

## **PENERAPAN TEKNOLOGI *BIG DATA* DENGAN EVALUASI KEMATANGAN *COMPLIANCE RISK MANAGEMENT (CRM)* TERHADAP TAX COMPLIANCE DI ERA DIGITAL**

*APPLICATION OF BIG DATA TECHNOLOGY WITH COMPLIANCE RISK MANAGEMENT (CRM) MATURITY  
EVALUATION ON TAX COMPLIANCE IN THE DIGITAL ERA*

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### **ABSTRACT**

The government seeks to optimize state revenue, one of which is by increasing taxpayer compliance (Riris, 2020). The level of formal compliance over the past 5 years has fluctuated, the ratio of SPT submission in 2017 was 72.58%, in 2018 it fell to 71.1% and in 2023 out of a total of 19.4 million taxpayers only 17.1 million taxpayers have carried out their obligations at the end of 2023 (Hariani, 2023). This research discusses the Application of Big Data Technology with CRM Maturity Evaluation to Tax Compliance in the Digital Era. This study aims to monitor how Big Data and CRM technology can assist DGT in improving formal and material compliance. By utilizing data from various sources including social media, DGT can improve efficiency in the taxation process. The implication of this research is the importance of the integration of Big data and CRM technology in increasing state revenue through increasing taxpayer compliance. The research method used is quantitative with a descriptive approach and verification analysis, hypothesis testing is done with primary data in the form of questionnaires distributed to Account Representatives (AR) in the West Java I Regional Office. The sampling technique used purposive sampling. The results of this study indicate that the application of big data (X1), and CRM (X2) has a significant taxpayer compliance in the digital era (Y).

Keywords: Big Data; Compliance Risk Management (CRM); Tax Compliance.

## I. INTRODUCTION

Taxes are contributions from taxpayers, both individuals and entities that are compelling based on the Law, which do not get direct rewards and are used to the greatest extent for the prosperity of the people of a country (Law of the Republic of Indonesia, 2007). Tax payment is compulsory and forceful, although it is compulsory, the tax system in Indonesia faces various challenges and still needs to be improved. The goal is to support government policies and the welfare of the people, but the tax system in Indonesia is still burdened by very complex challenges (Azzahra, 2023). One of the main issues is the difficulty in collecting accurate and reliable data in the tax system in Indonesia. Non-compliance with tax rules and regulations is a major challenge faced by the government and tax authorities (Organization For Economic Co-Operation And Development, 2004). The important role of taxes, is that the government tries in various ways to optimize state revenue, one of which is by increasing taxpayer compliance (Riris, 2020).

According to Bhima Yudhistira in the Economist Institute of Development on Economics and Finance, the reporting of SPT (Annual Tax Return) for the 2023 tax year did not reach the target. the factor of the decline in individual SPT reporting is certainly affected by the issue of public trust in the Directorate General of Taxes (DGT), one of which is the issue of Rafael (Ex-Directorate General of Taxes Official of the Ministry of Finance) which has eliminated public trust in tax reporting. In addition, the issue of money laundering scandals in the DGT whose value is huge reaching IDR 349 trillion (Ramadhan et al., 2023).

In Indonesia, the Directorate General of Taxes (DGT) monitors two aspects of compliance: formal and material. Formal compliance, which includes timely reporting, is easier to monitor. However, to ensure material compliance related to correctness and accuracy in tax calculations, DGT requires in-depth analyses of various data sources (Rahayu, 2020). Through information technology sources, trillions of data are obtained, such as sensors, machine data, the internet, smartphones, social media, digitalization, user interfaces, and transactions, and this leads to one concept, namely Big Data. In this case, the use of Big Data and BDA becomes crucial. Big Data can help tax authorities detect evasion and improve tax compliance and has the potential to revolutionize accurate and comprehensive tax analysis of taxpayer behavior and tax policy effectiveness (Nurina et al., 2023).

The function of big data is to store complete data and present accurate data quickly (Supriyanto et al., 2021). Big Data Analytics (BDA) plays a key role in improving Indonesia's tax system, which has the potential to result in more efficient tax collection and better tax law enforcement (Nurina et al., 2023).

