DESA : Growing the Digital Economy from a National Perspective

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ABSTRACT

The aim of this paper is to share the journey and the birth of unique national account specific for ICT, named Information Communication and Technology Satellite Account (DESA). It explains the intent of satellite account and includes the extensive use of data from DESA in national planning activities, advocacy roles in both local and international platforms as well as benchmarking the nation's digital maturity position against other nations. The paper also illustrates how the ICT industry can kick-start and further escalate the nation's effort towards open data initiatives. The paper suggests the way forward to ensure future challenges can be minimized and the immediate need for improved coordinated effort to sustainable Digital Economy growth.

Key words: digital economy, satellite account, digital transformation,

1. Intent of satellite account

The Malaysian Digital Economy is a significant part of the overall larger national economy. With the latest data sourced from the preliminary ICTSA 2010-2014, the Digital Economy contributed RM188.3B to the national economy, or a 17% contribution[1]. Figure 1 shows the time-series of GDP growth for both the national economy and the Digital Economy from 2010 to 2014. Within the ICT industries are five major ICT Industry sub-sectors contributing a combined Gross Value Added of RM 132.5B. E-Commerce plays a major role as well, contributing RM63.8B to the economy, or a 5.8% contribution. Productivity of the ICT industry productivity remains higher than the national average at 1.6 times. Figure 2 shows the ICT industry employee average gross wages vs national is 1.7 times the national average and fairly consistent over the time-series. Total trade of ICT shows positive net exports of RM102.2B, and in 2014 is bucking a four year declining trend.

