Tourism And The Digital Economy In Indonesia: The Ardl Approach

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Abstract :

The purpose of this research is to examine the relationship between the long- and short-term impacts of factors on the digital economy and tourism are reflected in the relationship between economic growth, revenue receipts from tourism, internet users, and government spending in Indonesia. This study uses the ARDL approach with data from the world bank from 2000 to 2020. We find that in the short term, the previous year's economic growth had a significant positive effect on economic growth this year, as well as revenue receipts from tourism which in the short term also had a positive effect on economic growth, in line with previous variables, such as internet growth and government spending which in the short term also has a positive effect on economic growth.

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Background

The digital economy is a business conducted through virtual media, value creation and exchange, transactions, and relationships between mature economic actors with the internet as a medium of exchange. The use of digital information and communication technology for commercial purposes and its resulting empowerment is known as the "digital economy." The digital economy is quickly expanding in Southeast Asia, where there is a large market opportunity (Hinning, 2018).

Digital users such as the public, business actors, and even government agencies must have the infrastructure, literacy, and talent as well as a digital culture mindset. In this case, the entire communication network, the applications that we use, and even the big data that we have, must be used wisely, obey the law, and intelligently filter the information (Nham & Ha, 2022).

The digital economy provides the flexibility for business transactions that no longer have to meet face-to-face. This is an option during the Covid-19 pandemic. The digital economy is actually growing at this time. The Covid-19 pandemic has changed the mindset and behavior of people interacting economically and socially. Activities are carried out with a new order and encourage the community to comply with health protocols (Aprilia, Waluyo, & Saragih, 2021).

The digital economy can be interpreted as human behavior about how to choose to meet their unlimited needs using only their fingers or the digital economy can also be interpreted as human activities related to production, consumption, and distribution using their fingers. The definition of the digital economy above means that humans no longer need to go to the market to get goods and services, but enough with their smartphones, the goods can arrive at home to fulfill their desires (Permana & Puspitaningsih, 2021).

The COVID-19 pandemic has become a nightmare for all industrial sectors, especially the tourism sector. Fortunately, technological developments are a breath of fresh air for the tourism sector and the ability of the creative sector to endure and flourish while a pandemic is underway. The capacity to adapt, innovate, and work collaboratively well are the three major requirements for tourism and creative economy participants to survive during a pandemic. The three capabilities have actually started to be implemented in Indonesia through digital tourism(Huda, 2022).

According to Aprilia et al (2021), digital tourism is one of the effective strategies for promoting various destinations and Indonesia's tourism potential through various platforms. This means that digital tourism is not only introducing but also promoting tourism's beauty extensively to increase the number of international visitors to Indonesia. You could say the digital tourism trend will certainly be a big leap for the tourism sector and the creative economy in Indonesia. This is because digital tourism indirectly makes people more literate and adapts to technological developments. Of course, it is not difficult, because people's lifestyles tend to be fast and in direct contact with the internet.

Additionally, the direction of the present tourist trend is beginning to change toward digital. One indicator is the actions of travelers who begin organizing travels, pre-on-post adventures, virtually exclusively done digitally (Ammirato, Felicetti, Linzalone, & Carlucci, 2021). Interestingly, it turns out that current technological developments have made the tourism industry and creative economy one of the sectors that have experienced rapid digitization in recent years. To put it another way, developing a digital tourism strategy is the best move to draw in international visitors and aid in the recovery of Indonesia's tourism and creative industries following the COVID-19 epidemic (Marx, Flynn, & Kylänen, 2021).

Economic performance is very important for every country to provide a decent life for all its citizens. Economic growth that can create new economic growth in the future with increased economic growth will have an impact on increasing investment, both physical investment such as better infrastructure, and non-physical investment such as investment. human resources in the form of improving health services and affordable education services for all levels of society (Cheng, 2020).

Technology is the driver of human resource performance. In the aggregate context, the entry of technology is very important to economic growth (Christiana & Malik, 2021). In this digital age, rapid advances in computers and digital technologies drive consumption and facilitate communication and economic coordination. Economic growth leads to better investment in human resources and better absorption of technology. So that it can support future economic growth (Astuti & Prabowo, 2021)

When analyzing the digital economy, internet users have exhibited economic growth, educational attainment, physical health, and inflation. This demonstrates that, in accordance with technical literacy in Indonesia actually lowers GDP, it also demonstrates that Indonesians' usage of the internet for production is subpar. Or the majority of Indonesians use the internet for leisure and buy digital goods from other countries, which reduces GDP due to a lack of internet technology knowledge. Internet literacy, however, promotes education in Indonesia, where internet technology is widely used in the classroom. Internet literacy in Indonesia has greatly increased through education alone. Although not considerably, Indonesia's digital economy has shown it can hold down inflation. This demonstrates how the digital economy has the potential to lower inflation, even though it is not yet operating at its best in Indonesia. The bulk of Indonesian internet users now utilizes or buy digital goods from nations outside of Indonesia, hence they are unable to support home economic growth (Irawan & Laura, 2022).

