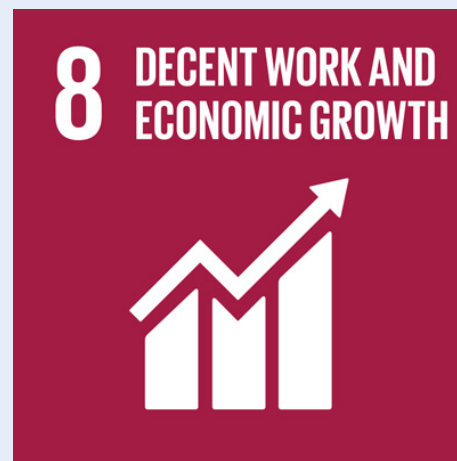# Preparing Workforce in Facing
The 4th Industrial Revolution as An
Optimization of Demographic Dividend

   Demographic dividend which takes decades to occur is going to play a key role in boosting ASEAN's economic over the next years. However, this condition doesn't necessarily assure a boost in economic growth and a country can waste it by implementing the wrong social and economic policies.

   In the other side, ASEAN is at the early stage of the fourth industrial revolution which with a certain estimation many jobs are at high risk of automation. Therefore, an optimization in taking advantage of demographic dividend by preparing the workforce is needed in facing this era and to evade demographic dividend waste.
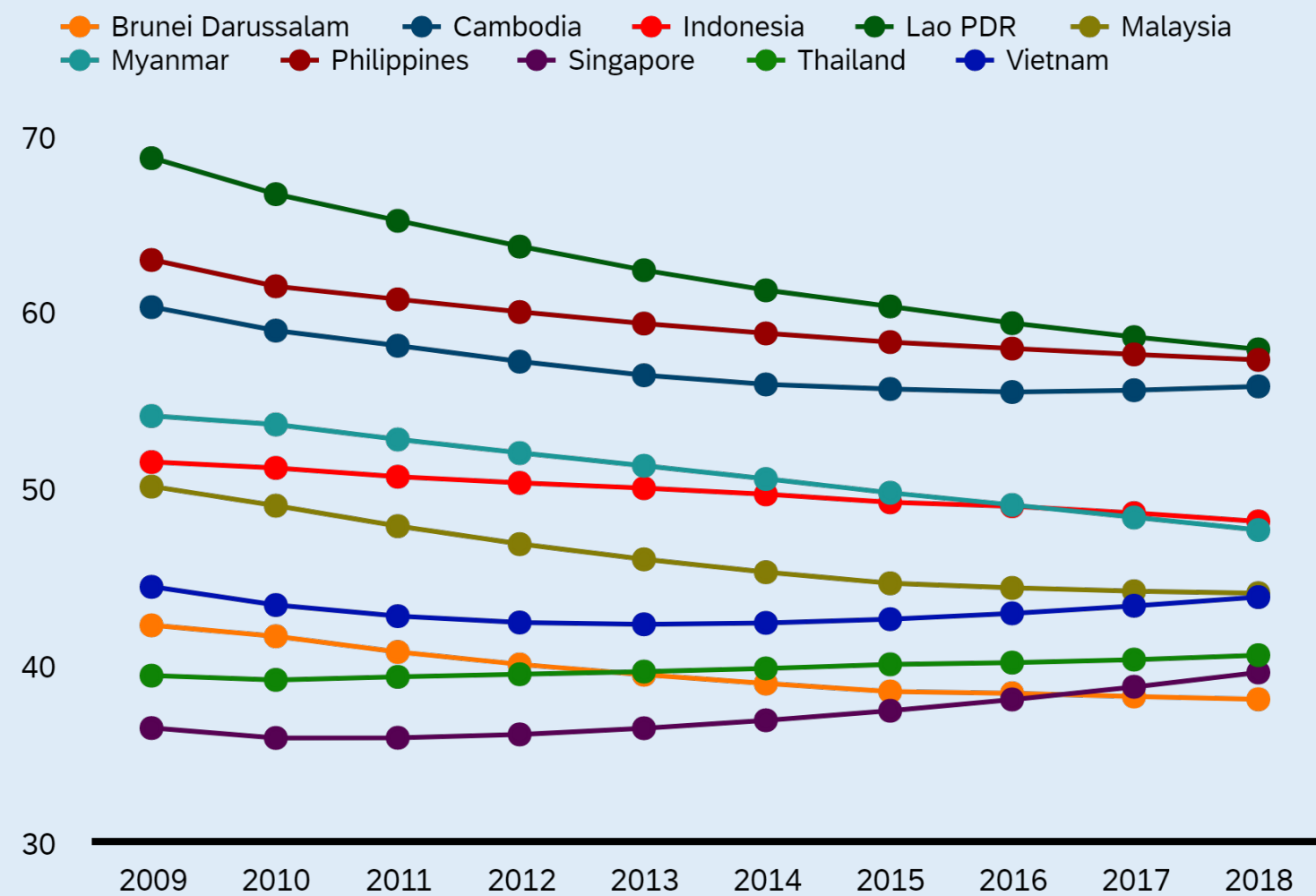
Team ILY 3000
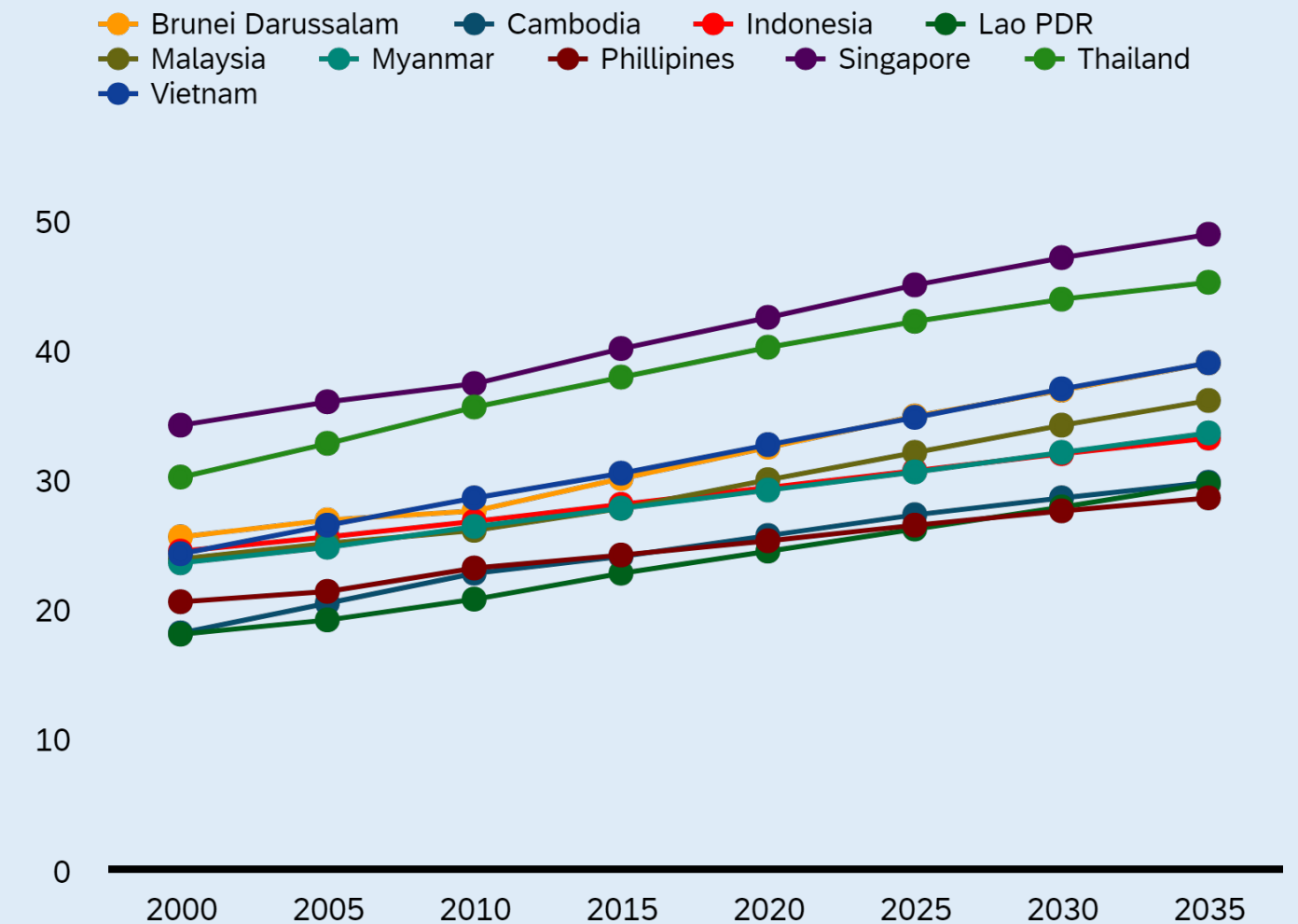Politeknik Statistika STIS, Indonesia
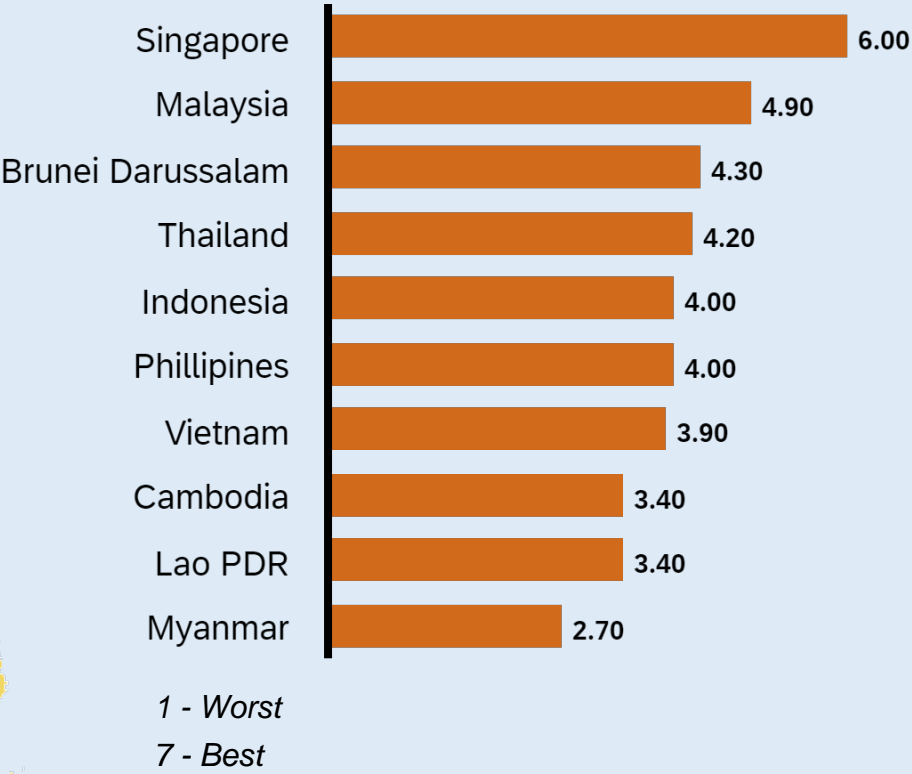
Representing:

