Enhancing Regulatory Compliance in Foreign Investment Management Under the Shadow of Big Data Analysis – A Fresh Insight from Malaysia

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Abstract

Big data emergence has brought a new trend in the current world of business. BDA enhance a firm to keep update with current changes and design its strategies, make effective decision and explore new market opportunities. The Malaysian Digital Economic Market has a growing trend in BDA, as according to The Digital Economic Corporation Commission of Malaysia expected a growth of US $ 1.9 million in BDA market. This is the country listed top in the 2022 Milken Institute Global Opportunity Index for having potential to attract foreign direct inflows in the country. Malaysia observed MYR 24.4 billion foreign direct investment in the year 2022. Being a large Islamic state, Malaysia holds various cultural and a tradition value having an increasing international outlook, put emphasize collective well-being and humane treatment in the society and prefers to maintain harmony among people. The country adopts sharia compliance and provides suitable framework to attract foreign investments. Finding a research gap on BDA's impact on regulatory compliance of FDIM, this paper examines the role of Big Data (endogenous variable) on the enhancement of regulatory compliance (exogenous variable) of foreign direct investment management (exogenous variable) in Malaysia. The study developed survey-based questionnaires for data collection and applied partial least square based structural modelling equation (PLS-SEM) for analysis purpose. The main survey was conducted in a market research firm having more than 5000 Malaysian IT managers and business analyst. Findings of the study indicate a significant positive role of BDA on RC, and partial positive mediating role on RC & FDIM. However, RC positively influences FDIM whereas, BDA is insignificantly negatively related with FDIM. The paper provides valuable insights for the policy makers of Malaysia to utilize the advantages of BDA in attracting more FDI through enhanced regulatory compliances.

Key words

Big data analytics, foreign direct investment management, regulatory compliance.

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Introduction

The digital growth of today's world is so fast and data volumes have become more organized in response to volume from terabyte to more high, data varieties including structured, unstructured and hybrid, the data growth speed is too high; this is what we called "Big Data" (Arshad et al., 2023). Big Data is the next stage of innovation, competition and productivity and its implication is expected to become a key factor for organizations concerning strategic decision making and business forecasting in the near future (Acciarini et al., 2023; Rajagopal et al., 2022; Saleh et al., 2022). Big Data Analytics is a term recognized as a Business Intelligence and Analytics related field which refers to BI&A technologies concerned mainly with mining of data and statistical analysis (Chen et al., 2012). Today's organizations are paying more attention towards Big Data Analytics to be updated with the current changes in business (Awan et al., 2021; Wright et al., 2019). Big Data Analytics allow an organization to boast its operation and decision making through information technology and quantitative analysis (Goyal et al., 2020). By applying big data analytics, organization can enhance their business decision making through exploring new opportunities in the market (Aziz et al., 2023).

Today's business traditional practices have been transformed by Big Data Analytics (Ferraris et al., 2019; Obschonka & Audretsch, 2020; Sivarajah et al., 2020). Big Data Analysis (BDA) capabilities affect a firm's performance (Gupta et al., 2020; Mikalef et al., 2020). These capabilities include staff's and management's talent as well as flexibility in BDA's infrastructure (Alkatheeri et al., 2020). BDA infrastructure refers to technology and technical software that enable data scientist to improve quickly, utilize and support necessary system components (Garmaki et al., 2016). Investments in BDA infrastructure and its flexibility can enhance organization performance and efficiency (Al-Darras & Tanova, 2022) BDA has capacity to change the manner of firm's competition through creating a better understanding, processing and exploiting the large quantity of data receiving from various internal and external sources (Saeed et al., 2023; Shah, 2022). Further, familiarity with knowledge management plays a crucial role in accelerating BDA capabilities. BDA capabilities refers to BDA ensures that data will be classified and analysed into useful information for the firms and transformed them into related big-data knowledge effective process of decision making and thus improves performances (Ferraris et al., 2019). BDA management capabilities refers to the ability of BDA managers to organize in a structured manner to manage BDA's resources according to business needs and priorities (Kim et al., 2012). Big Data Analytics and Capabilities (BDA&C) have the strength to divert conventional business strategies. BDA technologies and capabilities enable business to take decisions from derived data (Oufan, 2021). Effective marketing, income increasing opportunities, customization and upsurge operational capacity are predicted advantages of BDA capabilities. Advancement in infrastructural development, management potential, technical and personal expertise are strong influencers of BDAC (Singh et al., 2021). To drive benefits of BDA and high performance, a firm requires BDA personnel expertise. BDA personnel capability describes data scientist's skills and knowledge about using analytical technologies, data analysis and making insights to deal with BDA (Bharadwaj, 2000).

The Malaysian Digital Economic Corporation Commissioned (MDEC) stated that Malaysian big data analytics market is expected to grow up to US $ 1.9 million from $ 1.1 million in 2021. The service sector will contribute 64% of the entire data driven along with banking and telecommunication nearly contributing one-third (Felker, 2025). The vice senior president of MDEC, Raymond Siva stated that COVID -19 pandemic has proven to be a game changer in up surging the demand of big data analytics. He further stated that companies investing in BDA will continue to increase their existence for having Malaysia as a base for regional and global business unit to operate their core responsibilities. MDEC commented that BDA is crucial for a digital Malaysian economy, and it will result in other digital technological growth such as Internet of Thing (IoT), Artificial Intelligence (AI) and advanced automation. The institute further suggested a collaboration of private sector in attaining the desire level

of digital investment in the country. The government support along with MDEC-Led capacity and local and international partners, the institute will better equip the workforce with in-demand for fast-growth digital-led jobs ranging from online content production, data science analytics and programming. It will support talent development under BDA culture in the country and it will help Malaysian talent and economic players to secure $ 13 trillion revenue to be added by data fuelled applications to the world economy by 2030 (The Edge Market, 2023).

