates and the percentage of passing rates from primary to tertiary education are presented. The findings revealed that there exist gender differences in student enrolment in favour of males in the primary and secondary sectors, as well as in technical and vocational schools. However, at the tertiary level, particularly in higher institutions, the proportion of female students exceeds that of male students. In terms of academic achievement, the passing rates of female students exceed the male students at all levels. We discuss ways how to combat gender disparities and conclude by discussing the potential policy implications that could reduce gender gaps in educational outcomes.

Keywords: *Education, Gender, Educational Policy, Brunei Darussalam*

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1.0 Introduction

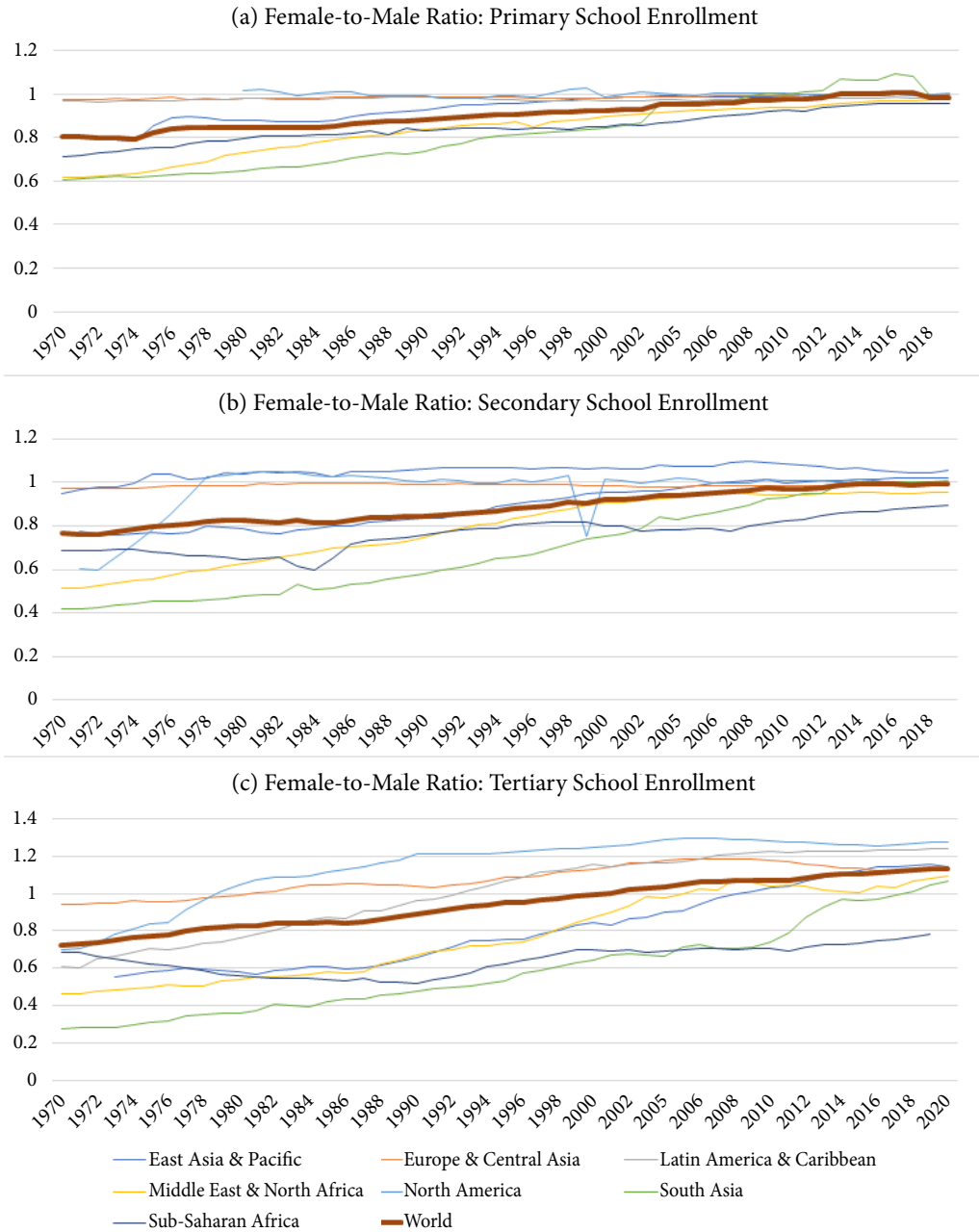
Policymakers have long recognized gender equality and access to quality education as vital to the sustainable development agenda. In 2000, the United Nations (UN) Millennium Declaration, signed by 189 countries, was translated into eight Millennium Development Goals (MDGs) for development and poverty eradication. This included the commitment by member states of the UN "to achieve universal primary education" and "to promote gender equality and empower women" (United Nations, 2000). In 2015, all 192 member states of the United Nations (2015) agreed to adopt the Sustainable Development Goals (SDGs) by 2030. Among the 17 SDGs are SDG4 on quality education and SDG5 on gender equality. While SDG4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all", SDG5 aims to "achieve gender equality and empower all women and girls". The quest for gender equality is inseparably linked to equal access to quality education. The Education 2030 agenda recognizes that gender equality requires an approach that "ensures that girls and boys, women and men not only gain access to and complete education cycles but are empowered equally in and through education" (UNESCO 2016).

While challenges in economic participation and political empowerment persist in terms of gender equality, gender gaps in educational attainment, health, and survival, are nearly closed. According to the recent Global Gender Report 2021, it is estimated that 95% of the gender gap in educational attainment has been closed globally, with 37 countries already at parity (WEF, 2022). Figure 1 shows that while significant gender gaps existed in primary and secondary school enrolment in 1970, gender parity[1] had been attained in many regions worldwide by 2020. However, gender disparity against girls in tertiary school enrolment reversed during the same period across all regions except for Sub-Saharan Africa. This reversal can be attributed to two conflicting trends globally. On the one hand, this reflects welcome improvements in educational opportunities and attainment for girls. On the other hand, it also reflects the relative underachievement of boys in education.

[1] The Gender Parity Index (GPI), released by UNESCO is a socioeconomic index usually designed to measure the relative access to education of males and females. A GPI between 0.97 and 1.03 indicates parity between the genders.

Figure 1.

Gender Parity Index based on Gross Primary, Secondary and Tertiary School Enrolment by Region from 1970 to 2020



Source: World Development Indicators (2022)

The lower educational achievement of boys relative to girls throughout different school ages has received a great deal of attention from researchers around the world (Bailey, 2006; Edwards &

Pasquale, 2003; Dougherty, 2005; Goldin, Katz & Kuziemko, 2006; Machin & McNally, 2005; Murphy & Welch, 1992). In the UK, females in higher education equalled males for the first time in 1992 and since then more women than men have been enrolled in British higher education institutions (HEIs) and the gender gap continues to widen (Broecke & Hamed, 2008). In the USA the trend suggests that for every two men who get a college degree, three women will do the same (Rosin, 2010). The dominance of females is not only a trend in developed or Western countries but also in the Asia Pacific region, where the percentages of female' students were larger than male students, except for Cambodia, Laos, Vietnam and the Republic of Korea (Wan, 2017). In Malaysia, female student enrolment in HEIs has been rising since the 1970s. By the late 1990s, the percentage of female and male students were equal, with female enrolment beginning to overtake male enrolment in percentage terms. More interestingly, even in societies known to be patriarchal, such as Saudi Arabia, the gross enrolment ratio for females has been significantly higher than for males, and women have become the majority group in higher education (Wan, 2017).

Although this is an emerging global issue, gender disparities in education have only received moderate attention in Brunei Darussalam. Previous studies by Metussin (2015, 2017) have found that the gender gap in academic achievement exists in secondary-level education and discuss the factors that have contributed to it. However, not much is known about whether these disparities exist at all educational levels. In this study, we examine whether such gender disparities in education exist at a country level and if so, to what extent. This paper presents new evidence of education trends in Brunei Darussalam at all educational levels utilizing the national statistical publications, namely the Brunei Darussalam Statistical Yearbook and Brunei Education Statistics. The study findings indicate that gender disparities in enrolment and attainment emerge as early as Primary 6 or Year 6, when students take the primary school examination. We document that these gender disparities continue to widen throughout the education system to the university level, where there were more female graduates than males. We further show that these disparities also exist in terms of the field of studies at the tertiary level. In an international standardized test score, the Programme for International Student Assessment (PISA) test scores have also demonstrated that females outperform males in mathematics and science in Brunei Darussalam. We discuss the lessons from other countries to compare and review what can be done further to mitigate the

gender disparities in education in Brunei Darussalam. We end the paper by providing potential implications of gender disparities and offer policy recommendations.

The outline of this paper is as follows: Section 2 shows the methodology, while Section 3 presents the gender disparities in education. Section 4 provides lessons from neighbouring countries. Section 5 provides studies on the interventions in schools and at home in tackling the gender gap disparities and Section 6 discusses the conclusion and provides policy recommendations.