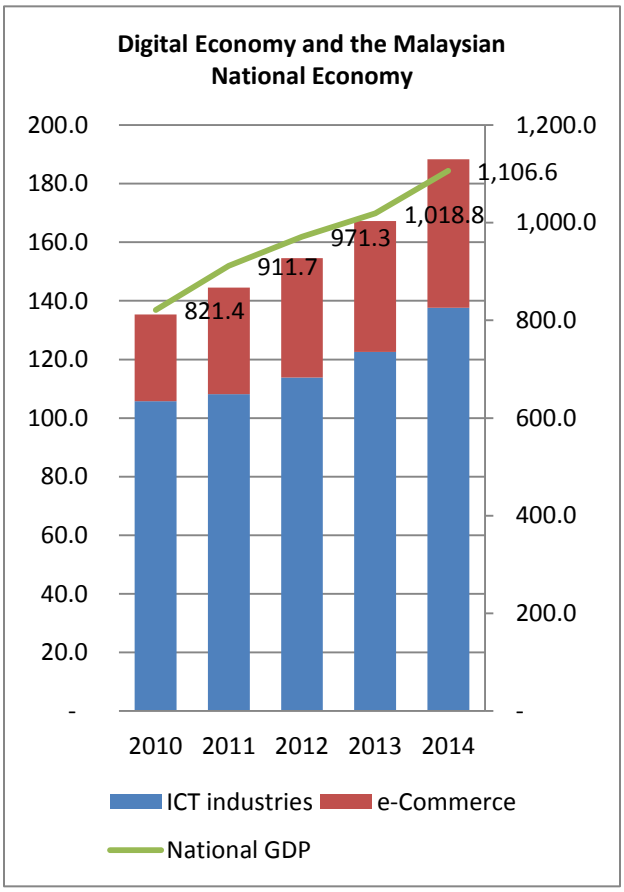

Figure 1 – Digital Economy vs. the National Economy

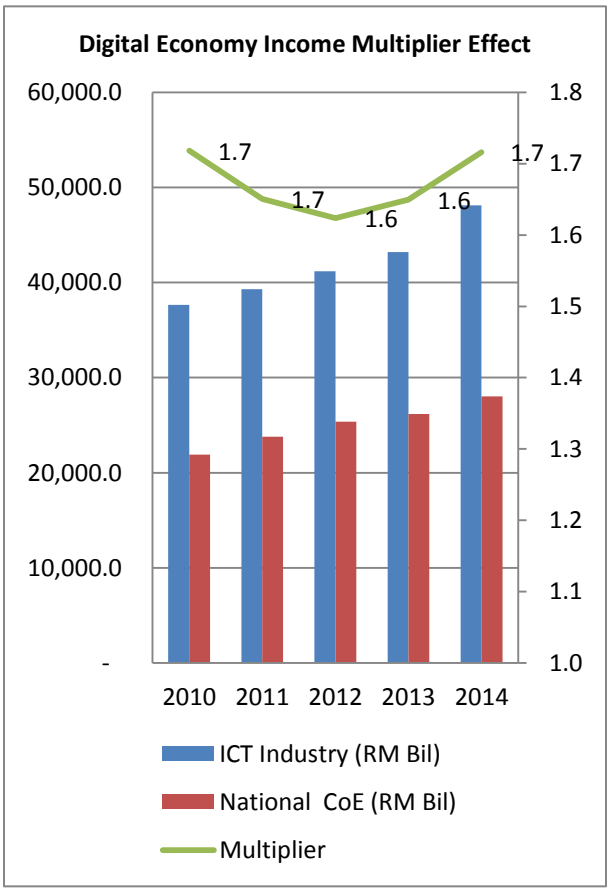

Figure 2 - ICT industry average CoE per employee vs national

The Digital Economy shows an industry sector that if it were a vertical, would be of the same size as the construction and mining & quarrying sectors combined[2]. The Digital Economy has a more productive work force, better paid workers as compared to the national average and a

[1] DOSM, Draft ICT Satellite Account Report, 2010-2014, DOSM
[2] MDeC Analysis based on Annual National Accounts, Gross Domestic Product, 2010-2014, DOSM

positive Balance of Payments. The Digital Economy is catalytic as well; growth of the ICT industry drives the demand for robust digital infrastructure, fundamental to Malaysia's competitiveness. In addition, accessibility and affordability are equally critical in uplifting the economy and narrowing the socio-economic gap through the provision of digital opportunities to the have-nots[3]. Hence the importance of this economic sector and it's continued growth.

In 1996, ICT in Malaysia was at nascent stage. The Multimedia Super Corridor (MSC) was established by the Government of Malaysia to grow the ICT Industry[4]. Evolution of this idea led to the approach of ICT as an enabler and the building blocks of a key services based sector. For the large part, the scope of what was referred to as ICT in Malaysia revolved around the MSC initiative under the purview of the Multimedia Development Corporation (MDeC).

By 2011, the size of the ICT industry was estimated using MDeC figures from 2009[5] until 2011 reported the GDP contribution of MSC Malaysia companies to be growing by 38.6%, from RM5Billion to RM9.6 Billion[6]. While the figures were highly accurate, the MSC calculations represented an industry cluster, diverse as it is with the mix of technology, creative multimedia and high-tech shared services firms, rather than an entire industry sector. In addition, they represent the supply-side impact of the Digital Economy, without factoring in national demand for digital products and services.

To address this gap in the collation of private sector data, a singular account to capture data and statistics on ICT and e-Commerce activities across all sectors in the country had to be developed[7].

To complement the perspective, other proxies were used, including:

1. The intensity of technology including the e-Intensity Index by the Boston Consulting Group[8]. In this Index, Malaysia was ranked within a cluster of nations with a similar technology profile of internet infrastructure, expenditure and degree of involvement by government, businesses and citizens in the internet
2. The index of digital components of supply, demand, institutions & innovation of 50 countries tracked since 2008 by the Fletcher School, under Tufts University. This index, named the Digital Evolution Index, saw Malaysia as a fast-rising nation and keyed on innovation[9].
3. EPU estimated based on internal research largely driven by comparison to the E&E and telco sector, an amalgamated ICT industry size of 9.8%[10] contribution to GDP in 2010. This total projected number was established as a measure of influence of the ICT industry in the Tenth Malaysia Plan.