DGT is tasked with collecting state revenue from the tax sector, to support the State Budget. To carry out this task, DGT is equipped with a system to carry out the process of managing taxpayer compliance risk. The system in question is compliance risk management, or CRM (Utomo, 2021).

The development of BDA at the DGT began in 2014 through the development of Compliance Risk Management (CRM) risk. The purpose of using CRM is to build a more precise risk profile for taxpayers (Rahayu & Kudianto, 2023). Therefore, CRM is formed to pay attention to the risks that become the basis for influencing compliance in fulfilling tax obligations such as risks in new registration, tax payment, and correctness in tax reporting (Septiargo & Fiorenza, 2019).

The development of BDA in DGT began in 2014 through the development of a CRM risk engine to improve compliance with taxpayers, as well as to fulfill the performance indicators of the Tax Administration Diagnostic Assessment Tool (TADAT) Field Guide, specifically on POA 2 (Effective Risk Management) (Rahayu & Kudianto, 2023).

The development of CRM in DGT is driven by the lack of an optimal Decision Support System based on data-driven analysis, limited resource allocation and high workload, low understanding of taxpayer compliance behavior, and the need for a systematic process to identify taxpayer compliance risks to ensure taxpayer compliance can be conducted more objectively, transparently and fairly. Understanding tax risks along with the allocation of appropriate resources is expected to encourage the level of taxpayer compliance (Diamendia & Setyowati, 2021).

Based on the above phenomenon, the authors are interested in researching ‘Application of Big Data Technology with CRM Maturity Evaluation to Tax Compliance in the Digital Era’. Thus, this research is expected to contribute and benefit various parties, namely being able to contribute empirically regarding Big Data, CRM Implementation, or Tax Compliance, and become a reference and reference material for subsequent research. This research can also provide suggestions and as a material consideration in the implementation of taxation policies, especially the application of CRM and contributions in the form of information, descriptions, and insights regarding the effect of Big Data Implementation through the maturity of Compliance Risk Management (CRM) on Tax Compliance for parties in need.

## II. LITERATURE REVIEW

### 1. BIG DATA

According to (Assiddiq, 2022) Big Data is defined as a set of data that has such a large volume, velocity, and variety that it is difficult to store, manage, process, and analyze data using traditional databases and data processing tools. In recent years, there has been exponential growth in both structured and unstructured data generated by information technology, industrial healthcare, the Internet of Things, and other systems.

The underlying characteristics of big data include:

#### 1. Volume

Volume is a form of data whose content is so large that it cannot be accommodated in a single machine. Therefore, special tools and frameworks are needed to store process, and analyze the data. For example, social media applications process billions of messages every day, industrial and energy systems can generate terabytes of sensor data every day, cabin aggregation applications can process millions of transactions a day, etc. The volume of data generated by modern IT, industrial, healthcare, Internet of Things, and other systems is growing exponentially driven by the decreasing cost of data storage and processing architectures and the need to extract valuable insights from data to improve business processes, efficiency, and service to consumers.

#### 2. Speed

Velocity is how fast the data is generated. Data generated by certain sources can generate data at a very high speed, for example, social media or sensor data. Velocity is another important characteristic of big data and the main reason for exponential data growth.

#### 3. Variety

Variety describes the form of data. Big data takes different forms such as structured, semi-structured, unstructured, audio data, text, images, and even sensor data. Big data systems need to be flexible enough to handle diverse data.

#### 4. Veracity

Veracity refers to how accurate the data is. To extract value from data, the data needs to be cleaned to remove noise. Data-driven applications can only benefit from big data if the data is meaningful and accurate. Therefore, data cleaning is important so that false and incorrect data can be filtered out.

#### 5. Value

Data value refers to the usefulness of the data for its intended purpose. The ultimate goal of a big data analysis system is to extract value from the data. The value of data also relates to the correctness or accuracy of the data. For some applications, the value also depends on how fast we can process the data (Bahga & Madisetti, 2016).