2.0 Methodology

The data used in this study are drawn entirely from the most up-to-date statistics published by the Ministry of Finance and Economy and the Ministry of Education, Brunei Darussalam. In particular, the two main sources of the data were the Brunei Statistical Yearbook and Brunei Education Statistics, which are from the year 2009 to 2020. Other than enrolment rate and academic achievement, data on students' specialization in vocational and technical schools, and at tertiary level, were gathered and analyzed by gender.

3.0 Gender Disparities in Education

3.1 Enrolment Rates

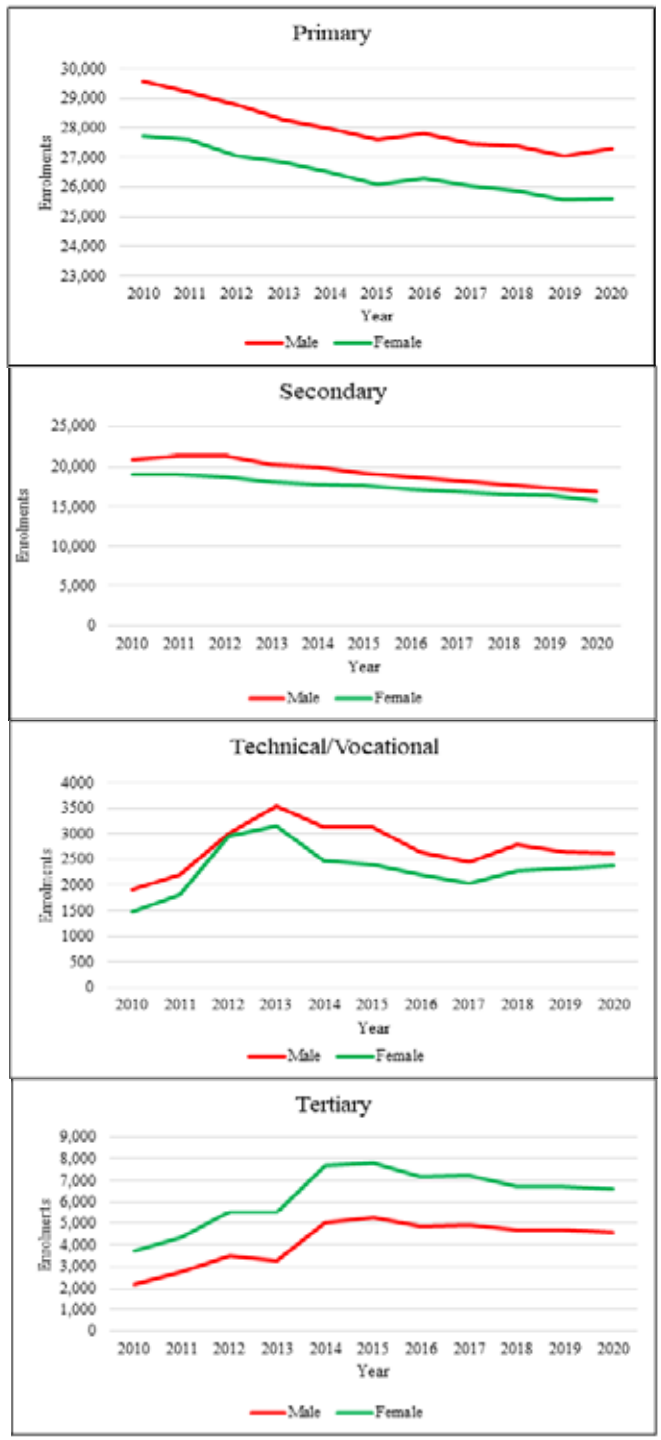
This section documents the enrolment rates to education at all levels segregated by gender. There are four enrolment levels in Brunei Darussalam education: primary, secondary, technical and vocational, and tertiary. Primary education starts at Primary 1 and ends at Primary 6, while secondary education students begin at Year 7 to Year 10, which encompasses four years or the 5-year programme from Year 7 to Year 11. Students following a 4-year programme will sit for their BC GCE O-Level at Year 10, while those in the 5-year programme will sit for their BC GCE 'O-Level at Year 11. Upon completing Year 10 (4-year programme) and Year 11 (5-year programme), students can choose different programmes and learning modes according to their interests, abilities, and needs. Students must meet specific requirements outlined by the institutions that offer such programmes and courses. Several higher education institutions have been established to provide for post-secondary and tertiary education namely Universiti Brunei Darussalam (UBD) in 1985, Institut Teknologi Brunei (ITB) in 1986 (upgraded to university status in 2008), technical and engineering colleges, vocational schools and Pengiran Anak Puteri Rashidah Sa'adatul Bolkiah College of Nursing in 1986. Subsequently, to meet the increasing demand for technical and vocational and higher education, new institutions were

established, such as the Universiti Sultan Sharif Ali (UNISSA) in 2007 (Ministry of Education, 2013).

Figure 2 presents the enrolment rates from primary to tertiary education from 2010 to 2020 segregated by gender. In primary and secondary enrolment rates, it can be observed that there is a decreasing trend for both males and females, while technical, vocational, and tertiary education follows an upward trend. In terms of gender, there were more males than females in primary education, and the gap between them can be seen through the years, while in secondary education the gap has narrowed. Similarly, the gap between males and females has narrowed down for the technical and vocational schools. Meanwhile, for tertiary education, the gap between males and females can be observed further. In primary, secondary, and technical/vocational schools there were more male than female students. This is in line with Brunei's population birth rate, with more males than females (Department of Economic Planning and Statistics, 2021). In contrast, in tertiary level education, there were more females than males. To further the analysis, we examine the gender differences in enrolment rate at the tertiary level.

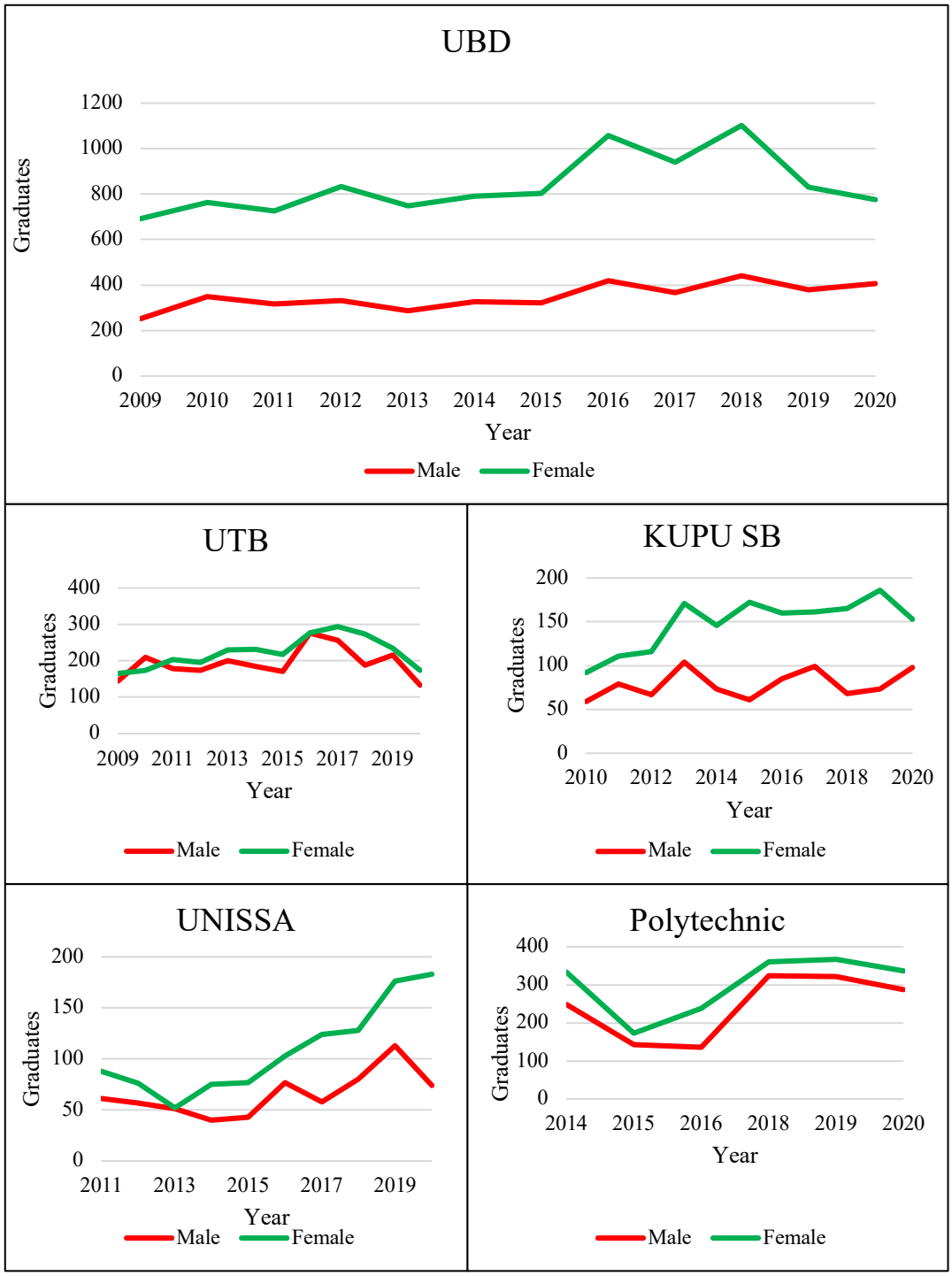
Figure 3 shows the enrolment rates for different types of tertiary education in Brunei Darussalam, which are Universiti Brunei Darussalam (UBD), Universiti Teknologi Brunei (UTB), the Polytechnic, Kolej Universiti Perguruan Ugama Seri Begawan (KUPU SB) and Universiti Sultan Sharif Ali (UNISSA). All tertiary education follows a constant trend with a small upward trend in some years. While all tertiary education has been dominated by females, the gap between males and females is more apparent in UBD, KUPU SB and UNISSA.