[3] ICT Satellite Account, 2010-2015, DOSM
[4] ICT Industry Blueprint, 1996
[5] MSC Malaysia Industry Report 2009, MDeC
[6] MSC Malaysia Industry Report 2011, MDeC
[7] Digital Malaysia Progress Report 2012, MDeC
[8] The Connected World: The Internet Economy in the G-20, Boston Consulting Group
[9] Digital Evolution Index, 2008-2015, Fletcher School
[10] Tenth Malaysia Plan, EPU

These proxy figures were more holistic than the MSC view, capturing both the demand and supply characteristics of a Digital Economy. However, these proxies were also limited in their use as they were either one or a combination of several factors, including one-off figures with no historical context, insights that were more qualitative than quantitative and more often than not involved analysis that required repeated primary research, market interpretation and other analyses to obtain a time-series figure. Often, these data-points incurred a large cost in their outlay, both in terms of funds and resources and there were questions raise regarding to the sampling accuracy.

In 2011, MDeC launched the Digital Malaysia Initiative with the goal of national Digital Transformation. One key effort within Digital Malaysia was the establishment of the Digital Economy Satellite Account (DESA) which consists of an ICT Satellite Account (ICTSA) and other indicators to build the complete picture of the impact of digital transformation. The ICTSA was developed based on the national accounts framework to present a picture of the value of transactions in ICT products[11] within the frame of the ICT industry sub-sectors of ICT services, ICT trade, ICT manufacturing, e-commerce, and content & media

Digital Malaysia was the driver of the DESA, but it was DOSM who ultimately conceptualized the structure and compilation method in accordance to SNA 2008[12]. These compilation efforts were placed under the governance structure of EPU, MOF, MCMC, MDeC, PIKOM and several other key actors. This satellite account was envisioned to capture the supply and demand aspects of the Digital Economy to build a cohesive picture the Malaysian Digital Economy[13]. In 2012, the first pilot ICTSA was established to enable the supply and use of ICT products to be analyzed from the economic perspective.

2. Application of DESA & ICTSA in national planning activities

The DESA and the chief core component ICTSA also has unique role in the highest levels of governance. Since 2012, the DESA has been a key input to the Implementation Council Meeting & International Advisory Panel that oversees the effective national-level strategy. These platforms, both of which are chaired by the Prime Minister, have members that include cabinet ministers, senior civil servant, heads of the government agencies and senior international advisors that are directly involved in the charter of MSC and Digital Malaysia.

Key outcomes from these meetings include projects that extend the benefits of the Digital Economy to the Bottom 40% of the income pyramid (B40) and to deepen the economic impact of niche segments such as key levers within ICT services such as a National Big Data Initiative, consolidated approach towards e-Commerce, multi-agency programmes in the Internet Of Things (IOT) sector and more. The fundamental issues and data-points stem from the DESA analysis and deep-dive of the ICTSA.

[11] Digital Malaysia Progress Report 2012, MDeC
[12] Transcending the Traditional Approach Through Satellite Accounts, 2013, DOSM
[13] Eleventh Malaysia Plan, Chapter 7, Strategy Paper 15, EPU

Other major uses for the satellite account in policy making are both diverse in range and perspective. A key example was the earliest ICTSA figures used by EPU to further enhance the collaboration required by the public sector on a common frame of data at NDC 2013. EPU used the satellite account information for the first time to revise their original RMK-10 estimate to the more accurate figure provided by DOSM.

From 2012 to 2013, MDeC initiated research into the Digital Malaysia Aspirational Goals, a far-reaching target to stimulate growth in Malaysia's digital landscape to increase technology & internet accessibility with relevant adoption on digital content and wider usage of digital technology by government, businesses and communities[14]. The central data-set employed was the ICTSA and enhanced with further research on the global indices from WEF and IMD. Overarching was the Digital Economy 18.2% contribution to the national GDP by 2020.