With the development of technology that is increasingly massive, it allows various community activities to be carried out using the system. Data production is carried out regularly, on an increasingly large and diverse scale. Existing database management systems (DBMS) are not robust enough to handle the growing volume of data. To this end, a technology known as Big Data was created, which encompasses the development of an entire database system. Big Data consists of three components: volume, speed, and variety. Big Data Analysis (BDA) is required not just for the amount of data that can be stored and processed but to derive benefits from large data sets.

Due to limited resources in the DGT that are not proportional to the number of taxpayers to be supervised, the DGT focuses more on large taxpayers in identifying risks, even though high tax risks may occur in individual taxpayers or small-scale companies (Diamendia & Setyowati, 2021).

Through information technology, trillions of bytes of data are created every time from various sources, such as social media, sensors, video surveillance, and smart grids. This sea of data leads to one term, Big Data (Sirait, 2016).

## **2. COMPLIANCE RISK MANAGEMENT**

Taxes are an important source of domestic revenue, providing governments with the necessary funds to support social development and inclusive growth. Tax administration leaders apply CRM to ensure that their tax administration optimizes revenue collection by improving taxpayer compliance across the four basic tax obligations: registration, timely filing, timely payment, and correct reporting. It is a methodology used to systematically identify compliance risks within the taxpayer population and determine how to mitigate and address risks most effectively and efficiently (Darussalam et al., 2020).

Taxpayer compliance risk management, also known as Compliance Risk Management (CRM), is a process that is carried out in a structured, measurable, objective, and repeatable manner to support the best decision-making by the DGT in managing taxpayer compliance risk. This process includes the stages of preparation activities, context setting, risk analysis, risk mitigation strategies by determining treatment options, and monitoring and evaluating compliance risks. The functions of CRM according to Utomo (2021) are as follows:

1. Extensification
2. Service
3. Taxation Education
4. Supervision and audit
5. Collection.

The implementation of CRM in DGT aims to help DGT achieve the organisation's strategic goals by utilizing decision-making tools. CRM implementation can assist the Directorate General of Taxes in interacting with taxpayers more fairly and transparently, resource management becomes more effective and efficient so that in the end it will realize a

new compliance paradigm for the Directorate General of Taxes, namely sustainable compliance (Diamendia & Setyowati, 2021).

### 3. TAX COMPLIANCE

According to Rahayu (2017), Tax Compliance is a condition of taxpayers who carry out and carry out their tax obligations and rights, indicators of compliance:

1. Filling out the Annual Tax Return (SPT) completely and correctly according to tax regulations
2. Reporting the Annual Tax Return on time
3. Do not have arrears on all types of taxes,
4. Never been convicted for committing a criminal offense in the field of taxation.

According to Rahayu (2022), the definition of tax compliance is the obedience of taxpayers in implementing the provisions of applicable tax regulations. Measurement of taxpayer compliance:

1. Submission of Annual Individual Income Tax Return (PPH OP)

$$\frac{\text{Annual SPT WP OP}}{\text{Registered Individual Taxpayer}} \times 100\%$$

2. Submission of Annual Corporate Income Tax Return (SPT)

$$\frac{\text{Annual Corporate Tax Return}}{\text{Wajib Pajak Badan terdaftar}} \times 100\%$$

3. Periodic Value Added Tax (VAT) Notification Letter

$$\frac{\text{Average Value Added Tax (VAT) Period / Month}}{\text{Number of registered taxable entrepreneurs}} \times 100\%$$

Tax compliance is a situation where taxpayers fulfil all tax obligations and exercise their taxation rights (Sudrajat & Parulian Ompusunggu, 2015). taxation and exercise their taxation rights (Sudrajat & Parulian Ompusunggu, 2015).

### PREVIOUS RESEARCH

The Directorate General of Taxes makes optimal use of information technology to increase state revenue and minimize tax-related fraud. One of the efforts made is to explore data through social media and then match it with tax report data and savings accounts. This requires support from Big Data technology (Sirait, 2016).