Figure 2.
Gender Differences in Enrolment Rates from Primary to Tertiary Education



Source: Department of Economic Planning and Statistics (2022)

Figure 3.
Gender Differences in Graduates at Tertiary Level



Source: Department of Economic Planning and Statistics (2022)

3.2 Field of Studies

One of the prevalent features of education was gender segregation in enrolment with respect to students' choice of courses. While it can be observed that there were more females at the tertiary education level, understanding where the females are concentrated would help us understand what females tend to specialize at. This section presents the gender difference in enrolment rates according to the field of education in tertiary education. Table 1 to Table 4 shows the enrolment rate for tertiary education in higher institutions in Brunei Darussalam according to gender for the years 2012, 2015 and 2018 by field of studies.

Table 1.
Enrolment of Male and Female students at Universiti Brunei Darussalam (UBD) by Course

Course	2012		2015		2018	
	Male	Female	Male	Female	Male	Female
Teacher Training	97	194	44	152	36	94
Humanities	684	428	161	337	47	126
Social and Behavioural Sciences	8	15	9	7	1	5
Business and Administration	70	206	88	204	42	90
Science	85	166	129	199	55	109
Mathematics and Statistics	3	2	3	4	0	0
Engineering and Engineering Trade	7	11	21	26	18	19
Computing	6	3	1	0	0	1
Health	39	115	20	65	34	101

Note: All the course numbers are for the combination of Doctor of Philosophy, Master's, First Degree and Diploma
Source: Brunei Education Statistics (2012, 2015, 2018)

Table 1 presents the enrolment rate of male and female students at Universiti Brunei Darussalam by course. In 2012, we find that females outnumber males in all field of studies except for humanities and computing. However, in 2015, there were significant changes as females were more than double the number of males in humanities. A similar situation happened in 2018 when the trends remained the same.

Table 2.
Enrolment of Male and Female students at Universiti Teknologi Brunei (UTB) by Course

Course	2012		2015		2018	
	Male	Female	Male	Female	Male	Female
Civil Engineering	117	138	131	157	70	84
Business and Administration	117	289	147	323	145	246
Computing	156	219	112	92	123	106
Electrical & Communication Engineering	189	112	154	115	58	129
Engineering and Engineering Trades	186	155	300	223	219	141

Note: All the course numbers are for the combination of Doctor of Philosophy, Master's, First Degree, and Higher National Diploma
Source: Brunei Education Statistics (2012, 2015, 2018)

Table 3.
Enrolment of Male and Female students at Universiti Sultan Sharif Ali (UNISSA) by Course

Course	2012		2015		2018	
	Male	Female	Male	Female	Male	Female
Humanities	80	87	61	80	78	84
Business and Administration	8	22	8	26	45	96
Law	14	20	32	57	10	29

Note: All the course numbers are for the combination of Doctor of Philosophy, Master's, First Degree, and Diploma
Source: Brunei Education Statistics (2012, 2015, 2018)

Table 4.
Enrolment of Male and Female students at Politeknik Brunei (PB) by Course

Course	2012		2015		2018	
	Male	Female	Male	Female	Male	Female
Science and Engineering	24	32	167	157	83	69
Business	69	137	58	103	75	136
Information and Communication Technology	78	65	146	97	98	63
Health	0	0	31	86	20	71

Note: All the courses are a combination of Higher National Diploma and National Diploma
Source: Brunei Education Statistics (2012, 2015, 2018)

Table 2 explores the enrolment rate of male and female students at Universiti Teknologi Brunei. In 2012, there were more females in civil engineering, business administration and computing. However, there were more males in electrical and communication engineering, and engineering and engineering trades. In 2015, we can see that the trends remained the same with males

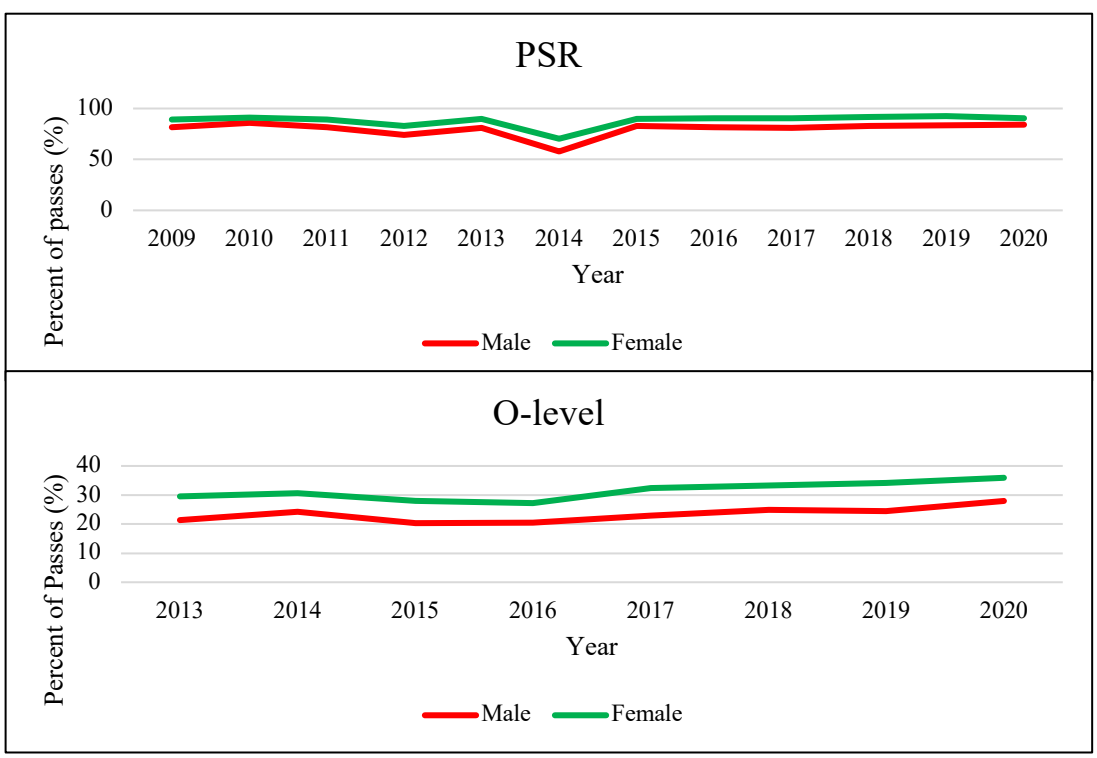
outnumbering females in the engineering fields, while in 2018, the situation changed significantly, with females outnumbering males in electrical and communication engineering.