A better business infrastructure leads good ideas to take root, create job opportunities and make life better for the citizens (Qureshi, 2020). The more complex, turbulent and vigorous business environment effects the operations and performance of businesses to a greater extent (Moreno et al., 2020). It is the need of organization to direct their concerns towards formulating models and making strategies to determine their profit motives, survival and growth (Alrowwad et al., 2020). It is recommended to easier the process of starting a business; it will increase more investors' entry and in turn create more job opportunities (Hameed & Irfan, 2019). This will help in sustainable development of private sector and enhancement of FDI inflow in developing countries (Berger & Gsell, 2021; Gizaw et al., 2023; Pandey et al., 2022).

Malaysia ranked top in the 2022 Milken Institute Global Opportunity Index as the best performing countries among Southeast Asian largest economies for having the potential to attract foreign investments in the country. Malaysia registered RM 48.1 billion foreign direct investments inflow in the year 2021 and RM 13.3 billion in the following year 2022 due to economic recovery from pandemic of COVID-19 (Jamil et al., 2022). The Ministry of Malaysian International Trade and Industry stated the FDI's are financial instruments (equity & investment fund shares and debt instruments) in the direct investment enterprise of Malaysia by foreign direct investors. Foreign Direct Investments in Malaysia are not regulated under any legislation, regulation and guidelines. Government has issued sector specific regulation which regulates Malaysia. There are very few restrictions for FDI in the country and foreign investors can hold up to 100% ownership in all investments in new projects of some sectors. FDI investment on different sectors are usually regulated by regulatory approvals like permit and license, limitations of ownership on foreign equities and minimum requirement for Malaysian equity ownership in the proposed project. The Government of Malaysia continued investor's interest in the economy by offering several tax incentives. Under The Pioneer Status, companies can enjoy partial tax exemption of income tax for five years. Companies eligible under the manufacture of promoted activities can pay income tax on 30% of its statutory income while companies qualify for service sector activities can pay income tax on its 70% statutory income. Companies also apply for ITA (Investment Tax Allowance) which grant them 60% allowance on the approved capital expenditure for five years and ITA can be offset for 70% statutory income for analysis of each year and any unutilized balance can be carried forward to the next year until fully utilized

Malaysia was known in past as the exporter of tin and rubber but nowadays, the country is an important trading partner of US and Europe. Malaysia, being a large Islamic nation with a diverse population of Malays, Chinese and Indian, holds many cultural values with having an increasingly international outlook. Malaysia put emphasize on collective well-being with humane treatment on society that respects hierarchical variations. The tradition shows positive confrontational behaviour that prefers to maintain harmony among people. The country expects its leaders to be corporative while adopting autocratic style than participative. Malaysia demands foreign managers to avoid actions that hurt these values (Kennedy, 2002).

Fraud prevention in business environment can't be controlled through internal policies but the management needs to be stronger in implying fraud prevention measures (Umar et al., 2020). The certainty of being caught environment is an effective deterrent step for discouraging fraudulent acts. The

Malaysian government has made some laws and regulations for individual and organization to take actions against fraud. The Company Commission of Malaysia (CCM) is responsible for the enforcement of The Companies Act 1965 (Act 125); Business Registration Act (Act 197); Companies Trust Act (Act 100) and various other laws. CCM also work with other regulatory authorities like Insolvency Department of Malaysia, Bank Negara Malaysia, Security Commission of Malaysia and other government authorities to ensure that all business organizations are following good governance practices (Azis et al., 2020).

Foreign Direct Investment (FDI) is an important means of technology transfer. It plays a significant role in the development of host country. Development has no specific definition, and it is an open ended process. United Nations define development as social and economic growth that improves the quality of life. FDI enhance labour training and R&D development in the host country and hence develop a nation. Nations require domestic sufficient savings for capital formation but developing countries lack this savings. In that case, FDI fill the gap of insufficient savings and helps in capital formation (Rani, 2023). According to Tsen (2005) FDI is a sort of investment which includes insertion of foreign countries fund in a project that operates in another country from investor's side. FDI is a long-term participation, usually involves expertise collaboration, cross border ownership, transfer of technology, green field investment and joint ventures. It is a cross-border governance of organization carries abroad investment into local goods and services.

Foreign direct investment has brought investment capital, technology and knowledge management required for economic growth in Malaysia. FDI inflows positively affect the regional gross domestic production and economic growth (Har et al., 2008). Foreign direct investment in Malaysia is observed to be dropped by MYR 12 billion in the first quarter of 2023 from MYR 24.4 billion in quarter one of 2022. The quarter third of 2021 was weighed down by immense cost burden, up surges in borrowing cost and overall worldwide recession due the pandemic on that year. The most contribution in FDI made by service sector of MYR 6.2 billion followed by mining & quarrying (3.4 billion MYR) and manufacturing (2.4 billion MYR). Singapore, US and Hong Kong are the three main sources accumulated 46.2% of the total FDI in Malaysia. In 2021, FDI increases to MYR 73.3 billion from MYR 48.1 billion in the country (Department of Statistics, 2023).