The identified clusters focus on several areas of big data utilization, which are identified as showing new trends in tax analysis including Tax compliance and awareness using big data, other examples such as sentiment analysis, and cryptocurrency (Nurina et al., 2023). From the results of the above research, the hypothesis is proposed:

H1 : *Big data affects tax compliance.*

Efforts to maximize persuasive CRM are carried out through humanistic CRM reconstruction by optimizing the role of universities as a medium for sustainable risk-based CRM evaluation. The research results are intended as a contribution to the practical

implications of optimizing the application of risk-based CRM during a pandemic in mitigating the risk of sustainable taxpayer compliance. The implementation of humanistic CRM reconstruction is supported by the internalization of an educational approach to maximizing authority performance through collaboration with universities during the Covid-19 pandemic. The reconstruction results are expected to be continued by future researchers to explore aspects that encourage the growth and development of humanistic CRM at a sustainable practical level (Darmayasa et al., 2022).

Evaluation of the application of tax audits using the CRM model at KPP Pratama Senen in tax revenue with six evaluation criteria. shows that the application of CRM is fairly effective in terms of achieving tax revenue and increasing taxpayer compliance (Saptono & Khozen, 2021). From the results of previous research, a hypothesis is proposed:

H2 : *Compliance Risk Management affects Tax Compliance.*

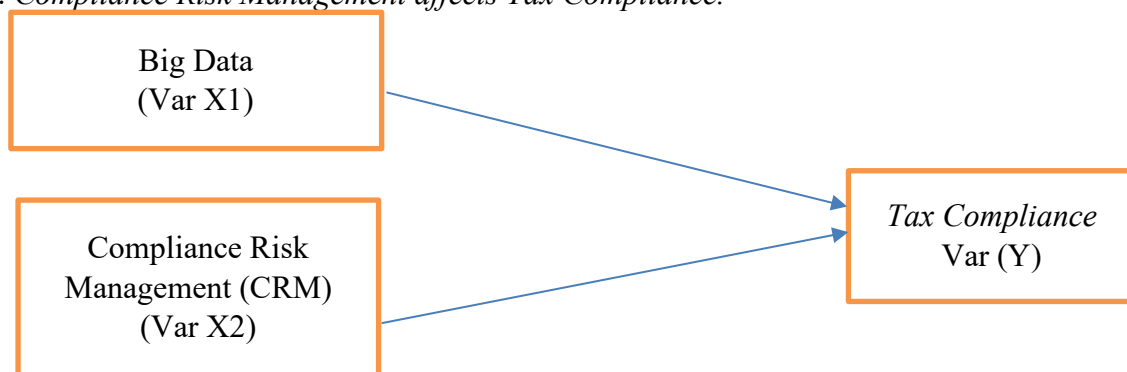


Figure 1  
Research Model

### III. RESEARCH METHOD

This research uses quantitative research methods. In the context of quantitative research, variables are measured using research instruments so that data in the form of numbers can be analyzed using predetermined statistical procedures (Kusumastuti, Adhi; Khoiron, A.M; Achmadi, 2020). The population in this study consisted of tax employees within the Regional Office of Jabar 1. The sampling technique was carried out using a non-probability method using purposive sampling. Criteria for sample selection Account Representative as a bridge between taxpayers and the Director General of Finance. This study uses primary data through distributing questionnaires and interviews. The questionnaire was conducted using a 5-point Likert scale. The data obtained will be processed through Smart PLS 4 software. Hypothesis testing is carried out using path analysis tests with primary data in the form of questionnaires distributed to Account Representatives in the West Java Regional Office area. And the sampling technique uses purposive sampling. The data analysis technique used is the Partial Least Square-Structural Equation Modeling (PLS-SEM) equation model. The tests carried out in this study are outer model evaluation with validity test and reliability test. Then, the inner model evaluation by looking at the R-Square value and hypothesis testing is carried out using Bootstrapping Test Results which are seen from the P Values.