In 2014, MATRADE also cited a key interest in the ICTSA, as it seeks to understand the ICT sector from an exports perspective. With a long history in analysis of the E&E manufacturing data, intra-agency research was conducted between MDeC and MATRADE to inspect the comparison between ICT goods exports and the E&E manufacturing exports. Code-matching between the Standard International Trade Classification (SITC) codes between the two segments has led to a greater understanding of the scope of ICT goods and E&E and the discovery of an estimated 90% overlap between the two sectors. It has also facilitated the necessary planning of future programmes by MATRADE and intervention efforts by MDeC particularly in the areas of IOT.

Other on-going initiatives include the use of the DESA in the size and growth of ICT Services exposrts under the stewardship of National Export Council. This activity is still on-going, where MDeC and MATRADE are working closely with the Ministry of Communications & Multimedia (KKMM) in bringing the details of sub-sector growth and providing a close watch on both the domestic output and talent supply needed. Another intra-agency activity is the research of the labour productivity estimates for the ICT sector, currently coordinated by the Malaysian Productivity Council (MPC) and MDeC.

The ICTSA is a unique experiment on the scale and reach of the size of the ICT industry with respect to the national frame of context. There have been a handful of nations that have attempted the ICTSA compilation; Australia in particular having the model that framed the earliest ICT Satellite Account frame[15]. However, Malaysia is unique in compiling this account on an annual and sustained basis. Malaysia's current ICTSA compilation is from 2010-2015 and is still actively pursued for the immediate future.

Thus there is a peculiar challenge for planning & strategy entities to comprehensively benchmark other nations within the ICTSA framework owing to Malaysia being the first mover and clear leader in this field. It is hoped that other nations can replicate this template and structure, improve on it where necessary and replicate their own satellite accounts in this field.

[14] DM Progress Report 2013, MDeC
[15] ICT Satellite Account, 2010, Australia

3. DESA in the Open Data Environment

In deepening the usage of the DESA, it becomes apparent that certain challenges emerge from two distinct angles:

a. Fundamentally, the issue with macro-economic planning is a challenge, owing to the very nature of national accounts. Macro aggregate demand and supply are composed of fundamentally heterogeneous items, whose precise magnitudes can never be accurately predicted[16]. This challenge is especially heightened owing to the fact that the ICTSA is a challenging compilation to begin with, and the observation of the economic impact is cross-industry as per the dual-nature of ICT as both an industry and an enabler. Thus, as policy-makers dive down into the critical factors contributing to the trends, to determine areas of interest & intervention, a deeper understanding of the aggregate components is necessary.
b. The second challenge is in the granularity of data needed for further investigation and research. As the use of the ICTSA has spread beyond the macro-planning efforts, further demands have been placed on it, including the breakdowns from the national ICT figures to the industry sub-sector level and now to the MSIC activity level. This is a repeated theme encountered with most stakeholders, partners and research efforts into the ICTSA; the need for increasing detail to plot the key levers of policy, industry intervention is very high.

Before proceeding further, it must be noted that DOSM has produced a tremendous effort so far, starting with the pilot ICTSA 2005 & 2010 that was published in 2012, wherein ICT industry GDP contributions were first established and breakdowns of the ICT Industry sub-sector were first compiled. In 2013, the ICTSA 2005-2012 was released with introduction of the seven-year time series and refinements made to the MSIC demarcations. A year later, saw the introduction of an e-Commerce GDP calculation. 2014 also marked a landmark year for the ICTSA as it was first published to the public for the first time, being an experimental satellite account in years prior. In 2015, the latest publication of the ICTSA will see a rebase to the 2010 reference, thus further highlighting sustained DOSM effort in keeping the ICTSA relevant for policy makers and industry analysts.