Emergence of big data has transformed business strategies of today's world (Singh et al., 2021). Malaysia has a growing market for BDA and it is the country having potential to attract foreign direct investments with a friendly legislative framework (Hammouri et al., 2022; Umar et al., 2020). Previous literature lacks to explore the role of BDA in FDI regulatory compliance enhancement. This paper examines the key role, BDA plays in enhancing the regulatory compliance of foreign direct investment in Malaysia, using questionnaire-based survey method and PLS-SEM for the estimation of model. This paper contributes to the literature by proving an insight on the role of BDA in the desired variables which has previously not been studied.

Introduction is written in the first part of the paper, this section contains description of variables i.e. Big Data (Infrastructure Flexibility, Management Capabilities and Personal Expertise Capabilities), Regulatory Compliance (Social Norms & Values, Legitimacy and Deterrence) and Foreign Direct Investment. The second part contain literature reviews of research related to the variables of the paper. Methodology has been written in the third part, and it presents data collection and test results. The fourth part discusses findings of test results along with citations of other research paper. Results and discussions have been provided in the fifth part. Conclusion has been written in the sixth part of the paper and seventh part describes the limitation and policy implication of the work.

2. Literature Review

2.1 BDA and Organizational Performances

Organizational ambidexterity and knowledge management capabilities are the factors influencing the relationship between organizational strategic flexibility and organization's ability to conduct BDA (Rialti et al., 2020). BDA&C is positively associated with innovation performance and this effect is more significant under low/high environmental uncertainty condition while this relation is influenced by a mediating role of organization's strategic flexibility and strategic innovation (Zhang & Yuan, 2023).

Saeed et al. (2023) stated that BDA-enabled dynamic capabilities (DC) positively affect a firms marketing exploitation and exploration and these in turn increase a firm's market and financial performance. A firm's market exploitation and BDA-enabled DC is moderately affected by environmental dynamism.

2.2 Foreign Direct Investment and BDA

Foreign direct investment creates opportunities to attain sustainable goals and increase productivity gains therefore, all countries are interested to attract it. MNCs collect a huge volume of structured and unstructured big data when desiring international expansion through FDI, but summarizing such data is practically not feasible. MNCs, nowadays depend on machine-based algorithm for finalizing data for their FDI projects. The artificial intelligence application of statistical tools can help drive time series graphs and forecast revenues for FDI variables. Foreign Investors can specify their search on industry or product to manageable from various investment options in the host country. Big data advancement offers the enterprises a cost-effective method to take decisions and manage their resources (Verma et al., 2022). The forecast of foreign direct inflow in Malaysia (2021-2030) made from Autoregressive Integrated Moving Average Method indicates an upsurge of inflow from 2021 to 2023 but a decline in the year 2024. The inflow back with a slow pace in the year 2025 till 2030. The criteria set by foreign investors are responsible for this pattern.

H1: BDA positively influences FDIM.

2.3 BDA and Regulatory Compliance

Jamil et al. (2022) studied the COVID-19 impact on financial crime and regulatory compliance. The paper also makes comparative analysis of financial crime and regulatory compliance mechanism before and after the occurrence of pandemic. The COVID pandemic has impose both challenges and opportunities to the financial crime patterns. COVID brings a reduction in physical crime but an increment in cybercrimes. The study implies that financial institution should work together with the regulators to fight with the criminals' high technological skills. The government funds initiative to assist especially small firms need to be utilized completely to improve the regulatory compliance in Malaysia (Jamil et al., 2022).

Diniyya et al. (2021) argue that financial technology development has provide numerous business models to fulfil customer's desire. Such innovation requires proper supervision to reduce chaos in the financial system and Malaysia and Indonesia are the countries registered by CCAF and top ASEAN countries for having high Fintech firms. Indonesia is lacking in providing cybercrime security laws for customer protection when compared with Malaysia, and this is threatening to Fintech industry. Malaysia treats Initial Coin Offerings under RMO while Indonesia runs it under Commodity Future Regulatory Agency (Diniyya et al., 2021).

H2: BDA positively influences Regulatory Compliance.

2.4 Islamic FinTech and Sharia Compliance

In the list of Global Islamic Financial Technology Index; Malaysia, Indonesia and United Kingdom are among the top five countries. The listed countries in GIFT are most conductive for the progress of Islamic financial market and ecosystem. Sharia compliance is the basis of Islamic Financing regulation while weak management and low sharia compliance are two hurdles still persisting in the implementation

of Islamic Fintech. A good Fintech Islamic ecosystem requires quality of Islamic Fintech Sharia governance, cooperative regulations and policies and sharia supervisory board (Muryanto, 2022).

Malaysia is very committed to maintain worldwide Islamic financing leadership. The modern financial activities require shariah compliance regulations for governance. It is necessary to introduce subsidiary legislation according to Islamic Financial Service Act (IFSC) 2013, produce a regulatory sandbox for Islamic FinTech firms, emphasize the importance of Shariah Advisory Council members processing knowledge in the technological aspects to ensure satisfaction of shariah compliance regulation in the Islamic finance industry (Razak et al., 2021).