Table 1  
Variable Operationalisation

No	Variable	Variable Concept	Dimension	Scale	Questionnaire Number
1	<b>Big Data</b>	<i>Big Data is defined as collections of datasets whose volume, velocity or variety is so large that it is difficult to store, manage, process, and analyze the data using traditional databases and data processing tools. In the recent years, there has been an exponential growth in the both structured and unstructured data generated by information technology, industrial healthcare, Internet of things, and other system</i> (Bahga & Madisetti, 2016).	1 Volume 2 Velocity 3 Variety 4 Veracity 5 Value (Bahga & Madisetti, 2016)	5 Point Likert Scale	1 2 3 4 5
2	<b>Compliance Risk Management</b>	Taxpayer compliance risk management, also known as Compliance Risk Management (CRM), is a process that is carried out in a structured, measurable, objective and repeatable manner to support the best decision making by the DJP in managing	1. Extensification 2. Service 3. Taxation education 4. Supervision and audit 5. Collection (Utomo, 2021)	5 Point Likert Scale	6 7 8 9 10

		taxpayer compliance risk. This process includes the stages of preparation activities, establishing context, risk analysis, risk mitigation strategies by determining treatment options, monitoring and evaluating compliance risks (Utomo, 2021)			
<b>3</b>	<b>Tax compliance</b>	Tax compliance is the taxpayer's obedience in implementing the provisions of the applicable tax regulations (Rahayu, 2020)	<ol style="list-style-type: none"> <li>1. Submission of Annual Individual Income Tax Return (PPH OP)</li> <li>2. Submission of Annual Corporate Income Tax Return (SPT)</li> <li>3. Periodic Value Added Tax (VAT) Notification Letter (Rahayu, 2020)</li> </ol>	5 Point Likert Scale	<p>11</p> <p>12</p> <p>13</p>

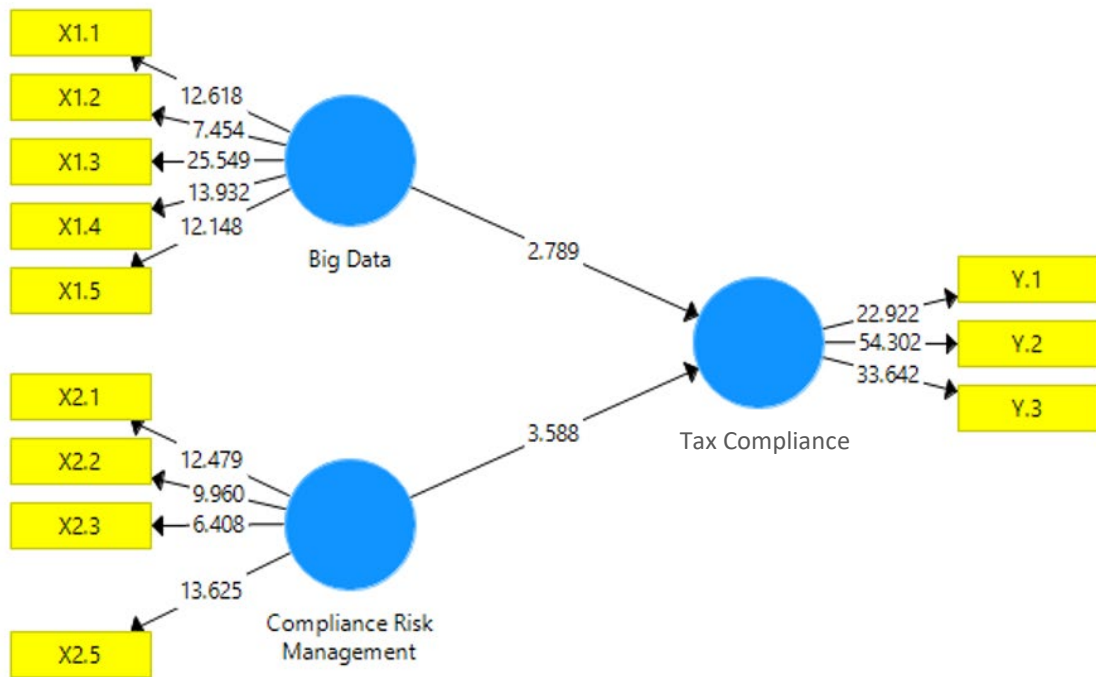
#### IV. RESULT AND DISCUSSION

##### 4.1 Research Data Analysis.

This research is primary data collected through distributing questionnaires for the period January - April 2024. The questionnaire uses Google from using a non-probability method using purposive sampling. The sample collected was 30 (thirty) Account Representatives in West Java Regional Office Region I. This research used a Likert scale questionnaire with 5 (five) answer choices, 1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = Agree, 5 = strongly agree. The data analysis used in this research is SmartPLS 4. Figure 4 shows the complete model path diagram for the external model.