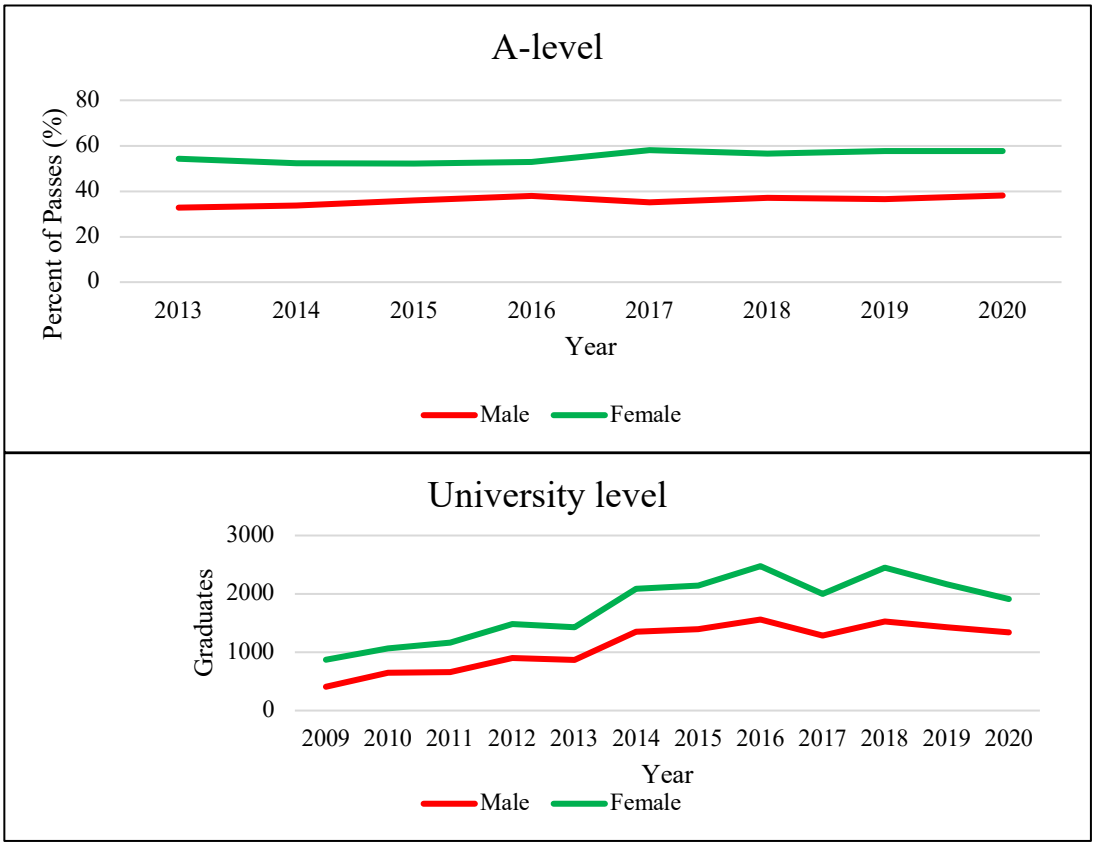
Table 3 shows the enrolment rate of male and female students at Universiti Sultan Sharif Ali. In all fields of education, which include humanities, business administration and law, females outnumber males in all the years presented. Table 4 presents the enrolment rate of male and female students at Politeknik Brunei. In 2012, females outnumber males in science and engineering and business, while there were more males in information and communication technology. This trend reversed in 2015 when there were more males in science and engineering, and information and communication technology. Overall, this section shows that the enrolment differences suggest that subject selection for males and females continues to be gendered, with males demonstrating a preference for enrolling in technical courses over humanities courses, particularly in the field of engineering. Based on these participation rates, it is possible to conclude that males prefer technical courses.

3.3 Academic Achievement

Figure 4.

Gender Differences in Academic Achievement from PSR to University Level





Source: Department of Economic Planning and Statistics (2022)

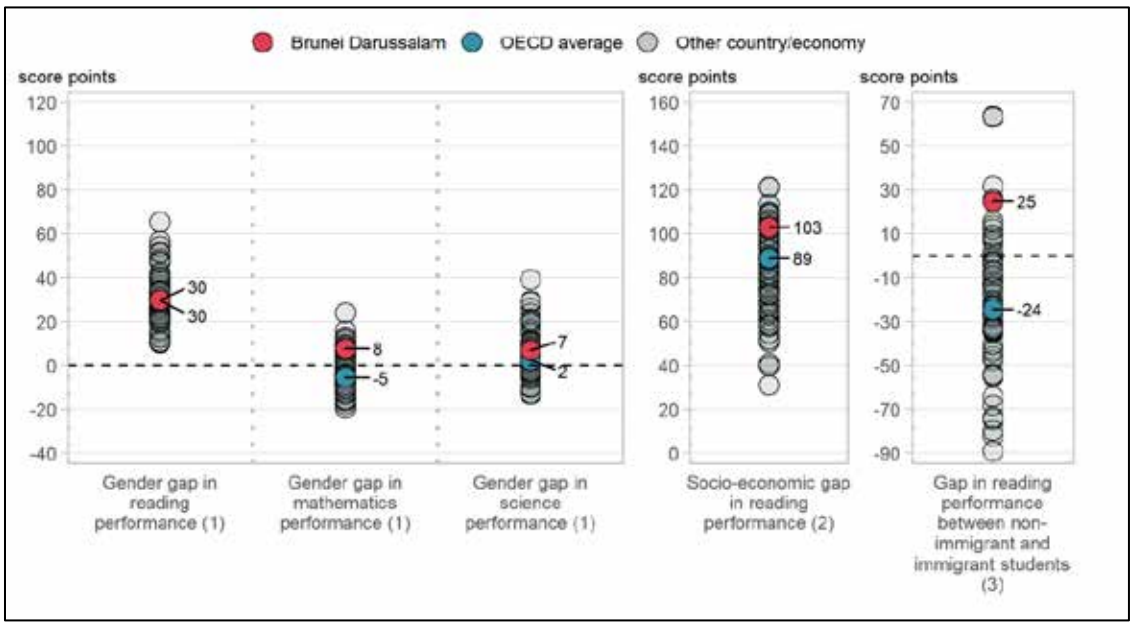
Figure 4 documents the trends of academic achievement or students from the Pernilaian Sekolah Rendah (PSR) examination in Primary 6, the Brunei Cambridge General Certificate of Education Ordinary Level (BC GCE O-Levels) in Year 10 for students following a 4-year programme and at Year 11 for students following a 5-year programme, and A-levels (BC GCE A-Levels) and the number of graduates from university level, as the data for academic achievement for tertiary level is unavailable. In PSR, females outperform males throughout the years studied, when at least 80 per cent of females passed the exams. Although the males were outperformed by the females, the gap is smaller. There was a slight decrease in passing rates in 2014. The trends remain consistent from 2009 to 2020, while the O-level, the passing rate for O-Level is at least 4 'O' Levels. The passing rates for females increased from 30 per cent in 2013 to 35 per cent in 2020. Males also experienced an upward trend of passing rates from 21 percent in 2013 to 29 percent in 2020.

Similarly, female students outperformed male students. For A-level, the passing rate is at least 2 A-levels obtained, and yet again the females outperform the males, where the percentage of passes were at least 58 percent for females achieving at least 2 A-levels in 2013 and 39 per cent for males in 2013. The passing rate trends for A-levels have remained constant. At the tertiary level, due to a lack of data availability, we measured academic achievement by the number of graduates. We found that there were more female graduates than male, as shown in the diagram. It is important to note that while there were more female graduates than male, the enrolment rate of females is more than the males. Thus, it cannot be deduced that females outperform males in the tertiary level.

3.4 Programme for International Student Assessment (PISA)

PISA is an assessment of a survey of 15-year-old students that assesses the extent to which they have acquired the critical knowledge and skills essential for full participation in society. The assessment focuses on reading, mathematics, science, an innovative domain, and students' well-being. In 2018, Brunei Darussalam participated for the first time in the Programme for International Student Assessment (PISA). 97 per cent of the country's 15-year-olds were covered in the PISA sample, the highest share in the East Asia and Pacific (EAP) region. Figure 5 shows gender differences in reading, mathematics, and science performance. Girls scored higher than boys in mathematics by eight points and in science by seven points. This suggested that there are disparities in performance between the males and the females. In terms of students' well-being, PISA also reports that in Brunei, the average level of student well-being is one of the lowest among the countries and economies participating in PISA (5.8 PISA Index, rank 69/70) where 25.7 per cent of boys agreed that they are not satisfied with their lives, while for the girls the figure was 27 per cent. Alarmingly, Brunei ranked second highest in bullying compared to other PISA-participating countries. The percentage of students who reported being bullied at least a few times a month is one of the highest (50.1 %, rank 2/75, 2018) (OECD, 2018).

Figure 5.
Gender Differences in performance



Source: Adopted from the OECD (2018)

4.0 Lessons from Neighbouring Countries

The issue of gender disparities in education has caught enormous attention from policymakers to researchers to parents. In Malaysia, girls outperform boys in secondary school education in two ways: girls score better than boys in standardized tests and they drop out at a lesser rate. Frenette and Zeman (2007) have shown that there is a positive link between performance in standardized tests, overall marks, and good study habits with university enrolment. The most common explanation for the gender gap is due to the better performance of female students compared to male students (Kapoor and Au, 2011). Jelas et al. (2014) found that gender disparities in academic achievement in Malaysia were due to two main reasons, which are student engagement and school burnout. Girls are reportedly more engaged and experienced less burnout than boys, which results in girls outperforming boys in national examinations across school levels and types. The authors further concluded that there were other factors, such as parent and teacher support, personality and motivational factors that need to be investigated by researchers for future studies to further examine why gender disparities in academic achievement in Malaysia exist. Similar studies done by Ismail (2015) found that female students have different characteristics and inspirations that

influence their educational achievement. Females were shown to be more hard working, determined, dedicated and highly ambitious compared to males. Tienxhi (2017) argued that male underperformance at the secondary schooling level contributed to the gender gap in higher education. However, the author further argued that it does not suffice as an explanation to why the gender gap exists in Malaysia. The author suggested that socialization may also play a role, where a person's upbringing can heavily impact his or her biological traits, to the extent that different genders may systematically behave differently. This can be due to the interactions during childhood, parental role models, peers, or schooling. In Malaysia, the author argued that it is possible that boys have become socialized to accept unhealthy gender stereotypes, which inhibits their ability to partake in academic life and enroll into universities. This socialization can occur across different aspects of society, such as in parenting, peers, and schools. Saadat et al. (2022) explains that the factors that affect gender disparity in Malaysian higher education institutions are multidimensional, encompassing individual, social, financial, and educational factors.