2.5 Regulatory Compliance and FDI

Gizaw et al. (2023) observed that persistent betterment in business environment is necessary for countries willing to take advantage of investment and trade by regional cooperation. Making an attractive environment of business for progress is an emerging concept of today's international development organizations and a friendly environment allow this idea to become reality, and this will lead to open different job opportunities and improve life standards in host countries. The authors collected time series data from World Bank for the period 2010 to 2019 and investigate the impact of business regulations on foreign direct investment. The study reveals that construction dealings, applying agreements, access to credit and electricity, tax payment and protection of minority investment have a significant impact on the inflow of FDI in East African countries (Gizaw et al., 2023).

The anti-money laundering regulations have an impact on economic growth as well as on foreign direct investments growth in country. The study of Ofoeda et al. (2022) on AML regulations on economic growth and foreign direct investments suggested that the AML regulations stimulate growth, the growth enhancing impact of FDI is more pronounced in countries having high level of AML regulations.

H3: Regulatory Compliance positively influences FDIM.

2.6 FDI Motivators

There are four categories of FDI motivation which are: Efficiency Seeking, Strategic Seeking, Resource Seeking and Market Seeking. The determinants of FDI include economic factor (market volume, cheap skilled labour & raw material availability, economic strategies of the host country), regulations of FDI (Fiscal and Monetary policies, exchange rate policies and labour market policy), and facilitations of business. Other determinants include stabilities of macroeconomics, wages, human capital, natural resources, infrastructure, geographical and cultural variations and the nature of entry of FDI. Greenfield FDI's enhance economic growth, set up new operation units, offer employment opportunities and export revenues by new technological introduction. Brownfield FDI make few changes in the ownership of developing countries engaged in cross-border M&A's (Rani, 2023).

According to Ling et al. (2020) financial, macroeconomics, regulatory policies, social and environmental are the key driving aspects of sustainable foreign direct inflows in a country. Countries with effective start-up regulations, minority investment protections and better infrastructure and procedures for international cross border trades can attract more FDIs (Contractor et al., 2021).

2.7 Behavioural Willingness to Adopt BDA

There are two key factors that determine the behavioural willingness to adopt to Big Data Analytics in the government sector of Malaysia. The first factor is the production of greater results through technology and it will increase performance demands. Task Technology Fit is the second factor. Further, initial trust has not been found out to be key factor and it is adversely related with the intention to adopt BDA (Sahid et al., 2021). The competitive pressure, relative advantage and environment uncertainty are some significant factors force SME's for BDA adoption. BDA adoption intention and regulatory compliance relation is moderately effected by the support of top management (Iranmanesh et al., 2023).

Younis (2022) studied the behaviour of Malaysian organizations toward accepting big data analytics and driving benefits through Enterprise Business Intellectual Maturity Model. The author uses EBIMM questionnaire and gathered data from large scale Malaysian organizations. The findings reveal that Malaysian companies are prepared for big data economy. 94% organization under survey reached a definite maturity level, having decent abilities and competencies to drive benefit from it. Further, no institutions reached the level of improvement, indicates the need of more investment in technology, talent and culture to make Malaysia, an economic hub for big data analytics (Younis, 2022).

2.8 BDA Influence on Social and Financial Performances

The big data and predictive analysis have grounded financial sector but there is little information available on how big data effect social and environmental performances. Ali et al. (2021) investigated the impact of Big Data estimative analysis on Islamic bank's social and environmental performances using two moderators which were dynamic capability view and organization culture in the context of Malaysia. The results reveal a significant impact of BDPA on social and environmental performances however, organizational culture is neutral in the nexus of social/ environmental performances with BDPA (Ali et al., 2021).

Data Analytics is an assuring domain in auditing as it provides greater audit performance accuracy and digital transformation of audit work. Application of Data Analytics in auditing has immense benefits as it will reduce errors, increase transparency, enhance audit quality and strengthen stakeholders' confidence (Hezam et al., 2023).

H4: RC mediates the positive relationship between BDA and FDIM.

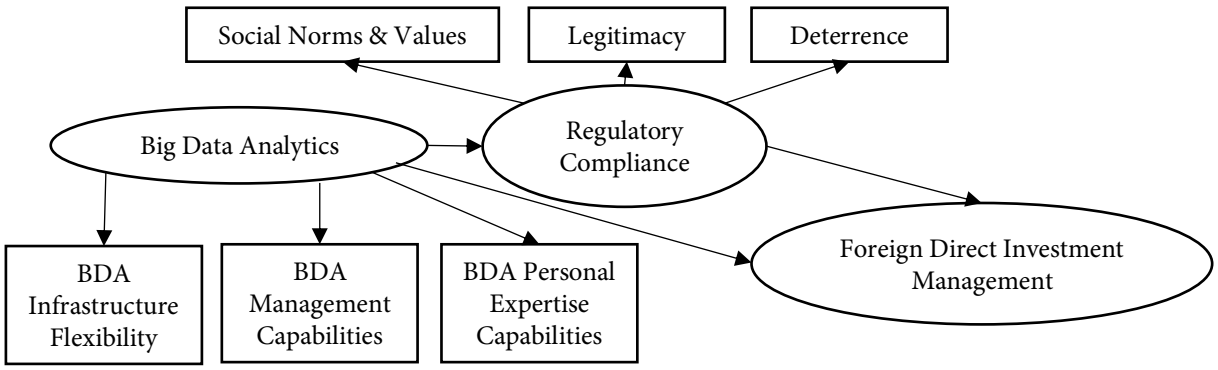

Figure 1. Hypotheses and Conceptual Framework.
Source: developed by the authors.

