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Economic crime data management (ECDM) model for sustainable growth.

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Abstract

Economic crimes cause notable damage to the overall economy of the nation, negatively influencing the growth and improvement of the government. The faith in the financial trustworthiness and security of the country is undermined which further, affects the countries global competitiveness. Moreover, the nation becomes unworthy of investments from inside as well as outward. This paper proposes a conceptual model for a centralized reporting system aimed at providing the reports on economic crimes. These reports can be further used for studying the historical patterns and improve the performance of the law enforcement agents. A developing country like India is more prone to crime attacks, and where there is a significant number of an economic crime, the government and bureaucracy are also surveyed as being nefarious and dull. Some of the notable consequences on the national economy that may be caused by the economic crimes are increasing in inflationary pressure, uneven distribution of resources and parallel economy. Further, marginalization of the tax base, production of black money and weakening of developmental work are other factors which will impact the nation. The nation will become a territory for corruption, and illegal businesses. Economic offenses, such as imitation of currency, financial scams, fraud, money laundering, etc. are crimes which invoke severe concern and impact the nation's sustainable growth. Curbing the economic crimes to the least will pay the way for a sustainable environment.

Key words: Economic crimes, sustainable development, centralized model, parallel economy

I. Introduction

In the eleventh UN, Congress Committee held on 19 April 2005 at Bangkok, Thailand to address the issue of crime prevention and justice. It was brought forward by the representative of Thailand that the actions such as drug trafficking, exploitation of natural sources, corruption, and misuse of reserves from banks concerned the economic wellness of the people. Further, the outcomes of such actions sometimes advanced well beyond financial decline and the economic stability of the community. It is necessary that the citizens of any place feel that they are lasting in a stable and righteous nation and, if economic and financial crimes were not checked, people would begin to feel frequently resentful. The suspects who were behind economic crimes were usually smart and cultured, making use of financial support to build extensive connections with law enforcement executives. In many cases from the past, officials had to fight interference from influential powers, and that was often more complicated than the investigation itself. Strong political directions and government responsibility are needed to combat such crimes. If the perpetrators were constituents of the government, decisive and speedy action would reconstruct society's faith in government policy on the issue.

The sustainable natural resource management also faces a significant hit as a part of economic crimes. The misuse of natural resources by few powerful agents or miscreants will lead to an unforeseen effect. If the balance between the usages of the natural resource does not extend to meet human needs without threatening the stability of the ecosystem, then it implies the economy is heading towards an undesired state of living. Further, this will lead to an environment with uninhabitable qualities. The threat to natural resources is a global issue. Enough Projects researched eastern Congo and released its findings on Jan 2015.This study reveals that there existed a widespread support, among the Congolese human rights and affected communities for stopping the natural source robbery. According to one member of the bar in

eastern Congo, the economic crimes are becoming a part of their daily life .Further, a Congolese ex-minister has pointed out that Mafia practices are finding a good breeding ground in Congo mostly focused on exploiting the natural resources and minerals of the forests.

A glance at the 2015 National Crime Records Bureau data of India shows a bordering increase in the number of economic offenses from those recorded in the previous year. In the last ten years, the recording of economic crimes such as deception and unlawful breach of trust has doubled. This period was when during which India has been moving towards adaptation of technology.

In India, the Directorate of Enforcement(ED) is a law enforcement agency which originated in the year 1956.Initially, this unit was known as the enforcement unit and later it was renamed to the Directorate of Enforcement in the year 1957. The ED is an economic intelligence agency which is accountable for implementing economic laws and combating financial crime in India. ED is a division of the Department of Revenue; Ministry of Finance.Few of the cases dealt by ED during the year 2016 is listed beneath. Louis Berger bribery scam wherein the chief minister of Goa Kamat was enquired for allegedly receiving a bribe to grant contracts for sewage and water project in state-funded by Japan International corporation(JICA).The Enforcement Directorate ceased two properties of drug lord Jagadish Bhola at Fatehgarh Sahib under the prevention of money laundering case. The probe into the forex violation in USL's Whyte and Mackay deal in which Vijay Mallya was involved. The Enforcement Directorate attached the YSR Congress party chief Jagan's asset of worth Rs.749 crores in the money laundering case. This paper proposes a conceptual model for an active economic crime repository for deriving insights for future actions with regards t crime detection.