In Singapore, gender disparities in education can be observed throughout, from mathematics test scores in primary education to academic performance at the tertiary level. Yoo (2017) investigated the gender disparities in mathematics achievement using TIMSS 2011 data for Singaporean eighth grade students. The study revealed that parental involvement in education has a positive and significant effect on students' agreement with statements "like learning mathematics" and "confident in mathematics" for boys and girls. The finding suggests that Singaporean eighth grade students may not like learning mathematics as much as their high achievement levels indicate. These findings imply that parents and teachers exert greater influence on girls than boys in raising confidence in mathematics and raising girls' confidence in mathematics has a greater impact on improving mathematics achievement scores than for boys. Therefore, increasing involvement and the positive influence of parents and teachers are essential for improving girls' mathematics achievement levels and reducing the gender gap in mathematics achievement. To improve girls' mathematics achievement, parents and teachers should actively be engaged in girls' education and provide positive feedback and encouragement. Jayanthi et al. (2014) examined the effect of gender differences on students' academic performance using questionnaires obtained from 144 students in tertiary education. The study found that in Singapore female students score higher in their CGPA score and there was a statistically significant difference between the females and males. The study attributed such findings due to female

students being more responsible, less likely to be absent from classes and working harder when compared to their male counterparts.

These studies from neighbouring countries have suggested that gender disparities in education were due to the behavioural aspects among boys. Behavioural skills or non-cognitive skills, also known as soft skills, can be described as social, emotional and behavioural, skills which include qualities such as perseverance, conscientiousness, self-control and leadership ability (Duckworth and Yeager, 2015). Boys have been widely documented to have lower attention and behavioural difficulties (Beaman et al., 2006; Entwisle et al., 2007; Gilliam 2005; Ready et al., 2005). The lack of non-cognitive skills has been argued as the reason why females outnumber males in primary, secondary and tertiary education (Jacob, 2002; Becker, Hubbard and Murphy, 2010; Golsteyn and Schils, 2014). This further escalates to the labour market, where the gender gap in non-cognitive skills also manifests itself in the higher incidence of arrest rates among teenage boys than teenage girls in the United States (Goldin et al., 2006). The lack of non-cognitive skills has been further emphasized in a survey of hiring managers, where they are more concerned about the lack of non-cognitive skills for graduates (PayScale, 2016). More than half of the hiring managers are worried about the lack of attention to detail and teamwork among recent graduates. This is important, as Deming (2017) found that for the United States, the labour market has demanded more non-cognitive skills and there is an increasing reward for non-cognitive skills as there are changes in the job tasks from mathematical and routine tasks to social and service tasks which requires more non-cognitive skills.

5.0 Schools and Home Interventions

While it is beyond the scope of this paper to discuss the role of behavioural skills in education and labour market success in detail it is important to understand the ways of tackling such problems. Studies have suggested that focusing on improving behavioural skills may help to improve boys' performance in schools and in the labour market (Deming, 2017). Thus, to solve the problems of boys getting left behind at all educational levels, one of the most promising ways was by school interventions programmes that seek to develop social and emotional skills, self-regulation, mindfulness and service orientation. Meta-analyses by Celio et al. (2011), Dignath et al. (2008) and Durlak et al. (2011) have found that the interventions in schools improved students' non-cognitive skills, where each non-cognitive skill intervention resulted in improved academic

performance and positive social behaviours as well as reductions in conduct problems and emotional distress. These studies suggested that many aspects of non-cognitive skills can be developed, nurtured and taught.

Another type of intervention was through pre-school interventions. Rigorous evidence from studies of random assignment to high-quality preschool suggests that early childhood policy interventions have wide-ranging long-term impacts. In the United States, the Perry Preschool Project was an experimental preschool intervention for a particularly disadvantaged African-American population living in Michigan in the 1960s. The project was part-time and emphasized cognitive development as well as non-cognitive skills. Researchers have found that the programme was successful in changing the economic and life outcomes of the participants. There were notable gender differences in the outcomes of the study such that there was an increase in employment for the males and increased physical activity for the females. Heckman et al. (2013) found that the long-term effects of the Perry Preschool Project were reductions in externalizing behaviour, which is a component of non-cognitive skills. Another preschool intervention known as Head Start, which was aimed at low-income children, also emphasized both cognitive and non-cognitive skills development. Likewise, research has shown that the Head Start programme improved subsequent high school graduation rates, health and non-cognitive skills such as self-control (Deming, 2009; Bauer & Schanzenbach, 2016).

At home, parents have a role in improving their children's' ability in cognitive and non-cognitive skills. Studies have shown that family characteristics such as household income have been shown to have an impact on non-cognitive skills. Early studies used the socioeconomic status of families as a measurement of parental investment. Blau (1999), Loken et al. (2012), and Fletcher & Wolfe (2016) found that parental socio-economic status is an important determinant of a child's future socioeconomic status. These studies found children enter kindergarten with substantial differences in non-cognitive skill endowments based on family resources and the disadvantages grow substantially, often to double or triple in magnitude over the next few years. Lower income families tend to have children with lower non-cognitive skills. Instead of relying on observing family income as a measure of parental investment, recent studies have used the quality of the home environment, which includes aspects of the parent-child relationship. Corneus et al. (2020), Elkins and Schurer (2019) and Neidell (2000) found that parents who spent more time with their children in increased their cognitive and non-cognitive skills. More importantly, Corneus et al.

(2020) found that there exists a sensitive period, between the age of 0 to 4.5 years, when parental investments in their children is crucial for the development of their children's ability in cognitive and mental skills. Thus, these studies echo the importance of the role of early childhood.

6.0 Conclusion and Policy Implications

Achieving gender equality in education is a critical social objective. Differences in boys' and girls' academic achievement are particularly concerning because they are likely to be perpetuated, spilling over into other educational outcomes and undermining efforts to achieve gender equality more generally. Brunei Darussalam is committed to supporting gender equality by providing equal opportunities to boys and girls throughout the education system. However, these equal opportunities have not translated to similar outcomes. This paper examines the gender disparities in education at every level in Brunei Darussalam. The results of this study found that gender disparities in education exist in Brunei Darussalam as early as Primary 6 and further extend to tertiary level. Furthermore, there exists gender segregation in terms of field of studies at the tertiary level where females tend to gravitate more towards the humanities and teaching fields, while males were more enrolled in the engineering courses.

This paper has also briefly discussed the lessons from other neighbouring countries and what can be done to reduce the gender disparities in education. Non-cognitive skills have emerged as a prominent explanation as to why females outnumber males in education when males have lacked behavioural and emotional skills. Interventions in the form of pre-school programmes, school-based intervention programmes and parents' role at home show promising results in improving students' behavioural outcomes. These studies have suggested that non-cognitive skills are malleable, and thus a promising target for public policy. Considering these issues, this paper provided the following policy recommendations i) emphasis on non-cognitive curriculum, especially in pre-school education; ii) increased investment in early childhood education; iii) introduce school-community based programmes, which can assist parents to understand the value of greater engagement with their child's education. These are just some of the policies that could tackle and reduce the numerous dimensions of gender disparities that this paper has documented. Many others have been proposed and would also make a positive difference. More research needs to be done to produce informed recommendations on how to reduce or mitigate the gender gap at all educational levels in Brunei Darussalam.

Overall, this paper suggests that there is a need to formulate new educational policies to combat the gender disparities between boys and girls, where boys' underachievement should neither be ignored nor be the exclusive focus of attention. Part of the purpose of this paper is to open a dialogue among policy makers and academics to focus more attention on the issue of why boys are underperforming at all educational levels. A move from boys' underachievement to a broader analysis of gender and education is needed to place the debate in a gender relational context. The crucial prerequisite for all this is that employers, policymakers, and society at large must recognize that those gender disparities are pervasive and unacceptable – and that conscious efforts by the community can reduce and ultimately erase them. Given gender differences in how educational opportunities are taken up, in Brunei and in other countries, a one-size-fits-all approach is not suitable. This is essential to be accounted for in the formulation of any educational strategy or national manpower blueprint. Other countries have been more ambitious in challenging gender disparities in education and is proof that the current state of affairs is neither natural nor permanent.