The hypotheses generated from the study literature focus on the relationship between constructs variables are:

H1: BDA positively influences FDIM.

H2: BDA positively influences Regularity Compliance.

H3: Regularity Compliance positively influences FDIM.

H4: RC mediates the positive relationship between BDA and FDIM.

3. Methodology

In this study, the methodology is conduct by the positivism-philosophy and quantitative survey method. We adopted the questionnaire-based survey method because it captures causal relationships between constructs and hence provides generalizable statements on the research setting. Moreover, surveys can accurately document the norm, identify extreme information and delineate associations

between variables in a sample. Also recommended survey research for explanatory and predictive theory in order to ensure greater confidence in the generalizability of the results.

The research design of our study is based on a quantitative technique to obtain the report from a collection of data analysis to validate the literature by Structure Equation Modelling (SEM) analysis and check the mediator role in our study construct.

The survey questionnaire used in the study consists of previously published multi-item scales with favourable psychometric properties. All the constructs in the model were measured using 7 - point Likert Scales (strongly disagree – strongly agree). A cross-sectional survey was used to collect the data and test the research model.

The main survey was conducted by a market research firm with a database of more than 5,000 Malaysian IT managers and business analysts. There are two reasons why we choose this market firm: 1) it has the resource of a large list of more than 5,000 Malaysian IT managers and business analysts, 2) it has a professional reputation for its survey quality control. An online questionnaire was distributed to 500 people using simple random sampling. In around two weeks, we received responses from 350 people.

After getting the survey data through questionnaires and ensure the whole dataset is reliable after the screening and error checking of dataset. In order to assess the higher-order BDA capabilities model, the study applied SEM because it estimates hierarchical models by removing the uncertainty of inadmissible solutions using its flexible assumptions (Hair et al., 2011). However, before entering the data for SEM and Mediation analysis of our study, a reliability test analysis is conducted to ensure Cronbach's Alpha each measured variable is reliable and supports for path analysis of SEM. Moreover, in this study the data analysis is performed by SPSS20 and AMOS 24.

4. Results

The data analysis of our study is distributed into three parts, firstly we discussed demographic & descriptive analysis and check the reliability of our study model. Secondly, analyse the path coefficient of SEM model and testing our study hypothesis and check the goodness of fit of SEM model. Thirdly, to check the mediation effect in our study by Path Coefficient Bootstrapping Model.

The demographics of the respondents are as follows with respect to the gender, there were 245 males, accounting for 70%. While females made up 30% of the targeted population. According to the age, 80 (32%) were aged 20-30 years, 96 (39%) 31-40 years, 49 (20%) aged 41-50 years, and 25 (10%) aged 51-above years. Respondent had different position in the Information Technology and Financial Institutions industry were IT experts (25%), Compliance Manager (30%), Financial Analyst (35%) and 10% of Financial Law Firm respondents from Malaysia.

Table 1 displayed a selected item matrix for the construct of Big Data Analytics, Regulatory Compliance, and Foreign Direct Investment Management.

Table 1. Descriptive Statistics.

Variables	Mean	Std. Deviation	Corrected Item-Total	Cronbach's Alpha	N
BDA_IF	4.95	1.291	0.789	0.845	350
BDA_MC	5.37	1.392	0.68	0.97	350
BDA_PEC	5.00	1.278	0.78	0.976	350
RC_SNV	5.09	1.370	0.731	0.98	350
RC_Legi	4.91	1.381	0.816	0.978	350
RC_Deter	5.01	1.406	0.826	0.94	350
FDIM	4.91	1.441	0.832	0.976	350

Source: developed by the authors.

The first step is the measurement items of each variable have achieved more than a cut-off point. The mean values of the construct variable have achieved about to 5.0, which has indicated significant agreement on respondent between measured variables. Moreover, the standard deviation shown of each item is 1.3, which is a high standard deviation which discloses that numbers are more extend.

The reliability of our study construct's variable is desirable, because the Cronbach's Alpha of our construct variables is more than 0.70 it means the construct reliability is very good. However, the corrected item-total correlation is 1.70 that is desired in order to confirm items with the sample size of the study's respondents is 350.

Table 2 represents that the matrix of construct reliability and validity for three variables such as, exogenous variable, mediating variable, and endogenous variable.

Table 2. Construct Reliability and Validity.

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Big Data Analytics	0.922	0.94	0.553
Regulatory Compliance	0.952	0.965	0.581
Foreign Direct Investment Management	0.91	0.932	0.605

Source: developed by the authors.

Each variable's Cronbach Alpha is >0.70, which is more than desirable on our study construct. The Average Variance Extracted (AVE) has achieved the amount of variance, which has captured a variable association to the amount of variance causing measurement error. The AVE has achieved the desired values >0.50 means the construct variables are validating because all variables AVE value is greater than 0.50.

Table 3 represents that the collinearity statistics with the Variance Inflation Factor (VIF) and Tolerance, are both generally used for measured of the degree of multi collinearity of the exogenous variable with the other exogenous variables in a regression model VIF has achieved acceptable value from 1to 3 or less than 5 but our study construct the VIF values are more than 5 or less than 10, it means there in no collinearity issued between them (BDA and RC).