Figure 2  
 Complete Model Path Diagram (for Outer Models).



The next step, evaluating the outer model, is the stage of construct validity testing which consists of convergent validity, taking into account the loading factor values, AVE values, and discriminant validity as indicated by the cross-loading values. Then, the second stage, namely reliability testing, is shown by the composite reliability value.

a. Convergent Validity

This stage has two value criteria that will be evaluated, namely the loading factor value and the average variance inflation factor (AVE) value.

Table 2  
 Outer Loading

	Outer Loading	Standar Value	Information
X1.1	<b>0.883</b>	0.500	Valid
X1.2	<b>0.798</b>	0.500	Valid
X1.3	<b>0.950</b>	0.500	Valid
X1.4	<b>0.828</b>	0.500	Valid
X1.5	<b>0.843</b>	0.500	Valid
X2.1	<b>0.823</b>	0.500	Valid
X2.2	<b>0.808</b>	0.500	Valid
X2.3	<b>0.737</b>	0.500	Valid
X2.5	<b>0.827</b>	0.500	Valid
Y.1	<b>0.905</b>	0.500	Valid
Y.2	<b>0.956</b>	0.500	Valid
Y.3	<b>0.916</b>	0.500	Valid

Table 3  
Convergent Validity Output (AVE)

	Average Variance Extracted (AVE)
Big Data	0.743
Compliance Risk Management	0.640
Tax compliance	0.858

From the results of the table above, the outer loading variable value and the average variance inflation factor (AVE) value are greater than 0.500, which means the data is valid.

#### b. Discriminant Validity

Table 4  
Discriminant Validity Output (Cross Loading)

	Big Data	Compliance Risk Management	Tax compliance
X1.1	<b>0.883</b>	0.475	0.593
X1.2	<b>0.798</b>	0.513	0.444
X1.3	<b>0.950</b>	0.569	0.538
X1.4	<b>0.828</b>	0.520	0.631
X1.5	<b>0.843</b>	0.657	0.557
X2.1	0.619	<b>0.823</b>	0.738
X2.2	0.331	<b>0.808</b>	0.498
X2.3	0.305	<b>0.737</b>	0.398
X2.5	0.661	<b>0.827</b>	0.605
Y.1	0.557	0.650	<b>0.905</b>
Y.2	0.599	0.654	<b>0.956</b>
Y.3	0.644	0.719	<b>0.916</b>

Based on the results of the table above, the correlation between the loading values of each item on the construct is higher than the cross-loading value, so the evaluation of discriminant validity is fulfilled.

#### c. Reliability Test

To test reliability, it is done by looking at the Composite Reliability value. Based on the table below, the Composite Reliability value is more than 0.700, so it can be stated that all variables are reliable

Tabel 5 Composite Reliability

	Composite Reliability	Standard Value	Informasi
Big Data	0.935	0.700	Valid
Compliance Risk Management	0.876	0.700	Valid
Tax compliance	0.947	0.700	Valid

d. Value R-Square

Table 6  
Output R-Square

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Tax compliance	0.592	0.633	0.103	5.752	0.000

Based on the output of the analysis using the bootstrapping method, the R-Square value for the Tax Compliance variable is 0.592, which means that the variability in Tax Compliance can be explained by the Big Data and Compliance Risk Management variables in the model of 59.2%, while 40.8% can be influenced by other factors.

e. Hypothesis test

Table 7  
Output Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Big Data -> Compliance	0.312	0.324	0.112	2.789	0.005
Compliance Risk Management -> Tax Compliance	0.532	0.537	0.148	3.588	0.000