Age Dependency Ratio

Legend: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam

Median Age

Legend: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Phillipines, Singapore, Thailand, Vietnam

ASEAN countries are now having demographic dividend which can help boost economic growth. This condition is expected to end by around 2030 for the region. The median age also suggests that there are still lots of young in the ASEAN.

Although the median ages of Singapore, Thailand, Vietnam, and Brunei Darussalam are more than 30, regionally there are still lots of young especially when compared to other parts of the world, such as US (37.9), China (37.1), and Japan (46.9).
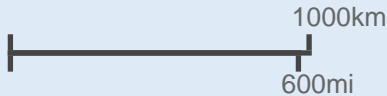
Networked Readiness Index

Country	NRI
Singapore	6.00
Malaysia	4.90
Brunei Darussalam	4.30
Thailand	4.20
Indonesia	4.00
Phillipines	4.00
Vietnam	3.90
Cambodia	3.40
Lao PDR	3.40
Myanmar	2.70

1 - Worst
7 - Best
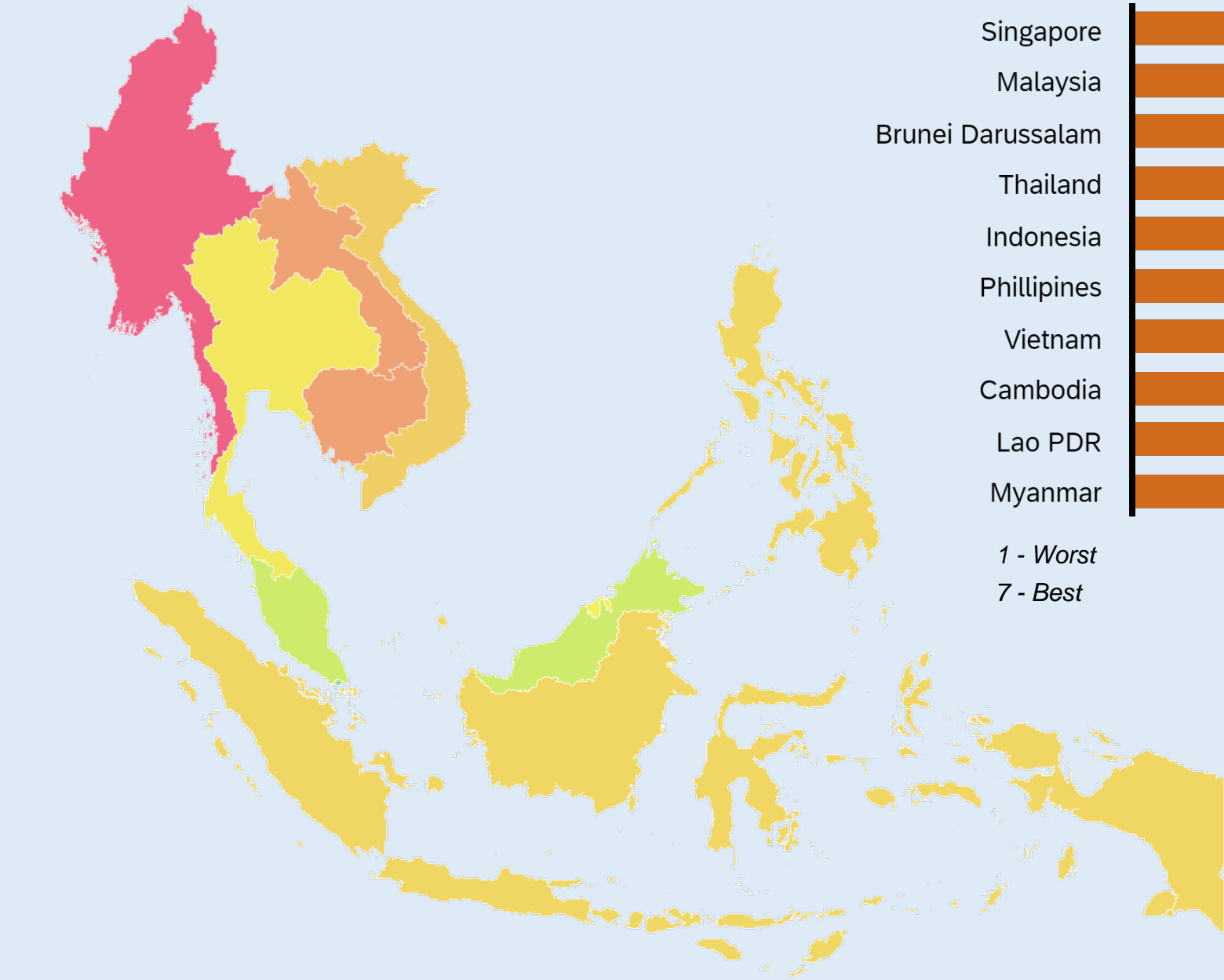
Source: The Global Information Technology Report 2016

LEGENDS

Layer 1

Area_3 (Country) (NRI)