II. Literature Review

Belousova (2016) has analyzed and offered his findings on the problems associated with economic crimes. He considers qualitative trends, the preeminent scholarly approaches, cause-effect associations, and the reasons for the growth of economic crimes and measures to subdue economic crimes. The author has further analyzed and demonstrated the components of economic crime using law enforcement's fight with regional economic crime in Irkutsk blast.

Boldyreva (2001) has listed out the effects and impact of economic crimes on the socio-economic balance of Russia. Engdahl (2009) has used the concept of "hiding behavior" wherein he shows how the economic problems act as the catalyst in influencing the commitment of crimes. Moore et al focuses on the problem of online crime, which has taken off as a grave trade since about 2004.

Latov (2000) has analyzed the economic theory of crime and punishment. Pinotti (2015) has studied the causes and impact of organized crimes. Pinotti (2015) has analyzed the economic cost of organized crimes in southern Italy exposed to mafia activity after the 1970s.The author has monitored the economic development of the two regions in south Italy and has applied synthetic control methods for estimating the economic performance in the absenteeism of organized crime. The author has identified a low GDP in both the regions which he has under taken for observation.

Lens et al. (2016) has tested the effect of criminal activities on the economy. Further, the author has brought out the scenario in New York which shows the commercial property values fluctuation based on the magnitude of the crime committed in a particular geography.

Pressman (2008) in his paper has identified several fundamental differences between the political strategy and the neoclassical strategy to crime. The author has also shown how these disagreements lead to the policy conclusions. The author further states that how the political economy method to would lead to lower crime rates.

Shelley (2080) has come up with the report on whence transnational organized crime has become a pivotal issue in international affairs and its impact on the global economy. The author proposes a regional level analysis and transnational assessment system to reduce organized crime in South-eastern and Central Europe.