However, there is still much effort to address the pressing need for more granular data. The most likely remedy for probing into the three-digit and five-digit MSIC of the ICTSA will likely be a longer time-series for increased statistical accuracy, in particular the accuracy of the forecasts[17]. However, the time pressure on delivering a cohesive and sustainable plan of growing the Digital Economy is very high, as Malaysia is in a crucial growth stage. Thus, this paper suggests the use of proxy data to ameliorate the dearth of granular data of the ICTSA. We postulate that this gap can be served by the rich public sector information data-set similar to, or at least largely synonymous with, Open Data.

[16] The Meaning and the Implications of Heterogeneity for Social Science Research

[17] The Relationship Between The Length of the Base Period and Population Forecast Errors, Stanley Smith, Terry Sincich, 1990, Journal of the American Statistical Association

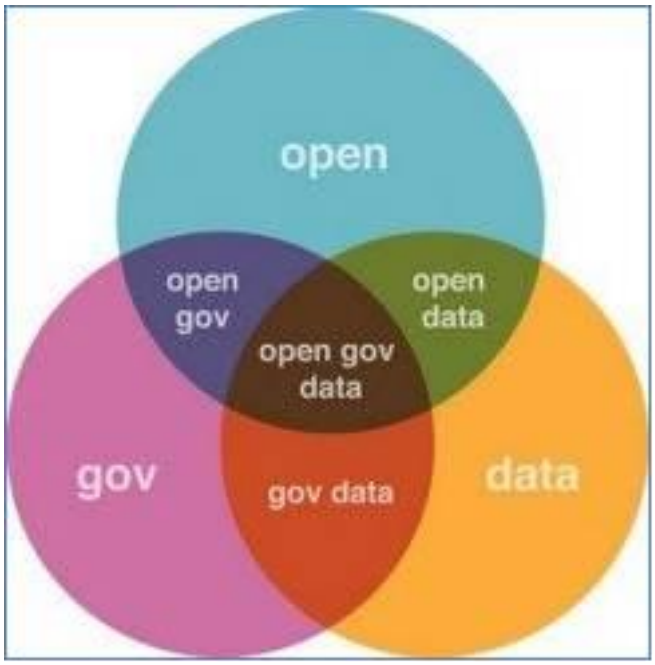

Figure 3 - Open Data topology[18]

Open datasets are not a new phenomenon, with the earliest concept as we know it today first appearing in 2006. Open data has been used to such an extent by industry and governments to produce meaningful economic insights and has also held an economic value in and of itself[19]. Research has shown that use of data is "non-rivalrous" the fact that governments (or others) have used the data for the purpose for which it was originally collected does not prevent that data being used for other purposes - by others or, indeed, by other parts of the government itself[20]. Economic theory suggests that benefits are maximised when access to the information is priced at the marginal cost of distribution - and the internet has made the marginal cost of distribution of digitized data by download from the web effectively zero.

Several national governments have created platforms to distribute a portion of the data they collect. It is a concept for a collaborative project in Government to create and organize a Culture for Open Data or Open government data. A list of over 200 local, regional and national open data catalogues is available on the open source Data Portals project, which aims to be a comprehensive list of data catalogues from around the world[21].

So pervasive is the use of open datasets that it has been cited as a potential threat to NSO, owing to the volume, variety and in some cases, the velocity of data. It is only the veracity of this open data that is still suspect and a big reason why the stringent function of NSO data validation is one that can never truly be replaced. This is especially true in the Digital Economy where there is significant challenge faced by many national statistics offices (NSOs) in developing indicators on the very fast developments on ICTs and Internet adoption. Traditional statistics, when

[18] The Aid Management Journey to Transparency and Open Data, http://www.developmentgateway.org/
[19] Open data – Unlocking Innovation and Performance with liquid information, 2013, McKinsey Insights
[20] Open Data for economic growth, 2014, World Bank
[21] Building the Digital Enterprise: A Guide to Constructing Monetization Models Using Digital Technologies (Business in the Digital Economy), 2015, Mark Skilton

available, generally takes several years to prepare, and thus could rarely capture current developments, which however were of high interest to ICT and Internet policy makers[22].