≤0   ≥100   %

1000km

600mi

Unemployment Rate

■ Total ●— Youth ●— Adult

|	Brunei Darussalam	Indonesia	Singapore	Malaysia	Philippines	Vietnam	Myanmar	Cambodia	Thailand	Lao PDR
Youth	29.25	15.84	8.61	11.18	6.76	6.95	3.87	1.05	3.54	0.61
Total	9.22	4.30	3.77	3.36	2.52	1.89	1.56		0.67	
Adult	6.32	2.03								
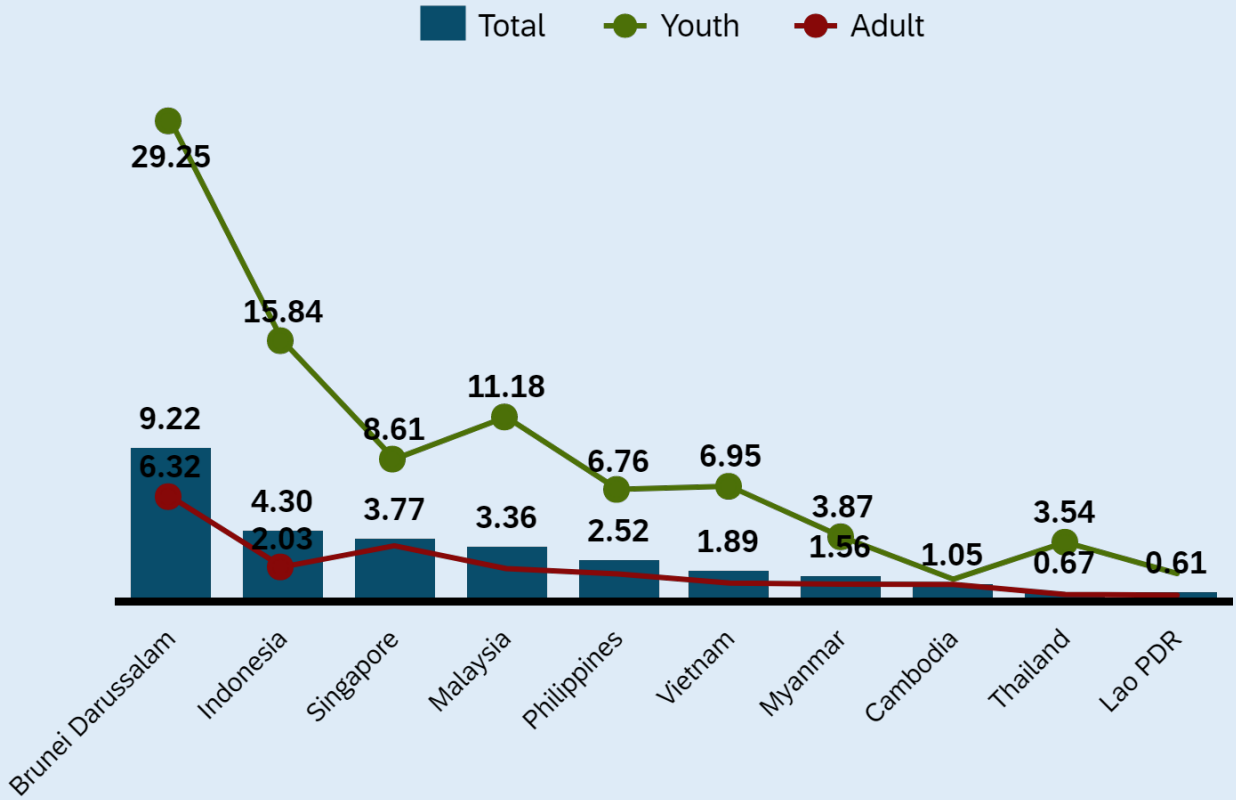
Source: World Bank Data 2018

ASEAN countries are at the beginning of the fourth industrial revolution (4IR). Through the networked readiness index (NRI), we can find out how ready each country is to reap the benefits of 4IR transition, and Singapore is the readiest country in the world.

In this era, artificial intelligent and robotics can perform better and faster than people. It may reduce costs and raise productivity, but also threaten jobs, which low-skilled and repetitive jobs are immediately threatened. The ILO estimates that 56% of jobs in Cambodia, Indonesia, Vietnam, Thailand, and Philippines are at high risk of automation in the next few decades. Meanwhile, the workforce in ASEAN is forecast to grow by 11000 new workers every day for the next 15 years.