Based on Table 7, the p-value of the Big Data quality variable (X1) is 0.005, and the p-value of the Compliance Risk Management variable (X2) is 0.000. The two independent variables in this study have a p-value of less than 0.05, which indicates that the Big Data variable Tax Compliance (X1) has a significant influence on tax compliance (Hypothesis I is accepted). These findings are from previous research conducted by Nurina, et al (2023). The identified clusters focus on several areas of big data utilization, which are identified as showing new trends in tax analysis, including tax compliance and awareness using big data, other examples such as sentiment analysis, and cryptocurrency. Next, the second hypothesis is the influence of Compliance Risk Management (X2) on Tax Compliance (Y) (Hypothesis II is accepted). This is in line with research by Saptono & Khozen (2021) Evaluation of the implementation of tax audits using the CRM model at KPP Pratama Senen in tax revenues with

six evaluation criteria. shows that the implementation of CRM is effective in terms of achieving tax revenues and increasing taxpayer compliance.

## V. CONCLUSION

Based on the results of the analysis and hypothesis testing, it can be concluded that big data and CRM influence tax compliance simultaneously or simultaneously in the West Java Regional Office Region I. It is hoped that this research can develop more widely. Authors can be more innovative to improve the quality of learning, especially in Tax compliance research. Future researchers can use other independent variables to develop similar research with different powers. In this research, 30 respondents were collected, so the next researcher will get more data.

## VI. APPENDIX

**Table 8**  
**Questionnaire**

NO	PERNYATAAN	STS	TS	N	S	SS
	<b>BIG DATA</b>					
1	Your information system can manage large volumes of data					
2	The information system at your place can handle various types of data, including structured, semi-structured, and unstructured data, audio data, text, images, and even sensor data.					
3	Your information system can manage the speed of data generation, processing and analysis					
4	The information system where you work can guarantee the quality and accuracy of data					
5	Data processing and analysis capabilities at your place of work to provide added value in improving business processes, efficiency, and services					
	<b>COMPLIANCE RISK MANAGEMENT</b>					
6	Taxpayers who have fulfilled the subjective and objective requirements as Taxpayers in the place where you work are the priority in granting NPWP to Taxpayers					
7	All registered taxpayers where you work will be given the same services without distinction of social status, ethnicity, race, and religion					
8	Taxpayers where you work will be given information and education regarding changes to tax regulations					
9	Less compliant taxpayers where you work are a priority for being given sanctions/reprimands					
10	The billing function to determine priorities for exploring potential taxpayers where you work is carried out according to procedures					
	<b>TAX COMPLIANCE</b>					
11	The rate of submission of individual taxpayer tax returns at your place of work increases every year					
12	The level of submission of Corporate Tax Returns at the place where you work increases every year					
13	The level of delivery of e-invoices at your place of work has increased every year					

Figure 3  
 Output PLS Algorithm (Step 1)