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Vibrant and Green: Kampong Ayer Beyond 2040

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Abstract

This report details a strategic foresight exercise for potential futures of Kampong Ayer conducted by a group of government employees as part of their strategic foresight workshop assessment in 2022. This report covers four parts of the exercise. The first part involved uncovering the context and background of the development of Kampong Ayer using the Causal Layered Analysis tool. Transformative spaces were also generated from the narratives. The second part involved scanning and mapping out emerging issues and trends that could become potential drivers of the development of Kampong Ayer. Three overarching themes of potential drivers emerged from the group's exercise: (1) green and sustainable development; (2) mobility and accessibility; and (3) a self-sufficient and sustainable economy. Building on the insights gained from the first and second part, the next part centres on generating potential futures for Kampong Ayer using the 2x2 Scenario Method. Four distinct, but not mutually exclusive, futures were envisioned and narrated by the group: (1) Vibrant Heart of the Nation; (2) Lost in Transformation; (3) A Future of Sisyphean Slumville Revitalization; and (4) Little Green Paradise. Narratives, key features, and stories were provided for each future. The final part provides policy and strategy recommendations to achieve the desired future of Kampong Ayer.

Keywords: *Kampong Ayer, strategic foresight, future scenarios, futures tools, causal layered analysis, transformative spaces, 2x2 scenario method, policy, strategy*

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1.0 Introduction – The Sickly Heart of the Capital

Kampong Ayer (KA), situated in the heart of the capital Bandar Seri Begawan (BSB) along the banks of the Brunei River, is the world's largest stilted cluster of water villages. It is a living national heritage site and holds a special significance for the Bruneian identity, as it is the cradle of the Brunei civilization that emerged in the sixth century. During the height of Brunei's maritime empire in the sixteenth century, the KA area was a significant trading hub in Southeast Asia and was home to a huge, bustling and thriving stilted water settlement that European traders dubbed the "Venice of the East". As Brunei's influence, however, diminished, the settlement area shrank to its current size.

Fifty years ago, KA and the central business district (CBD) area of BSB was still home to about 60% of Brunei's population, approximately 81,000 residents (Abadi, 2018). Fast forward to today, KA is now home to only about 3% of Brunei's population, approximately 10,000 residents (Zaidi, n.d.) and is riddled with problems – socioeconomic risks (e.g. crime, poverty, unemployment), rampant domestic waste disposal and river pollution, dilapidated and abandoned houses, and eroding authenticity and heritage, among others.

Despite numerous preservation and revitalization efforts over the years, KA is a shell of what it once was, from a thriving self-sustaining community and economy to a heritage in peril, from a functional living space to 'a place that belongs in the past', from a heart that drives a nation into a community living on the fringe and becoming more and more disconnected from the rest.

1.1 Better Futures Ahead for KA?

With this in mind, a group of government employees from different ministries and departments undertook a strategic foresight exercise (as part of an assessed group project during a strategic foresight workshop conducted by the Centre for Strategic and Policy Studies from 8th to 12th August 2022) to explore potential future scenarios for KA. The future scenarios were developed so that the group could examine the potential dangers and rewards of various futures, and then use the information to develop solid plans for KA's revival. The group decided to take a simple, intuitive, qualitative and participatory approach for this exercise due to its usefulness in a collaborative and creative setting. This paper details the steps taken during the strategic

foresight exercise, offers insights into potential future scenarios for KA and provides recommendations for getting there.

2.0 Process 1 – CLA of the situation

At the start of this strategic foresight exercise, the group first sought to understand the context and background of the KA situation using Causal Layered Analysis (CLA). The group consider CLA to be an appropriate futures tool to deconstruct the present status and reveal insights and information not only for deeper understanding of the issue at hand but also to create transformative spaces leading to more robust and enriched future scenarios (Inayatullah, 2004).

The key questions at this stage: *How did KA find itself in its current state today? What has shaped the present KA? Can narratives be transformed to create better alternative futures?*

At the systemic level, the group determined that the declining local economy in the CBD and KA area was the primary driver of the downward trajectory of both CBD and KA, which in turn caused an accumulation of spiralling processes (demographic spiral - outmigration for jobs and better economic opportunities, leaving behind the old and vulnerable, relocating businesses; socioeconomic spiral - unemployment, low-income, poverty, crime, drugs, illegal networks, malaise, poor access to amenities; urban spiral – abandoned houses, ruins, marred landscape; and financial spiral – rejuvenation costs, welfare) that feed into one another, further exacerbating the decline.

In 1971, the local CBD and KA economy was supported by fishing and various craft industries, as well as economic activities centred around the *'pengalu'/'padian'* (boat traders/peddlers) on the rivers and a large, bustling land market, Tamu Bandar. Recent years have seen a decline in the fishing industry as a result of pollution, quarrying, and the decline of local craft industries like boatbuilding (Abadi, 2018). Additionally, the *'pengalu'/'padian'* have ceased to exist because there are no longer any goods to sell or customers to buy them, and the Tamu Bandar was supplanted in 1996 by the construction of the Yayasan Complex, with a few of the tenants relocating to the smaller Tamu Kianggeh area (The Travel Sisters, 2015). Outmigration and "urban" degrowth have been a problem for CBD and KA as the local economy has drastically declined. This trend has been exacerbated by the movement of development (residential, commercial, industrial) away from CBD and KA, which has brought with it an increase in

prosperity and quality of life. People move out of KA in search of better living condition and access to jobs, and driven by rising materialistic trend.

Table 1.
CLA of the current KA situation and the potential transformative spaces for alternative futures

	Current situation			Transformative spaces
Litany	"Sickly heart of the capital" / "crime nests" / "low income area" / "disconnected" / "dirty boring old place" / "Unattractive place for living, working and visiting"			"Attractive living, working and visiting"
Systemic	**People** • People move out in search of better living condition • Jobs are all on land • Low income – reliant on pensions, state support, or commuting to the mainland to work in low-paying services jobs • Spiralling socioeconomic and social problems (crime, poverty) • Deteriorating living conditions; poor housing • Disintegrating close-knit society • Rising materialistic trend (modern living) • Poor mobility and accessibility in the area (poor small flows) • Missing or disconnected from amenities and services (e.g. security and safety, convenience,	**Businesses** • Inability to attract business or no opportunity for businesses; no place, small market size, low income population, unprofitable, high socioeconomic risks, isolated from supportive industries, logistical barriers • Poor facilities and management services	**Government** • Addressing only some of the development deficiencies • Disinvestment/inability to attract investment • Becoming a financial burden and strain • Continuous failure to capitalize on latent strengths/exploit cachet to develop KA economy • Lack of a functioning municipal government • Unenforceable BSB development plans • Almost non-existent regulatory framework for development on water/river e.g. title deeds • Focused only on the big flow routes • Years of incentives to relocate people and polycentric development policies • Urban planners trained to look at	• Self-sustaining domestic economy • High economic opportunities • People-centric development; enabled people serve as the basis for a turnaround • Organic development of economy • Mobility and accessibility • Immigration • Attractive living environment • Creating "open"/communal space on water • Urban planners shift to development of existing system • Rethink land and water space development (appropriate to KA context) • Shift from "preservation" to "development"

	delivery of services) • Lack of "open" space • Ecological problems and worsening quality of the river water	future expansion and return to growth but not management of existing system • Traditional "land/space" use thinking	
Worldview	• KA community felt neglected and left behind; feeling of isolation/disconnected; visible from the capital but detached from it	• Keep KA "traditional" • KA is a place for history and "old" things • Facility management has always been our weakness • Urban degrowth is natural • Difficult to develop KA; easier to focus development elsewhere • Businesses/tourism to stimulate local economy	• KA is a place for living, working and visiting • Adaptation to modern times without perversion of its unique character • Development of KA as a challenge and opportunity • Community well-being to stimulate economy
Metaphor	"A 'burden' that can't be disowned" / "swept up by the sands of time" / "dilemma of respecting the past while facing the everchanging present and future" / "From Venice of the East to slum living"		"Empty bags can't stand upright" "Build homes not houses"

The majority of those that remained are the old, the young and the vulnerable, facing the problems of deteriorating living conditions due to the inherent design (wood and stilts) of KA, poor mobility and commuting, and poor access to amenities and services among others. The quality of life was also severely affected by the worsening of the river water as a result of years of rampant domestic waste disposal into the river by KA inhabitants. The practice may have been fine a century ago but not with modern waste (e.g. plastics, non-biodegradables, chemicals). On top of the emigration issue, businesses also shy away from KA due to the unavailability of suitable locations or space, unprofitability (small market size and low-income population), and socioeconomic risks.

The group also discussed some of the systemic causes arising from the side of the government. Firstly, most preservation and revitalization efforts by the government are usually isolated

projects that only address some of the development deficiencies that KA faces instead of a holistic long-term development plan for KA and its economy. Second, currently the government also lacks a comprehensive regulatory framework for development of the blue zone (water area). Thirdly, transportation infrastructure development has mostly focused on the big flow (road) and not so much on the small flow (paths). Fourthly, as one member pointed out, over the past century our urban planners and policymakers are used to looking at future expansion and return to growth for development but not in the management of existing systems and they are trained to view development in terms of "land space" but not "water space" ever since our modernization.