Table 3. Collinearity Statistic by VIF method.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Constant	-0.389	0.115		-3.395	0.001		
	BDA	0.219	0.067	0.186	3.246	0.001	0.104	9.565
	RC	0.835	0.063	0.761	13.292	0.000	0.104	9.260

Note: Dependent Variable: FDIM.
Source: developed by the authors.

Figure 2 shows a path diagram for the causal relationship between the three variables of our study. All variables that are affected by other variables, Regulatory Compliance and Foreign Direct Investment Management are endogenous variables, while Big Data Analytics in exogenous variables.

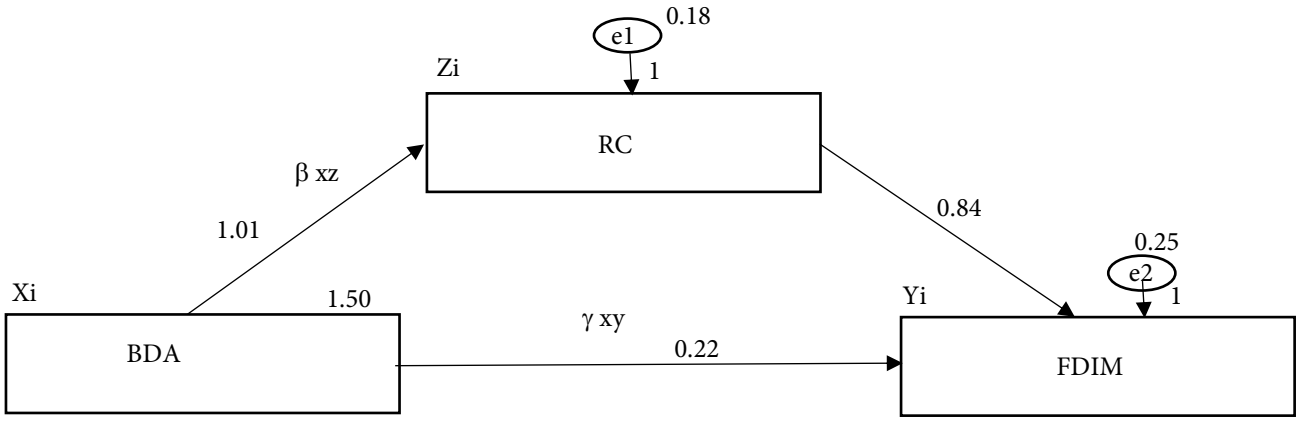

Figure 2. Path of Coefficients by SEM.
Source: developed by the authors.

This analysis includes exogenous factors to facilities the examination of endogenous variables through SPSS-AMOS 24. The basic design was constructed by using observed facts (rectangle) to develop.

Table 4 is the pathways to testing the mediation effect using SEM required significant correlations between independent variable, mediating variable, and the ultimate dependent variable (Hair et al., 2011).

Table 4. SEM Pathways Testing Mediation Among RC, BDA, and FDIM.

Pathways	t-statistics	p-value	Result	Remarks
RC → BDA	54.710	0.000	Significant	H1 accepted
BDA → FDIM	3.255	0.001	Significant	H2 accepted
FDIM → RC	13.330	0.000	Significant	H3 accepted
BDA → RC → FDIM	2.439	0.016	Significant	Partial Mediation Accepted

Source: developed by the authors.

According to the Table 4 the first relationship between BDA and RC performed is statistically significant as p-value (0.000) is less than 0.05. However, the second relationship between BDA and FDIM performed is statistically significant as p-value (0.001) is <0.05. The relationship between the mediating variable of RC and FDIM has performed output at the p-value is (0.000), which is strongly significant relationship.

The conditions of mediation proposed by Baron and Kenny (1986), all pathways of our study is significant, now there is Partial Mediation exist in the study construct.

The direct effect is the pathway from the exogenous variable (BDA) to the outcome while controlling for the mediator (RC). Therefore, the path diagram (γxy) is the direct path. The indirect effect defines the pathways from the exogenous variable to the outcome through the mediator, this path represent through the (βxz and γzy). Finally total effect is the sum of the direct and indirect effects of the exogenous variables on the outcome, γxy + βxz γzy (Table 5).

Table 5. Decomposition of Effects in SEM Mediation Analysis: RC, BDA, and FDIM.

Total Effects			Direct Effects			Indirect Effects		
Variable	**BDA**	**RC**	**Variable**	**BDA**	**RC**	**Variable**	**BDA**	**RC**
RC	1.014	0.000	RC	1.014	0.000	RC	0.000	0.000
FDIM	1.065	0.835	FDIM	0.219	0.835	FDIM	0.847	0.000

Source: developed by the authors.

The discriminant validity indicates that two measurements that are not meant to be associated are in fact not associated. Excellent construct validity requires the presence of both forms of validity. The HTMT analysis is used to determine discriminant validity, with the cut off threshold for severe discriminant validity being 0.850 and for liberal discriminant validity being 0.90. According to Table 6 all items fulfil the criteria of the discriminant validity because all values are greater than the cut off values (0.90 and 0.85) respectively.

Table 6. The results of HTMT Analysis.