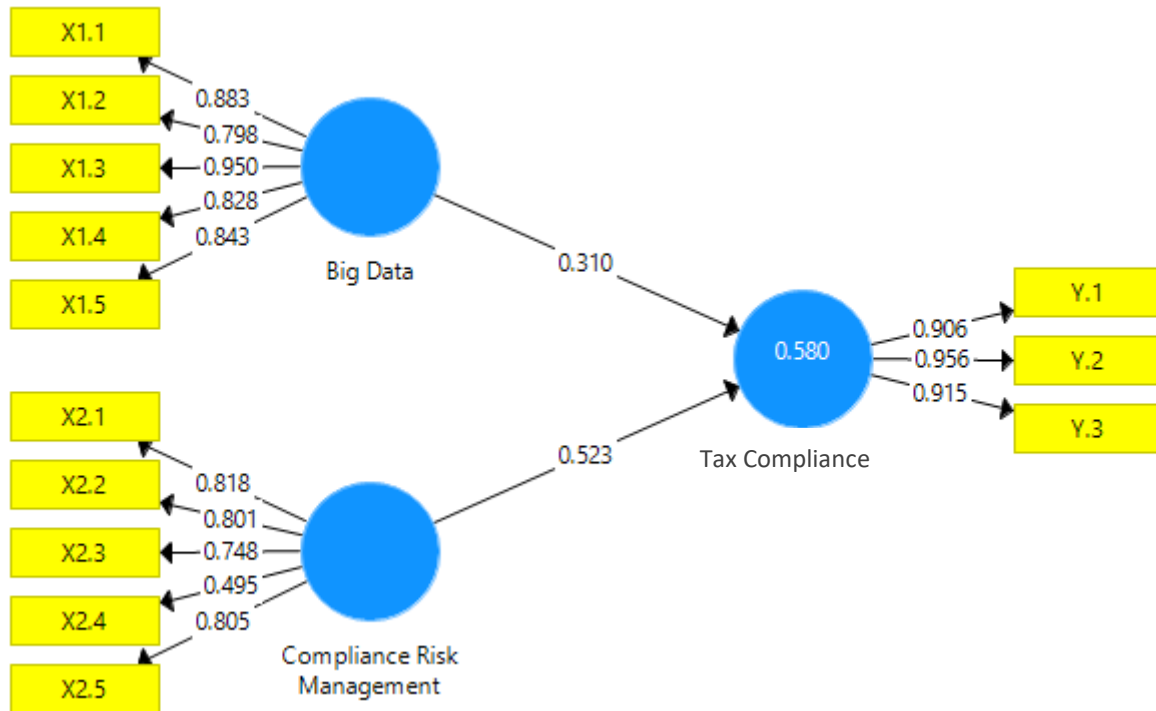
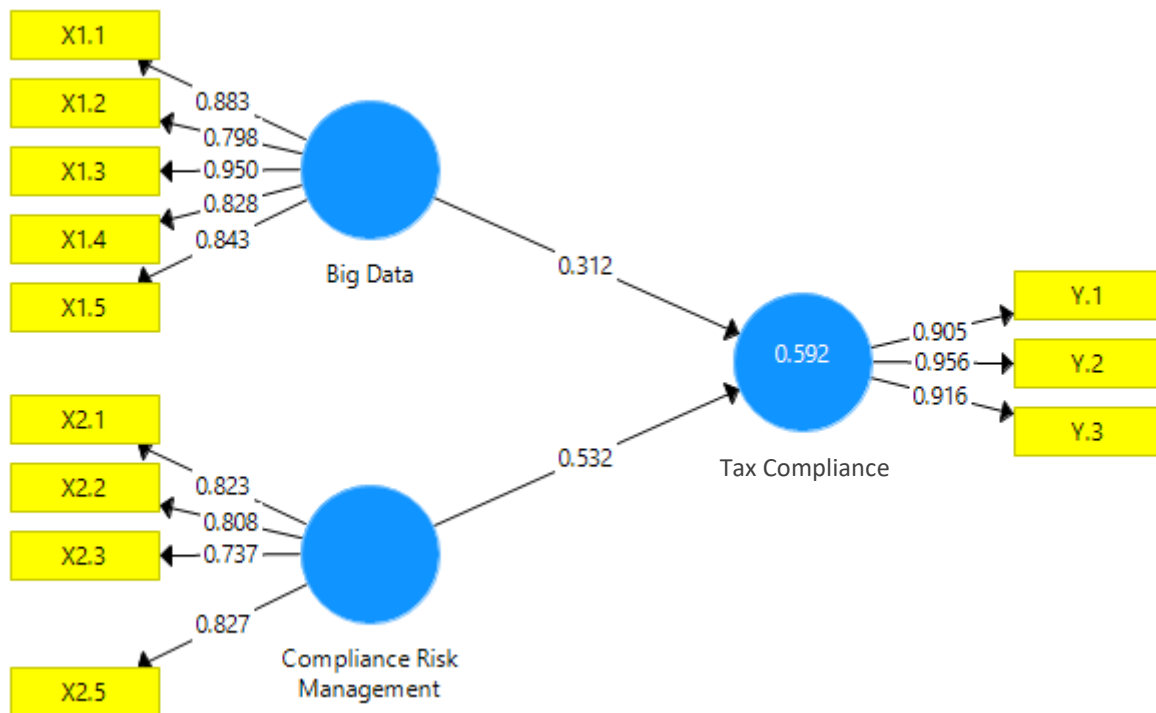


Figure 4  
 Output PLS Algorithm (Step 2)



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