At the worldview level, the group discovered that the perspective of KA among Bruneians is gradually changing. KA, once a functional living space/residential area and an essential part of Bruneian culture, is now viewed as a place of history and "old things", especially by the younger generations. The group also noted that urban degrowth is seen and accepted by the majority of the population and policymakers as a "natural" part of the urbanization process.

Another dominant worldview held by many, especially among the policymakers and urban developers, was that development of businesses/tourism is the key to stimulate the economy of KA and CBD. In spite of this held worldview, there was little success in promoting business growth in KA and CBD. Subsequently, for urban planners it is much easier to focus development elsewhere, which reinforce the previous worldviews. Perhaps our current perspectives and methods for KA development have been influenced by such philosophies.

At the metaphor level, the group attempted to discover the deepest causal layer through eliciting emotional images or responses among the members when thinking about KA development. The most prominent metaphor that emerged was that everyone (general populace, policymakers, urban planners) struggles with the "dilemma of respecting the past while facing the everchanging present and future" in the development of KA. Indeed, there seems to be a conflict between "preservation" of certain qualities of KA and the changes needed to be done for KA to remain relevant, which leads to a conundrum. Can we find a balance between the two or the solution to the whole conundrum? Or will we totally resign to the fact that KA will eventually be "swept by the sands of time" as one group member commented.

Despite the bleak first part of the CLA, the group was able to create transformative spaces for the KA situation in the remainder of the CLA. KA is envisioned by the group to be "an attractive place for living, working and visiting". In order to achieve that Litany, KA must possess a self-sustaining domestic economy with easy access to all the amenities and services that its residents could possibly desire. And without compromising its distinctive qualities, KA can once again serve as a desirable place to call home, with sufficient population density and diversity to support itself economically. The development of KA must also be people-centric and organic for it to be sustainable instead of the current business-focused strategy. There must be a shift of mentality away from "preservation" and towards "development" to create a better future for KA.

Key themes of the desired future of KA from the CLA:

1) Quality of life and attractive living
2) People-centric development
3) Self-sustaining local economy and high economic opportunities
4) Preservation of its distinctive characteristics
5) Preservation of its surrounding natural environment

2.1 Process 2 – Scanning and Mapping of Trends and Emerging Issues

The second phase involved conducting an emerging issue analysis to look into new developments that could add to and complement the results of the CLA. A free-for-all brainstorming session was followed by organizing and mapping of the issues and trends around key themes (Figure 1). The issues and trends (or their shifts) are those which the group identified as potential drivers to the development of KA and its community and the nearby CBD.

Key questions at this stage – *What are the trends and emerging issues locally and globally in urban planning and urban development? What are the 'impossible' today but if done (or they happen) will be the driving forces for KA's development?*

Figure 1.

Mapping of trends and emerging issues

Three overarching themes emerged:

1) ***Green and sustainable development*** – the utilization of resources, energy and technology to meet existing requirements without damaging the environment or the capacity to meet future needs.

2) ***Improved mobility and accessibility*** – centres around the concept that necessities, needs and wants, including work and play, are either within people's walkable/cycling distance or can be accessed/reached conveniently. It entails provision of urban mobility infrastructure for various mode of transportation.
3) ***Self-sufficient and sustainable economy*** - developing an economy that is diverse/plural, driven by an innovative community, using the circular (no waste) principle and care for the environment enabled through the adoption of technologies that are green.

2.2 Process 3 – Scenario Building Using 2x2 Scenario Method

In the third phase, the group used the 2x2 scenario method to generate future scenarios for this exercise. The group utilized the 2x2 scenario method because of: 1) the simplicity and flexibility of its application for beginners or fledgling futurists as the axes acts as backbone/scaffold for creating the futures, 2) the clarity in distinction among the scenarios generated, 3) the ease in communicating/presenting the scenarios to audiences, and 4) its ability to complement other future tools and narratives, e.g. details of the futures using information gathered from other tools (Ramirez & Wilkinson, 2014; Rhydderch, 2017).

Key questions at this stage – *What will KA look like 15 to 20 years from now? What are the critical uncertainties? What are the different scenarios? What is the preferred future?*

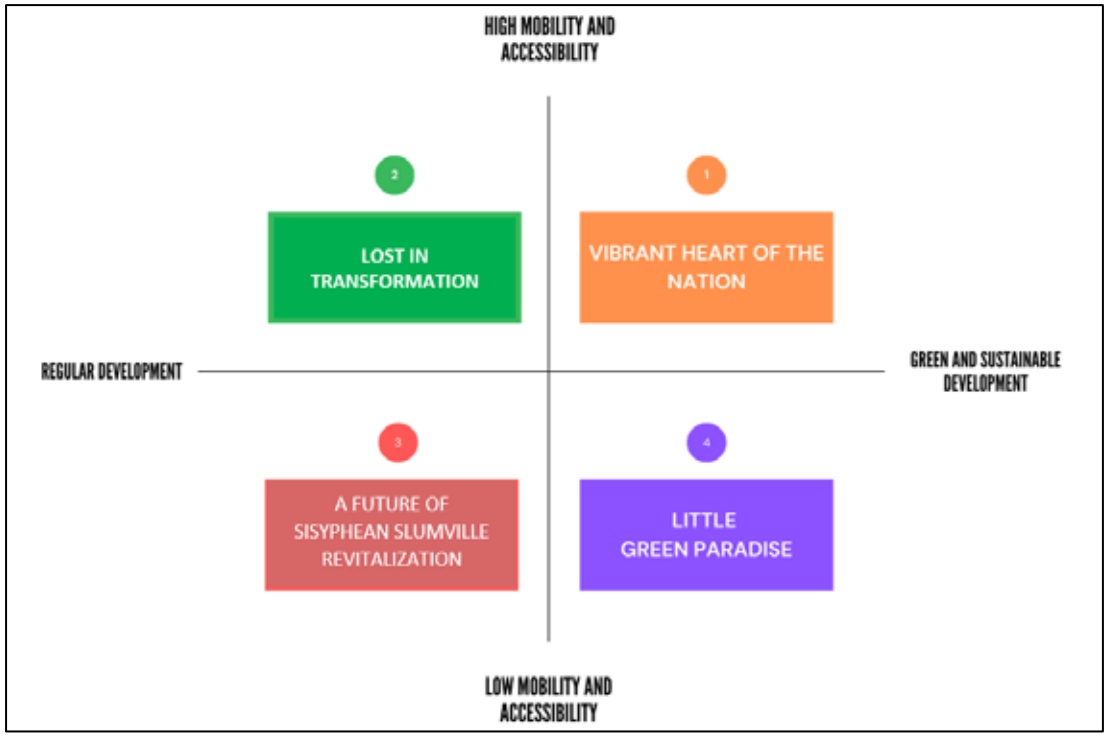
The group eventually created four distinct but not mutually exclusive futures, plotted against continuum axes (grid approach), which represent two key questions – critical uncertainties – that will be pivotal to the future of KA based on the transformative spaces in Process 1 and key themes from Process 2.

Critical Uncertainty 1 – To what degree will investment be made in improving mobility and accessibility around KA and CBD?

Critical Uncertainty 2 – Will the development of the nation be skewed towards green and sustainable in the next 10-15 years?

Figure 2.

KA's Future Scenarios



2.2.1 Future 1 – Vibrant Heart of The Nation

- KA's mobility, accessibility and connectedness with the surrounding land, especially the CBD, are vastly enhanced through the early development of a sustainable circular transit rail and walking path, thereby fostering economic growth.

- In addition, a network of wooden-concrete paths originating/extending from newly established villages' civic centres also improves the small flows within KA. The large space civic centres within each KA village provide opportunities for not only the preservation of heritage and community connectedness but also the organic establishment of businesses and attractions by the local communities, incentivized start-ups, and investors, creating sustainable economies for KA and becoming hotspots for tourists and local visitors.

- Increased footfall and flows lead to the revival of boating activities/services (e.g. taxi and peddling) further diversifying transportation options and economic opportunities.

- The private purchase of space/property (as people become drawn to live in KA), social housing, national housing programmes, and pre-existing residents all contribute to KA's diverse housing landscape.

- Effective regulation of building requirements for the area and the use of newest construction technology have resulted in a hybridized traditional-modern look that has preserved and even improved upon KA's traditional aesthetics and natural beauty.

- There is a diverse workforce in KA, including people who work from home, in local commerce and tourism, and who travel to CBD in comfort.

- KA becomes a high economic opportunities area with a sustainable internal economy and ease of access to all levels of amenities and services within and outside the area and attracting people to reside there.

- Thanks to a national shift towards 'green' policies and leveraging green technologies, early rigorous river cleaning interventions, and sustainable river quality and waste management systems, and with the support of an eco-/sustainability-conscious generation of young Bruneians, KA sits atop a clean water and pristine river surrounded by a biodiverse environment.