The green and digital economies quicken economic growth. A more sustainable and digitalized society is being created via the green economy and the digital economy (Ma & Zhu, 2022). Information technology, or digital technology, has lessened the negative consequences of the economic crisis brought on by the Covid-19 pandemic. This is due to the fact that, in the COVID-19 pandemic period, digital technology creates economic room for survival (Ben-Ahmed, Ayadi, & Hamad, 2021).

A more sustainable and technologically advanced civilization is being shaped by the green economy and digital economy. The primary objective of global economic growth is to find a way to overcome the pandemic issue. An economy that prioritizes green and digital issues will help it become more ecologically friendly and sustainable. An economy that prioritizes environmental sustainability in addition to economic growth is known as a sustainable economy (Yang, Ma, Wang, & Lin, 2022)

Funds will be set aside for the change of society toward a greener and more digital one through the growth of the green economy and digital economy. A green economy coupled with digital technology offers a huge chance to revolutionize the way that economic growth is done while also advancing environmental preservation initiatives. A green transition, a digital transformation, and intelligent, sustainable, and inclusive development are all being fueled by the green and digital economy (Cao, Nie, Sun, Sun, & Taghizadeh-Hesary, 2021).

The tourism industry can innovate in a number of areas, starting with the upstream sector by implementing supply chain innovations like the use of websites and search engine optimization so that customers can order hotel services directly from providers without going through middlemen and thus receive more affordable prices. The internet and other communication and information technologies are used extensively in the tourist sector. The widespread usage of the internet opens up new options, such as online marketing, which is often accomplished through e-commerce (Soniansih & Sulisnaningrum, 2021). This study aims to find out how the long-term and short-term effects of variables related to the digital economy and tourism are reflected in the relationship between economic growth, revenue receipts from tourism, internet users, and government spending in Indonesia.

Research Method

We adopt the Cobb-Douglas system of equations in estimating the control variables that we use which is also developed from the Cobb-Douglas production function equation which is mathematically simple as follows:

$Y = f(X1,X2)$

Where Y is production output, X1 is production input and X2 is production input. In this study, we examine the role of the digital economy in influencing production output, where nationally, production output is an indicator of economic performance. We use time-series data so that we develop the equation as follows :

$$\Delta \ln Y_t = \beta_0 + \beta_1 \Delta \ln TR_t + \beta_2 \Delta \ln DE_t + e_t$$

Where t is time series, is constant, is a change of variable, Ln is natural log, TR is tourism revenue, DE is the digital economy, and e is the error term.

The DE variable based on previous research can be developed into 2 variables that form the influence of DE on production output. These variables are the internet user variable as a mechanism for using digital technology facilities in DE, and government spending in building infrastructure which has an impact on the use of digital technology and also has an impact on production output. So based on the development of the DE variable, we develop the following equation

$$\Delta \ln Y_i = \beta_0 + \beta_1 \Delta \ln TR_t + \beta_2 \Delta \ln IU_t + \beta_3 \Delta \ln GS_t + e_{it}$$

Where IU is an internet user, GS is a government policy that is reflected in government spending.

In this study, we use secondary data from the world bank, and to estimate the equations that we have built, we use the ARDL method. The ARDL method is a regression method that includes the lag of both the dependent and independent variables simultaneously. Using this model, we can analyze the long-term and short-term relationships.

Result and Discussion

Table 1 displays descriptive data based on the study's variables.

Table 1. Descriptive statistics

	EG	TR	IU	GS
Mean	4.911670	5.981231	15.71542	8.666660
Median	5.033069	5.580084	10.92000	9.005915
Maximum	6.345022	9.198053	53.72649	9.749414
Minimum	-2.069543	1.980184	0.925564	6.531995
Std. Dev.	1.731411	1.778344	15.72629	0.894289
Skewness	-3.271964	0.000790	1.175384	-1.012536
Kurtosis	13.97019	2.675939	3.258531	3.181897

Jarque-Bera	142.7721	0.091891	4.893832	3.617256
Probability	0.000000	0.955094	0.086560	0.163879
Sum	103.1451	125.6058	330.0239	181.9999
Sum Sq. Dev.	59.95569	63.25017	4946.321	15.99506
Observations	21	21	21	21

The results of descriptive statistics are expressed in terms of mean, min, max, and Std Dev. EG Mean 4,906, EG Min -2,095, EG Max 6,345, EG Std Dev 1,776. TR Mean 5,98, TR Min 1,98, TR Max 9,19, TR Std Dev 1,77 and so on. EG is Indonesia's economic growth, TR is revenue receipts from tourism, IU is internet users, and GS is government spending.