Furthermore, the graphic suggests that youth (15-24) unemployment rate is higher than the adult's (25-64). This indicates that youths have little job security with lack of up-skilling opportunities.

Labor Force Distribution Based on Labor Force Category and Work Status
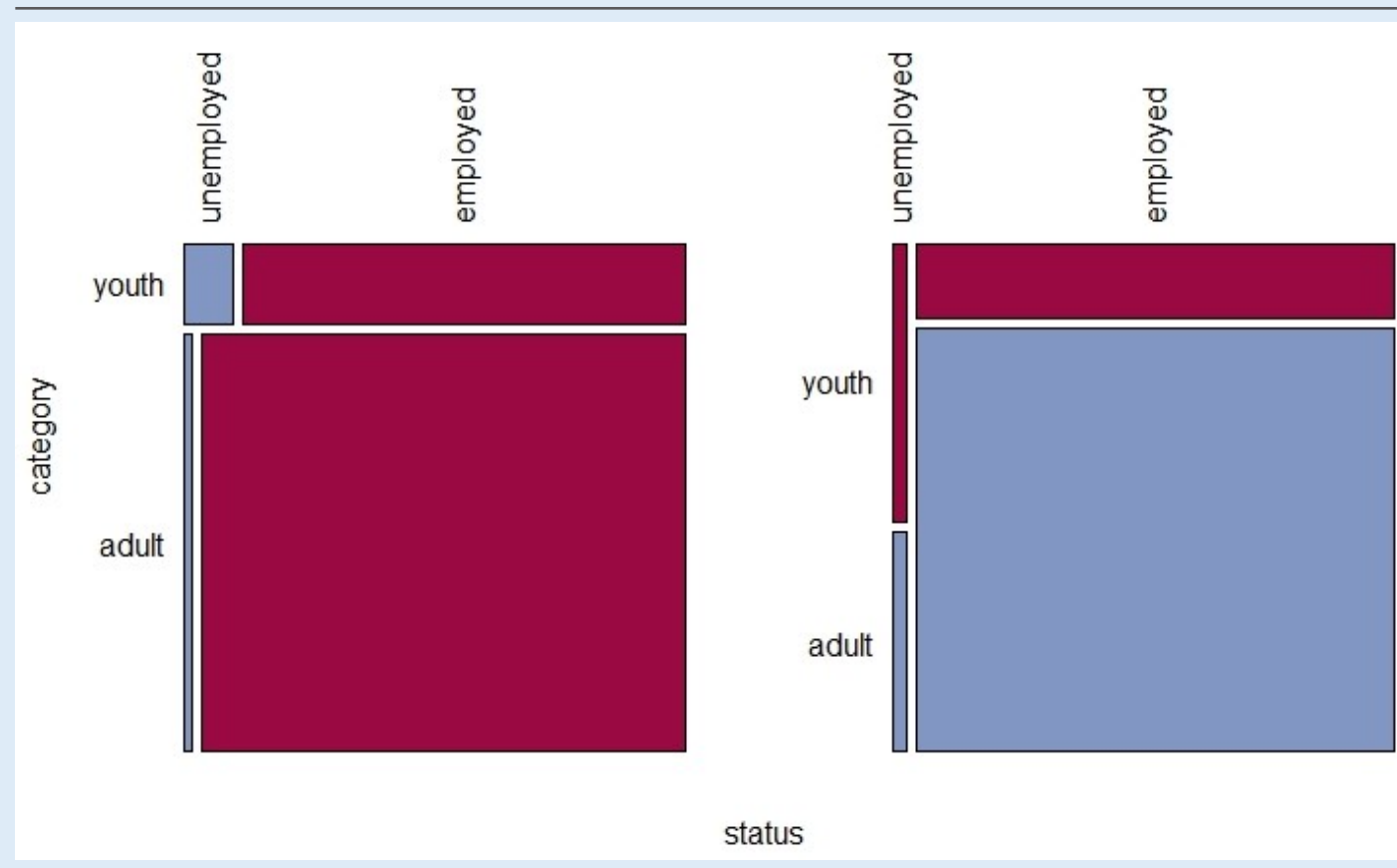
Source: World Bank Data 2018, computed by team ILY 3000