The primary features of this scenario: *improved mobility and accessibility, people-oriented development, organic revitalization and development of local economy, high economic opportunities, green society, preservation of heritage and close-knit society, preservation of nature*

A day in the life in KA in this scenario: *"It is nearing sunset and the Azan Maghrib—call to prayer—will be heard soon, and people are coming and going around the civic centre. Itqan', who has been playing with his neighbours for a good quarter of an hour at the bustling jetty, greets his father who has just disembarked from a water taxi and happily drags him to a convenience store nearby the surau for the usual return from work ice cream treat. They then sit on one of the public benches around the civic centre, where they enjoy a serene view of the river and the picturesque central business district skyline while gorging on their ice creams. Both Itqan' and his father are silently grateful for the gift of life, family, and prosperity as they*

take the last bites of their ice cream before joining the others at the surau for the Maghrib congregation. Indeed, which of the blessings of Allah will we deny?"

2.2.2 Future 2 – Lost in Transformation

- Sustainable mobility improves the living standards of the KA community.
- As a result of government housing initiatives, social housing and long-established communities, a complex housing market has emerged.
- In locations where water use and development are not strictly regulated, private investors and enterprises spring up to create highly commercialized areas and so-called tourist attractions, which in turn boost the KA economy. These changes are compounded by the inadequate building regulations for both residential and commercial structures, leading to the erosion of KA's distinctive character.
- As a result of gentrification, income disparities grow even as the neighbourhoods' economy improves.
- The workforce in KA falls into a few distinct categories: those who telecommute from KA, those who work for startups, those who are in the tourism industry, and those who enjoy a comfortable commute to CBD.
- As a result of improper waste management and urbanization's negative effects on water, KA loses not just its historical significance but also its biodiversity and the river on which it was built becomes increasingly polluted.

Primary features of this scenario: *improved mobility, poor legislation and governance, private-oriented development, inorganic and characterless development, gentrification, heritage loss, jeopardized river quality and biodiversity*

A day in the life in KA in this scenario: *"Ammar brakes his bicycle to a halt in the middle of the cycling path. He picks up a few tin cans that were lying around the path, while a group of tourists are backpacking their way along one of the famous walking trails heading towards the jetty. No doubt they are going back to the three-star floating hotel nearby judging from the*

stickers on their backpack. Continuing on his bicycle, Ammar remembers the peace and quiet days of the village as he passes along the jungle of houses and islands of floating garbage on the river. Ammar again stops, this time at the house just before his. He hands the tin cans he collected to the small boy living there, so he can sell them for recycling, together with some 'nasi katok' he bought. As they exchange smiles, Ammar cannot help but feel that things could have turned out differently for his village."

2.2.3 Future 3 – A Future of Sisyphean Slumville Revitalization

- In this future the downward development trajectory of KA remains unchanged.
- Outmigration from KA continues over the years as the area continues to be devoid of any economic vitality or opportunities, remains 'disconnected' and suffers from chronic socioeconomic problems.
- The overall quality of life has severely declined.
- From the riverbank, dilapidated and deserted stilted traditional residences and ruins mar the otherwise picturesque CBD.
- Contrasting sharply with the ruined waters are the concrete homes built as part of national housing programmes, yet even this residential area is having trouble filling up.
- Never-ending restoration and revitalization projects, assets losses, welfare support and healthcare costs have strained public finances.
- The quality of the Brunei River continues to worsen due to industrial development around the river mouth and unsuccessful river management programmes over the years.

Primary features of this scenario: *depopulation, deteriorating living conditions, failed economic diversification, loss of heritage, jeopardized river quality and biodiversity*

A day in the life in KA in this scenario: *"Sabri begins to reel in his line the moment it went tight. The boy has been fishing all morning at the abandoned jetty, and hopes that this time around he'll catch a 'lauk putih' or 'selungsong'. To his disappointment, he reels in another piece of garbage, one half of a pair of trainers to be exact. As he slumps down on the jetty trying*

to fix his line again, a voice calls over from the other side. It is his father, carrying a big bag of rice in one hand and a plastic grocery bag in the other, who has just returned from the store on the riverbank. His father reminds him to stay safe and return home before sunset. He nods and watches as his father strides along the walkway on the opposite side. The creaking sounds of the wood from his father's footsteps fit perfectly with the picture of the surrounding ruined and ghost houses. Sabri can only smile as he fixes his fishing line."

2.2.4 Future 4 – Little Green Paradise

- KA revitalization efforts shift towards green and sustainable development.
- Subsidized green technologies for KA's residents improve their quality of life.
- Household energy generation using solar panels, empowering the impoverished people with urbanized farming methods, provision of innovative waste and river management that feeds into the urbanized farming help improved the local economy.
- Outmigration continues, however, leaving behind only those who tenaciously stay for the KA lifestyle or those who moved in for the 'rural'/scenic living that KA provides.
- Tourists are denied the usual KA experience they crave due to the thinning in the number of residents, instead a new green and eco-tourism experience is offered.

Primary features of this scenario: *depopulation, sustainable living conditions, new green economy and tourism, green society, preservation of heritage and nature*

A day in the life in KA in this scenario: *"The sky is clear and blue; the sun is shining brightly. It is a beautiful day and Rayyan is smiling ear to ear knowing that today nature will abundantly provide – electricity and food for the tables for the villagers. Rayyan accompanies his mum outside their house harvesting some hydroponic greens and veggies from their porch garden for lunch. For this household, the solar panel and the soilless gardening helps in reducing sustenance costs. For a number of their neighbours, urban farming and energy trading has significantly helped to alleviate their socioeconomic condition this past decade. While his mum picks a few tomatoes, Rayyan helps his neighbour feed the fish in the aquaponics enclosure.*

Here, on the pristine river in the heart of the beautiful Brunei capital, people have found a way to sustainably live and prosper with nature."

3.0 Conclusion and Key Recommendations for Reaching the Preferred Future(s)

For KA and the surrounding area to evolve, remain relevant, and be able to preserve its dynamic sociocultural heritage into the future, we must have a clear vision and set of objectives. The four scenarios provide four distinct but not mutually exclusive futures for KA. The actual future will depend on how the variables and drivers play out. However, invaluable insights were gained that allow us to influence and plan for the future.

In this strategic foresight exercise, the group identified five key themes for KA's desired future: 1) quality of life and attractive living, 2) people-centric and organic development, 3) self-sustaining local economy and high economic opportunities, 4) preservation of its distinctive characteristics, and 5) preservation of its surrounding natural environment. To unlock the positive state of all five themes, two key drivers were identified. The first is **mobility and accessibility**. Critical to the growth and transformation of KA will be an early investment in infrastructure that improves the mobility of residents within and to and from the area. For any city, town or village to function at optimum efficiency, they must possess rapid mobility and be easily navigable. Next is **green and sustainable development**. The shift in policy and commitment to green growth and economy will support sustainable development and create new economic opportunities for the people. For example, investing in domestic energy generation via solar panels or urban farming systems, to name two, are diversification opportunities for the KA economy.

The transformative spaces generated from the CLA exercise also provide other potential strategies, policies, and recommendations for achieving the desired future:

- Invest in building large "open"/communal space (or civic centre) on water within each KA village to allow organic development of the local economy and provision of essential services instead of expensive new national housing projects. ("Build homes not houses" metaphor)

- Shifting our urban planning mindset from "expansion" to managing and developing existing systems including, but not limited to, the KA area.

- Rethinking water space development and formulating a comprehensive regulatory and development framework, including a review of property ownership (titles/deeds), building regulations, estate purchase and zoning of water spaces along the Brunei River and KA area, among others.

- Emphasis on community well-being and enabling people to serve as the basis for the development turnaround of KA through convenience in accessing all level of amenities and services, subsidized building materials or green technologies, household economic empowerment programmes, etc. ("Empty bags can't stand upright" metaphor)

- Engaging and listening to the KA community and all stakeholders in planning KA development to instil a sense of ownership and empowerment even though the process can be long and frustrating. In addition, organic development of KA can be promoted through funding and support of community placemaking initiatives (e.g. graffiti/art walls, parkour tracks, green gardens, new pathways and trails, floating attractions, B&B) to ensure a long-lasting impact and changes.

The group also believed that the difficulties in developing KA could be viewed as opportunities for national growth. Establishing KA as a special economic zone where (green) technologies and innovative solutions (such as smart utility meters, domestic solar energy, smart energy grid, urban farming, smart waste management, electric vehicles, startup ecosystems etc.) can be tested or piloted prior to scaling or national rollout may be a viable national strategy and an opportunity for the entire nation to collaborate.

There are undoubtedly brighter prospects for KA. The group's exercise was primarily exploratory, employing intuitive qualitative approaches and adapted foresight instruments. The group recommend future strategic foresight exercises for KA to utilize a variety of approaches and futures tools and involve the KA community and all stakeholders.

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