A stationary test should be done before utilizing the ARDL model to predict the value. By analyzing the error component, which includes any chance of autocorrelation if the series is not stationary, Augmented Dickey-Fuller (ADF) may determine whether the series is not stationary. The following are the outcomes:

Table 2. Unit Root Test on EG, CO2, LE and CDD data

Variable	Unit Root	The ADF Test stat.	Prob.	Description
Economic Growth (EG)	Level	-0.527808	0.8660	
	First Diff	-1.929268	0.3129	
	Second Diff	-3.319458	0.0293	Stationer
Internet user (IU)	Level	6.626153	1.0000	
	First Diff	-0.254496	0.9143	
	Second Diff	-7.999192	0.0000	Stationer
Government spending (GS)	Level	-2.674413	0.0958	
	First Diff	-4.911236	0.0011	Stationer
Tourism revenue (TR)	Level	-2.316712	0.1766	
	First Diff	-2.435618	0.1459	
	Second Diff	-3.255532	0.0332	Stationer

The EG, IU, and TR data were stationary at the second difference, while the GS data were stationary at the first difference. Since all data are stationary, we can continue to estimate ARDL

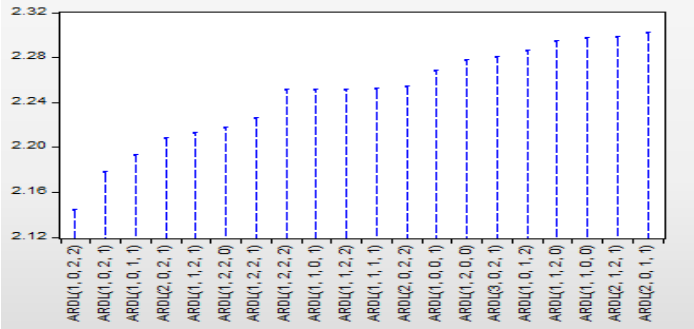

Figure 1. Optimum Lag Test

Optimal lag testing is performed to determine which lag is appropriate for use in the next test; as shown in the picture above, 1,0,2,2 lag is the most recommended.

Tabel 3. ARDL bounds test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	18.55770	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Note : Asymptotic: n=1000

The model's F-statistical value of 18.55770 is larger than the upper limit value at the 5% level, and even greater than the upper limit value at the 2.5 percent and 1 percent levels, according to the results of the ARDL model's Limit Test in Table 4. This indicates that the four factors investigated in this research, namely economic growth, revenue from tourists, internet users, and government spending are cointegrated over time, or all four variables move in the same direction.

Tabel 4. ARDL analysis results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
EG(-1)	1.418953	0.369835	3.836715	0.0033
TR	0.474882	0.103357	4.594562	0.0010
IU	0.302928	0.157226	1.926701	0.0829
IU(-1)	-0.195469	0.172341	-1.134199	0.2832
IU(-2)	-0.306676	0.178808	-1.715112	0.1171
GS	-0.607810	0.514747	-1.180794	0.2650
GS(-1)	1.878597	0.539282	3.483518	0.0059
GS(-2)	-0.809077	0.604775	-1.337816	0.2106
C	-8.082863	2.520001	-3.207485	0.0094
R-squared	0.943221	Adjusted R-squared		0.897798

The R-squared and R-squared values of the adjusted ARDL model were 0.94 and 0.89, respectively. The Adjusted R-squared value of 0.89 implies that each independent variable in the ARDL model, namely income from tourism, internet users, and government spending can

explain 89 percent of the variation in the dependent variable of economic growth. This shows that the research model is good enough to be researched.

Judging from the ARDL estimation results, the IU variable has a coefficient value of 0.302 which indicates that the internet user factor is a factor that affects economic growth. For example, when the increase in the level of internet users by 1% will result in an increase in Indonesia's economic growth by 30.2 percent. This shows that with the increase in internet users, technology inclusion, and the formation of digitalization of technology can be achieved quickly which makes it able to affect economic growth in Indonesia.

Table 5. analysis results in the long term and short term

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.082863	2.520001	-3.207485	0.0094
EG(-1)*	0.418953	0.369835	1.132810	0.2837
TR**	0.474882	0.103357	4.594562	0.0010
IU(-1)	-0.199217	0.046745	-4.261812	0.0017
GS(-1)	0.461710	0.331615	1.392307	0.1940
D(IU)	0.302928	0.157226	1.926701	0.0829
D(IU(-1))	0.306676	0.178808	1.715112	0.1171
D(GS)	-0.607810	0.514747	-1.180794	0.2650
D(GS(-1))	0.809077	0.604775	1.337816	0.2106

From the table above, the relationship between the variables EG and EG(-1) is significantly positive, as well as the TR variable which is also significantly positive, this means that in Indonesia in the short term income from tourism has a positive effect on economic growth, as well as growing the previous year's economy which also had a positive influence on economic growth this year.

Conclusion

In the short term, the previous year's economic growth had a significant positive effect on economic growth this year, as well as revenue receipts from tourism which in the short term also had a positive effect on economic growth, in line with the previous variable, as well as internet growth and government spending which in the short term length also has a positive effect on economic growth.

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