On a global level, several initiatives are spearheading the open data movement. One example is the World Bank's Open Data Initiative that was launched in April 2010 and provides free, open, and easy access to development data, and challenges the global community to use the data to create new solutions to eradicate poverty[23]. Today, the World Bank's Open Data Catalog includes over 8,000 development indicators, of which 1,400 for 252 countries and 36 aggregate groupings, going back over 50 years, in 50 languages, and is continuously expanding[24].

More locally, Malaysia is currently ranked 41 among 86 countries, according to the Open Data Barometer, a United Nations-lead common assessment method for Open Data that analyses the readiness, implementation and impact of Open Data initiatives around the world[25]. MAMPU is empowered to be the custodian of the Malaysian Open Data initiative embodied within the portal of data.gov.my. At present, 373 datasets from 17 ministries are available with the Ministry of Agriculture as the biggest contributor, with a total of 108 datasets, follow by the Ministry of Natural Resources and Environment with 66 datasets[26].

The mining of publicly available government data was first brought up in 2012, with the introduction of the DESA Secondary Indicators to the complement the ICTSA. This was a non-exhaustive list of potential indicators that in concert with the six primary indicators of the ICTSA could bring about further insights and granular details with regards to the Digital Economy.

To automate the process, the DESA System was envisioned to bring the initial active list of 16 supply and demand indicators under one common platform and the ultimate expansion to the wish-list of 132 indicators. Several challenges, including logistical, resource and budget changes led to an 18 month delay. However, in 2014, the DESA Steering Committee undertook an inter-agency workgroup to refresh the current list and determine the business needs of the relevant ministries and industry associations. Not only was the existing 132 indicators validated, but an addition of another 16 indicators were requested from EPU, MOF, MOSTI and PIKOM to further understand the Digital Economy in further detail.

At its essence, the DESA System will assist in the compilation of necessary information to bring in secondary components to support the ICTSA and enrich the entire DESA itself. Figure 3 below exemplifies the entirety of the DESA.

[22] The Proliferation of "Big Data" and Implications for Official Statistics and Statistical Agencies, 2015, OECD, Christian Reimsbach-Kounatze
[23] Open data in development – What and How, 2014, World Bank
[24] Et.al.
[25] Open Data Barometer, 2nd Edition, 2015, World Bank
[26] 27th Implementation Council Meeting, 2015, MDeC