Variables	BDA	RC	FDIM
BDA	x		
RC	0.946	x	
FDIM	0.906	0.937	x

Source: developed by the authors.

Figure 3 is the model of path coefficient bootstrapping between direct and indirect relationships among the variables and our study hypothesis testing.

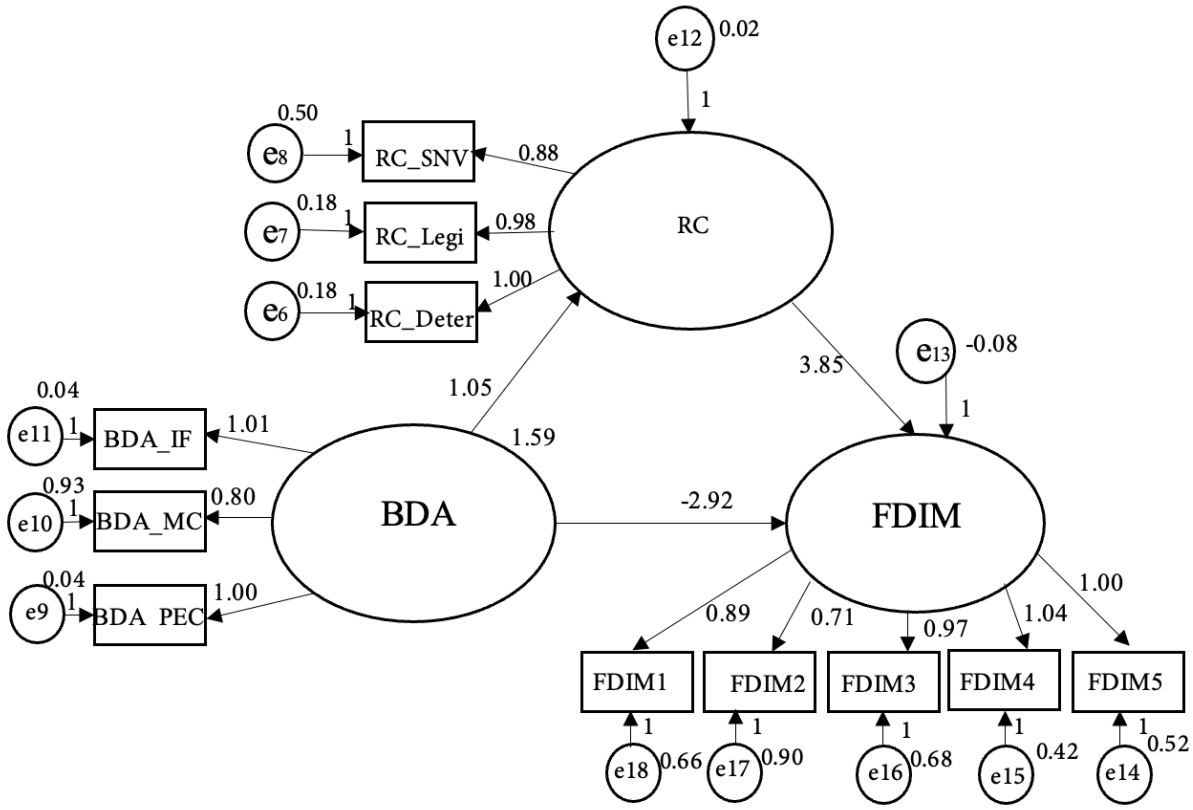

Figure 3. Path Coefficients by Bootstrapping and indirect effect.
Source: developed by the authors.

According to Table 7, the results find out that the first hypothesis of H1 has been accepted between BDA and RC because t-statistics is 49.30, which is >1.96 cut-off threshold (Hair et al., 2011) and p-value is 0.000 executed by bootstrapping. The second hypothesis H2 is statistically insignificant due to t-statistics is -1.681<1.96 and p-value (0.090) is greater than the 0.05 between BDA and FDIM. However, the relationship is also statistically significant between RC and FDIM due to t-statistics and p-value criteria are meet.

Table 7. SEM Results for Direct and Indirect Pathways Among BDA, RC, and FDIM.

Pathways	t-statistics	p-value	Result	Remarks
BDA → RC	49.302	0.000	Significant	H1 accepted
BDA → FDIM	-1.681	0.090	Insignificant	H2 not accepted
RC → FDIM	2.343	0.019	Significant	H3 accepted
BDA → RC → FDIM	2.439	0.016	Significant	Partial Mediation Accepted

Source: developed by the authors.

Therefore, specific indirect effects relationships among BDA and FDIM performance of mediating variable of RC strongly supports to partial mediation. Thus, specific indirect effects have identified by t-statistics and p-value accordingly 49.30 and 0.016 respectively, therefore the model has been empirically identified with partial mediation.

5. Discussion

The study output indicates a positive relationship of big data analytics in RC enhancement. found that artificial intelligence is going to be the most powerful technology to deal with financial crimes in the financial institution. Treleaven (2015) suggested big data adoption in enhancing regulatory compliance in financial sector. Through BDA, financial regulation can be enhanced across multiple jurisdictions, new automated reporting and analytics standards can be created, and this reduce systematic risk, industry performances, financial services and provide economic benefits.

Law enforcement policies are revolutionized by big data, algorithm and computing technologies. Cell phones data, transportation data, internet and social media data, biometric and facial recognition data are used to investigate, predict fraudulent activity is law enforcement presumptive (Coleman, 2023).