Labor Force Distribution Based on Networked Readiness Index and Work Status
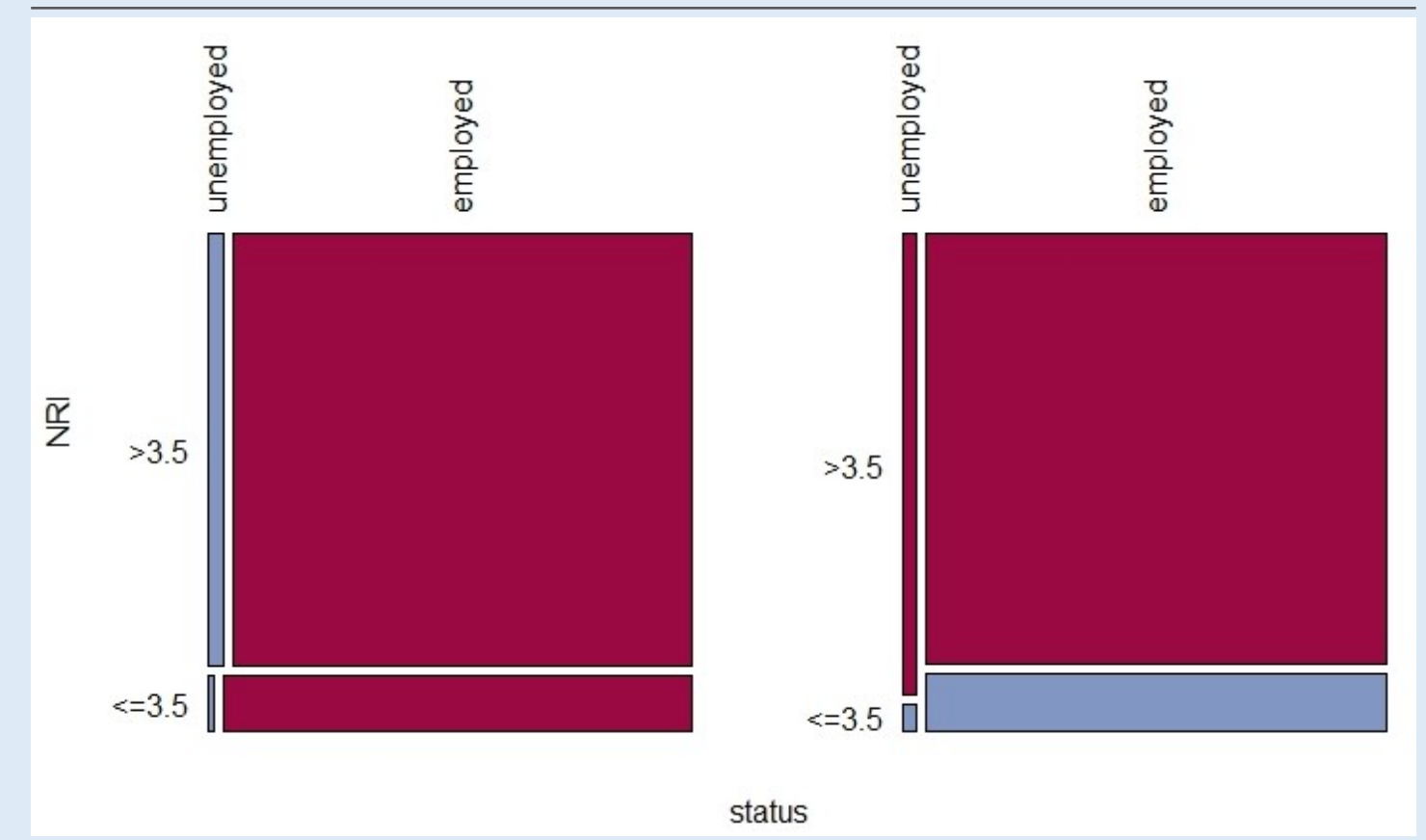
Source: World Bank Data 2018, computed by team ILY 3000

Findings

Below are some information that we found as the result of the calculation.