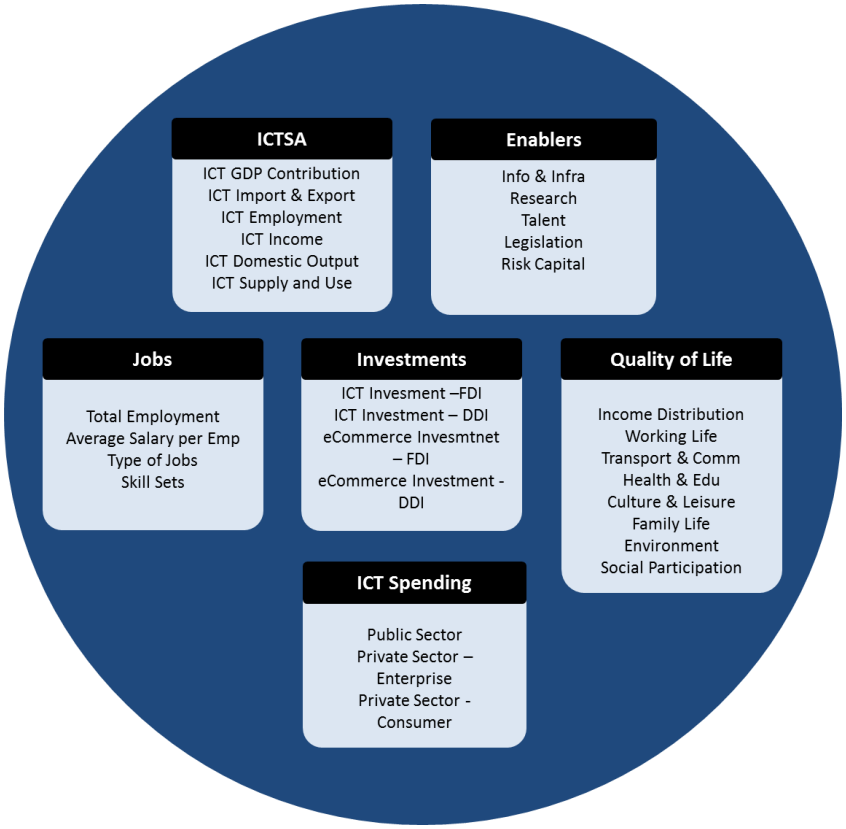

Figure 4 - DESA anchored by ICTSA and supported by sub-indicators

Research of the DESA System project continues at present through 2016 and beyond. The potential findings of DESA Secondary Indicators are promising, some examples surrounding the theme of wealth and income could include the following:

a. Compensation of employees in the ICT Sector: Low compensation to employees is a national issue. The GDP share of employees in Malaysia was 33.2% during 2010-2015 period, lower than that of high-income and middle-income economies like Australia (47.8%), South Korea (43.2%) and South Africa (45.9%)[27]. Early analysis indicate that the ICT industry sector have a better distributive share.
b. Income inequality is a potential area of research as there are a number of reasons why such inequality may harm a country's economic performance. At a microeconomic level, income inequality may correlate with health spending that leads to health issues and reduces the educational performance of the poor.[28] These two factors lead to a reduction in the productive potential of the work force. At a macroeconomic level, inequality can be a brake on growth and can lead to instability.
c. The DOSM Household Income Survey 2012 puts households in various monthly household income brackets. It starts with households that earn less than RM1,000 a month, then those that earn more than RM1,000 but less than RM2,000, all the way to

[27] 11th Malaysia Plan, Economics Research Malaysia, 2015, Maybank IB
[28] International Monetary Fund's Causes and Consequences of Income Inequality: A Global Perspective, 2015

those that earn RM10,000 a month or more. It is apparent that the median income is much lower than the average income and distribution of household income in unusually high. This signals an unequal distribution of income which may hinder growth drivers by depriving the ability of lower-income households to and accumulate wealth[29].

4. Conclusion & Moving Forward

There are three primary items that will need further effort:

a. Economic research into the existing ICTSA compilation by all parties that look into policy of the supply and demand of ICT products and services to determine potential findings and insight. This would include the public sector players such (e.g. EPU, MOF, DOSM, MCMC, KKMM, MDeC, etc), private sector industry assocations (e.g. PIKOM, etc), academia and research institutions.

b. Utilise Open Data to fill in the necessary granular details on a sub-sector level. By implementing platforms such as the DESA System, continued research into a non-exhaustive list of economic, industry, social indicators is needed to provide the necessary granularity for effective decision making by policy-makers, economists and industry analysts.

c. Most crucial moving forward is the continued effort for the DOSM to continue the compilation of the ICTSA. As the maturity of the ecosystem further develops, it is crucial that DOSM maintains this compilation effort owing to the national data-points for effective policy-making and insight. By extension, this also entails the continued operations of the DESA Steering Committee to oversee the evolution of the ICTSA in the years ahead, for example adding technology areas, increasing the periodicity, etc.

The rise of open data, (linked, as we have seen, to wider shifts towards openness and the developments of data-processing technologies), has introduced a new set of challenges, increasing the effectiveness and equitability of development through research production and communication. Active and engaged data curation, making connections between qualitative and quantitative resources, ensuring context of data is accessible to re-users, bridging data across linguistic and cultural divides, and attentively intervening in open data eco-systems is likely to be an important future role[30].

[29] State of Households Report, 2014, Khazanah Research Institute

[30] Emerging Implications of Open and Linked Data for Knowledge Sharing in Development", Tim Davies and Duncan Edwards, 2012, IDS Bulletin