BDA is negatively associated with foreign direct inflows in Malaysia according to the findings of this study. The risk associated with BDA hinder the inflow of foreign direct investment in Malaysia. The findings of Ghasemaghaei (2020) confirms the negative impact of bigness of data for data security concern and task complexity. The big data analytics impact can be varied depend on level of data security concerns, task complexity, data accessibility and data diagnostics. Clarke2016) outlined the threat of big data analytics that occur from reutilizing data, consolidating data from various sources and applying analytical tools for concluding results. (Pedro et al., 2019) Stated that there are a number of barriers to organizational effectiveness with BDA and recommended a new legal compliance regarding "Data Protection".

The analysis of the study finds a positive impact of regulatory compliance with foreign direct inflows in Malaysia. According to Gizaw et al. (2023) policy makers should construct a robust business regulation framework and ease the procedure of executing business to attract FDI inflows in their economies to promote regional economic growth. The findings of (Krifa-Schneider et al., 2022) on the nexus of FDI and corruption stated that less corruption in advanced economies bring more inflow of FDI whereas emerging economies, corruption doesn't matter. Corruption can attract FDI but is not sustainable in long-term. Contractor et al. (2020) also concluded that countries having robust agreement enforcement and more effective international trade regulation can attract more FDIs. The paper's output of Mahbub and Jongwanich (2019) also suggest regulatory aspects as most influencing factors for firms when engaging in FDIs.

Legal uncertainties can deter foreign direct investment in a developing country. Legal risk and uncertainty have many forms i.e. double tax agreement, corruption etc. The increased ratio of statutory corporate income tax on the destined source country negatively affect foreign direct investments (Zagler, 2023).

The mediating role of big data analytics between regulatory compliance and foreign direct investment management is partially approved in the test results of the paper. Mangla et al. (2021) argued that project knowledge management and project operational capabilities require mediating role of big data analytics. Marenga et al. (2023) suggested a legislative framework for the promotion of FDI in a region.

Financial institution is also going through a new era of big data analytics, which plays a crucial role into converting financial and economic environment. The evaluation of Wang (2022) revealed that big data analytics implementation support a firm to enhance regulatory compliance to detect fraud, conduct real time analytics, mitigate risk and manage customer portfolio. Corporations can provide customized services to their customer through customer portfolio management, customer data management and even in live analytics. Firms can better understand market trends, predict financial market, patters and irregularities.

Conclusion

Big data analytics is the competitive edge of current business world. Firms with efficient utilization of BDA can increase their financial gains. The current research paper focuses on finding the significant influence of BDA on RC and FDIM of Malaysia. Malaysia is a country having high potential for attracting FDI with a growing investment in BDA market. The regulatory compliance is related with the two factors i.e. BDA and FDIM. According to the analysis report, BDA positively influence regulatory compliance enhancement as it helps in making accuracy in audit work, deter financial frauds and generate analytical reports. Data security protection and task complexity arise a negative influence of BDA over FDIM. However, Legal framework and regulations, robust agreement and international trade enforcement laws as well as small investor's protection can attract more FDI. Further, the analysis indicates a partial positive mediating role of BDA between RC and FDIM. BDA supports to regulate compliances as it will help in deterring fraudulent activities, enforcement of international agreement laws and provide better decision-making opportunities for international managers which in turn increase more FDI in the country. The country can increase foreign inflows through making an ease in the regulations for foreign investors to establish in the region. Big Data Analytics can be utilized to make more betterment in the regulation compliances to deter fraudulent activities and promote healthy business environment for foreigners.

This study is a contribution to the literature of big data analytics (BDA) which is an emerging concept and has changed the business strategies and decision-making methods by providing enormous data. The paper uncovered the role of BDA in regulatory compliance enhancement of foreign direct investment management in the context of Malaysia. Although many authors have worked on BDA and FDIM or Regulatory Compliance and FDIM, but this is the first study combined the three variables which is significant contribution to the literature of related variables. The paper provides insight of BDA's role in regulatory compliance enhancement, BDA's impact on attracting foreign direct investments in Malaysian economy, role of RC towards attaining foreign investor's attentions and the mediating effect of BDA on RC and FDI. The paper guides regulatory authorities of Malaysia to draft policies to avail benefits of BDA for regulatory compliance enhancement and attracting more FDIs in the country. Further, this paper helps scholars for future research direction in the field of BDA and its relationship with the other two variables. The paper suggested to focus on deterring the negative use of BDA for data security concerns, utilizing BDA's capability to robust regulatory compliance and design policies to increase foreign investments.

Despite having theoretical and practical implication, this study has several limitations. The current paper has three variables i.e. BDA, RC and FDIM. The role of BDA on domestic investments of business in the country has not been made a part of this study. Future studies can be made on BDA's impact on the financial, economic, social and political factors of the country for attaining FDI's concern. Behavioural, cultural norms and demography can also make influence on BDA's impact on RC and

FDIM but none of the variables have been included in the study. Threat or risk related to BDA adoption has not been made discussed in this study. Upcoming scholars are recommended to shed light on these factors for their research. Further, the results of this paper can't be generalized to the country having economic and cultural variations from Malaysia. Authors are recommended to conduct the study on multiple economies and analyse the results of the variables.

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