Relationship Between Gross Domestic Product (GDP) of Information and Communication Technology (ICT), Import Trade of ICT and Revenue of Services ICT

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INTRODUCTION

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BACKGROUND OF STUDY

- The ICT sector is one of the fastest-growing sectors in the Malaysian market. ICT's contribution to the economy consists of ICT trade, ICT services, content and media, and e-commerce of other industries.
- According to DOSM, the ICT contribution to GDP has increased over the years and reached **22.6%** in 2020 and is expected to reach **25.5%** by 2025.

ISSUES

- The ICT industry is growing faster as technology is vastly improving.
- There are several variables that influence the ICT industry.
- Hence, this paper intends to examine some of the variables that have an impact on GDP ICT in Malaysia.

INTRODUCTION (Con't)

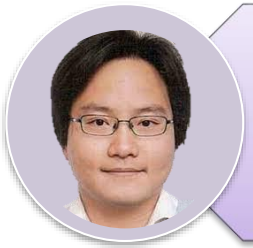
RESEARCH OBJECTIVES

- To examine the relationships between ICT for Import trade, ICT for services, and ICT for GDP in Malaysia.
- To study the future impact of ICT Import trade on ICT GDP.

LITERATURE REVIEW

LITERATURE REVIEW

Several findings for relationship between GDP ICT, Import trade ICT and Revenue of Services ICT



Yoon (2009) found that ICT goods imports have a positive but statistically insignificant effect on economic growth.

Vu (2011) found that information and communication dissemination affect economic growth.

Vu (2013) found that investing in technology boosts economic growth in Singapore.

Shahiduzzaman & Alam (2014) found that technical change played a positive role in economic growth in Australia.

METHODOLOGY

METHODOLOGY

DATA

- Quarterly data from Q1 2015 to Q2 2022. Source: DOSM.

METHODOLOGY

- Augmented Dickey-Fuller (ADF) unit root test was used to investigate the level of stationary of the studied variables.
- The optimal lag was chosen using the sequential modified LR test statistic (LR).
- The cointegration technique was employed to see the long-run equilibrium relationship among variables.
- The study adopts the Johansen test to examine whether the linear combination of non-stationary series has a long-run equilibrium relationship.
- Unrestricted Vector Autoregression (UVAR): to study short term relationships.

METHODOLOGY (Con't)

METHODOLOGY

- Diagnostics tests were also conducted to check whether the UVAR model is acceptable (i.e., residual normality, serial correlation, and heteroscedasticity).
- Variance decomposition (VD) was also used to examine the future whether the independent variables will impact GDP ICT.

RESULTS

RESULTS

UNIT ROOT TEST

- The unit root test showed that the studied variables were stationary at the second difference except for Services ICT (stationary at the first difference). Hence, ICT Services was omitted in this study.

OPTIMAL LAG SELECTION

- The optimum lag was at lag 4.

THE JOHANSEN COINTEGRATION TEST

- The Max-eigenvalue test and trace test indicated no co-integration at the 0.05 level (Table 1).

Table 1: Johansen cointegration test result

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistics	Critical value	Prob.**
None	0.136	4.221	15.495	0.885
At most 1	0.005	0.142	3.841	0.706

Source: Author's computation

Hypothesized	Max-Eigen	0.05	
No. of CE(s)	Statistics	Critical value	Prob.**
None	4.080	14.265	0.851
At most 1	0.142	3.841	0.706

Note. Max-eigen value test and Trace test indicates no cointegration at the 0.05 level

Source: Author's computation

RESULTS (Con't)

- **UNRESTRICTED VAR ANALYSIS**
  - Since there is no long run cointegration, this study proceeds to use UVAR.
  - UVAR estimates indicated that GDP ICT was negatively and significantly affected by its own second lag. 1% increase in GDP ICT lag 2 will result 0.18% decrease in GDP ICT ($p < 0.05$).
  - GDP ICT was positively and significantly affected by its own fourth lag. 1% increase in GDP ICT lag 4 will result 1.05% rise in GDP ICT ($p<0.05$).
  - Import trade ICT lag 1 was positively and significantly influenced to GDP ICT. 1% increase in Import trade ICT lag 1 will result 0.08% increase in GDP ICT ($p<0.05$).
  - Import trade ICT lag 3 was negatively and significantly influenced to GDP ICT. 1% increase in Import trade ICT lag 3 will result 0.05% decrease in GDP ICT ($p<0.10$).

Table 2: Unrestricted VAR test result

	Coefficient	Std. Error	Prob.	R-square/ F-stats
GDP ICT lag 2	-0.180	0.073	0.023*	
GDP ICT lag 4	1.051	0.065	0.000*	R^2 =0.999
Import ICT lag 1	0.077	0.017	0.000*	F stats = 0.000
Import ICT lag 3	-0.050	0.028	0.096**	
Import ICT lag 4	0.040	0.024	0.106	
Constant	0.370	0.041	0.000	

Note. *Significance at the 5% level (p<0.05). **Significance at the 10% level (p<0.10).

Source: Author's computation

RESULTS (Con't)

DIAGNOSTIC TEST

- Normality test: Jarque-Bera test = 0.855, which is greater than the p-value 5%. Therefore, the assumption of normality is fulfilled.

- Serial correlation test: Breusch-Godfrey Serial Correlation Lagrange multiplier (Table 3) showed no serial correlation existed (p-value> 5%).

- Heteroscedasticity: Breusch-Pagan-Godfrey test (Table 4) showed no heteroscedasticity existed (p-value> 5%).

Table 3: Breusch-Godfrey Serial Correlation LM Test

F-statistics	0.384	Prob. F (4,16)	0.817
Obs*R-squared	2.280	Prob. Chi-Square (4)	0.684

F-statistics > 5% I1 Bound significant level.

Source: Author's computation

Table 4: Breusch-Pagan-Godfrey test Test

F-statistics	0.821	Prob. F (5,20)	0.549
Obs*R-squared	4.426	Prob. Chi-Square (5)	0.490
Scaled explained SS	2.205	Prob. Chi-Square (5)	0.820

Source: Author's computation

RESULTS (Con't)

VARIANCE DECOMPOSITION

- GDP ICT variation decomposition:
  - ❖ In the short-run (quarter one), 100% of the forecast error variance in GDP ICT is explained by GDP ICT itself. The contribution of GDP to ICT is strongly endogenous. However, in the long-run (quarter ten), the influence of GDP ICT on itself decreases significantly to 45.68%, while Import ICT increase significantly to 54.31% (quarter ten).
  - ❖ Hence, it was found that Import trade ICT is a good predictor for GDP ICT.

Table 5: Variance Decomposition (VD) of GDP ICT

Period	S.E	GDP ICT	Import ICT
1	0.005	100.000	0.000
2	0.007	58.259	41.741
3	0.008	52.398	47.602
4	0.008	51.196	48.804
5	0.010	61.033	38.967
6	0.012	49.590	50.410
7	0.013	45.065	54.930
8	0.013	44.491	55.519
9	0.014	49.648	50.352
10	0.015	45.687	54.313

Source: Author's computation

DISCUSSION AND CONCLUSION

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DISCUSSION

- In this study, Import trade ICT (lag one) positively influenced GDP ICT. This was consistent with findings by Yoon (2009).

CONCLUSION

- GDP ICT lag two was negatively affected GDP ICT.
- GDP ICT lag four has a positive relationship with GDP ICT.
- Import trade ICT lag one has a positive relationship with GDP ICT.
- Import trade ICT lag three has a negative relationship with GDP ICT.
- Import trade ICT is a good predictor for GDP ICT.

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