- Youths are 7.36 times more likely unemployed than adults.
- In country which the NRI is more than 3.5, youths are 8 times more likely unemployed than adults.
- In country which the NRI is 3.5 or less, youths are 3.27 times more likely unemployed than adults.
- As additional information, people in country which the NRI is more than 3.5 are 2.28 times more likely unemployed than people in country which the NRI is 3.5 or less.
- Based on Breslow-Day Test with the significance level of 5%, we conclude there is an evidence that no homogeneity association works in the odds ratios, which proves that there is 3-way interaction of networked readiness index, labor force category (young, adult), and work status (unemployed/employed).
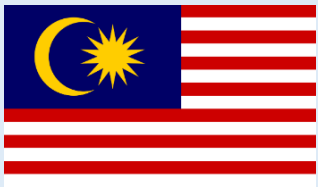
CLUSTERING

Using Hierarchical clustering with 3 variables, countries in ASEAN can be divided into 3 differrent cluster. Each cluster has its own characteristics. The members for every cluster are shown below.

● Cluster 1

● Cluster 2

● Cluster 3

CLUSTER PROFILE

dependency and unemployment rate	NRI Cluster 1	dependency and employmeny rate	NRI Cluster 2	dependency and employmeny rate	NRI Cluster 3
Cluster 1		Cluster 2		Cluster 3	
54.59 dependency (%)	**3.38** nri	**42.87** dependency (%)	**4.26** nri	**39.51** dependency (%)	**6.00** nri
1.43 unemployment (%)		**3.89** unemployment (%)		**3.77** unemployment (%)	

RECOMMENDATIONS

ASEAN countries overall

- Develop youth through education and digital literacy
- Shift from long-term blueprints to rolling three year plans
- Connecting the unconnected
- Create education networks

For Cluster 1

Conditions :

Low unemployment rate (1.43%)

Higher age dependency ratio (54.59)

Lower NRI (3.375)

The profile shows that the average of the age dependency ratio in this cluster is quite high. If we look back at the median age, countries which included in this cluster has relatively young population structure which means that the dependents mostly are under 15. For the next years, this population will turn into working age population, so quality of education is the focus point for this cluster to prepare a better workforce in the future. In the other side, this cluster has lower NRI than the others. If we look further to the readiness subindex which is one of NRI composites, the main problem in this cluster is infrastructure pillar and then followed by skills pillar. Therefore, it is clear that an up-skilling for the now workforce and a well developed infrastructure to support the workforce are needed in this cluster.

For Cluster 2

Conditions :

Low age dependency ratio (42.87%)

Moderate NRI (4.26)

Higher unemployment rate (3.89%)

The profile shows that the average of the NRI in this cluster is already good enough, but it still needs some improvements, such as the infrastructure pillar especially for Vietnam and Indonesia. Furthermore, as the countries in this cluster are still at the very early stage of 4IR, especially for Malaysia, Indonesia and Vietnam which just launched the 4IR policies in 2018, digital literacy and training related to the focuses of each country's policies are urgently needed. Meanwhile, this cluster has the highest unemployment rate among the others. Besides the skills of the workforce need an up-skilling, there is a mismatch between labor demand and supply, especially in Thailand and Brunei Darussalam. Once again, the education system has to equip students with knowledge and skills that are needed in labor demand of related country.

For Cluster 3

Conditions :

Low dependency rate (39.51%)

High NRI (6)

Higher unemployment rate (3.77%)

Singapore is the only country included in this cluster which has the best achievements among countries in ASEAN. Being the world's readiest country for the 4IR, Singapore has a good manufacturing as the largest sector in its industries. In addition, based on the report of International Federation of Robotics, Singapore has become the second country after South Korea which has the highest density of robot workers in the world with 658 robot workers per 10000 employees. This fact is good news for Singapore, but it's quite threatening to the workers as the automation in industries are rapidly developed and it causes the unemployment rate is quite high among the clusters. Therefore, this country needs to keep up-skilling its workforce regarding the rapid change of technologies.

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