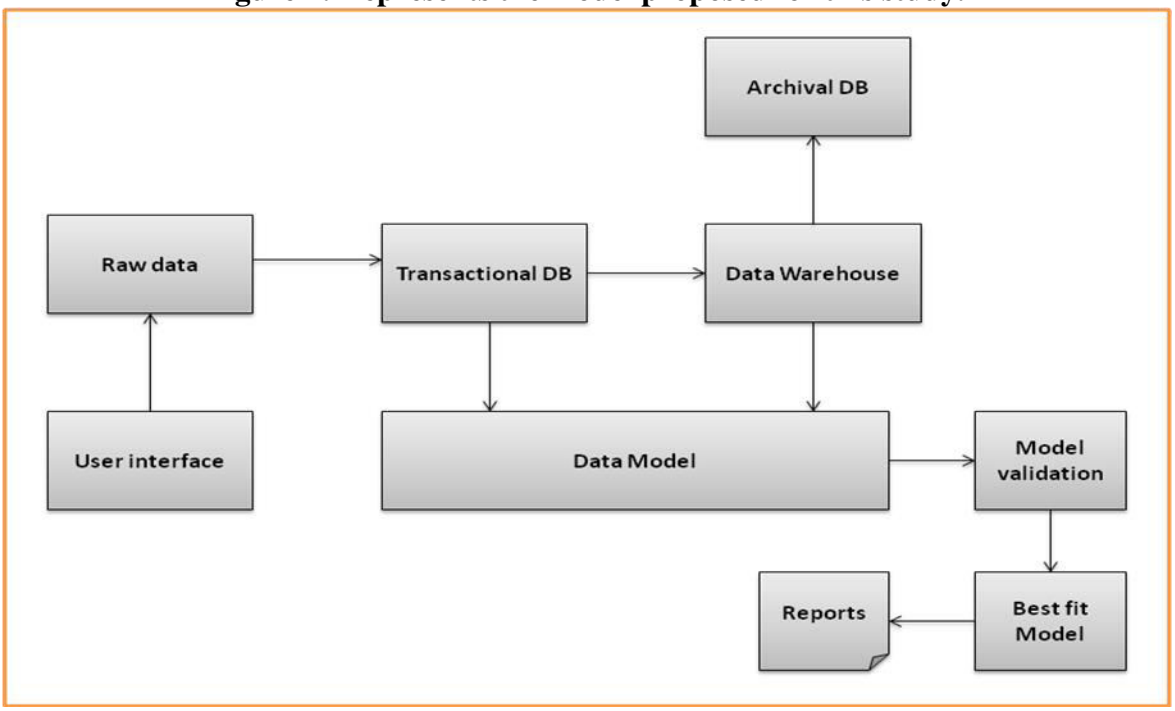
III.Methodology

The model is aimed at proposing a centralized system from which reports can be churned out for efficiently reducing the economic crimes. This model will help in creating awareness within law enforcement agencies and will guide in planning the way forward for the law enforcement agents. Preventive measures and police personnel deployment can be done based on the reports received from the model.

Tamil Nadu is the 7th largest state in India. Chennai is the capital city of Tamil Nadu and the state has 32 districts. The model can be implemented in Tamil Nadu and data of the six districts can be initially fed into the model post which the model can be extrapolated. The model will be initially restricted to handle the data related to Chennai, Coimbatore, Madurai, Tiruchirappalli, Salem and Tirunelveli.

Proposed Model

Figure 1: Represents the model proposed for this study.



User interface/Raw data

The current and historical data will be included in the model for data pattern interpretation.

Historical data:

The historical data loading for the six cities will be achieved through the initial one time loading using bulk loading concept in DB. Bulk-loading is the method of storing data specified in lines of a file directly into a database system, rather than performing a long series of INSERT statements. The comma separated values (.csv) data file format chosen will be chosen for bulk-loading into databases. The file format will be adopted for better and quick adaptability.

Current data:

The current data will be fed through the user interface on a daily basis. The data granularity will be on a daily basis.

Table 1: Raw dataset

Dataset -Meta data	Values
Police Force Strength	200
City/District	Madurai
Crime_rate_indicator	Highest
economic_crime_type	Robbery
Crime_cases_recorded	189
Crime_section	408, 409 or Prevention of corruption act,1988
Year	2015
Economic indication(Per capita income)	56506
Expected Income growth percentage	10.34
Literacy rate	83,45
Accused details	Socio demographic profile
Complainant details	Socio demographic profile

The current data set will include the above details such as the details of the crime and the complainant details to predict the sector gullible to economic crimes and the sector involved in the crime. This data can be further used for analysis.

OLTP or Transactional DB

OLTP (online transaction processing) can be used for the recording the data on a daily basis. The OLTP system is employed by a large number of users. The database is simple, to use and the response times are small since the OLTP system handles the data at a daily granularity alone. Benchmark SQL and PostgreSQL Database servers are open tools which can be used during the initial phase of the model set up post which the licensed versions like Oracle and other products can be utilized based on the data growth.

Data Warehouse or OLAP

The OLAP will be split into two components the staging DB and the data warehouse reporting layer. The daily data from the transaction database will be a move to the staging layer table's post which the data will be moved to the data warehouse layers. The data cleansing and transformation will happen when the data is transferred from the staging layer to the data warehouse layer. The warehouse layer will comprise of the past four years data and the current data. The archival of data will be done on data older than four years and the purging logic will be set for the data older than 10 years.

Data Modeling/Validation

The data modeling and validation is the vital part of the model which aims at providing apt reports for further action. The data models will be validated and at the end of the research the best fit model will be proposed. The open source tool r is the best practical tool for data prediction and modeling. The optimal cost associated with the r programme helps in achieving the required objective. The two approaches considered for the modeling will be the decision tree and linear/logistic regression techniques. Further, this model needs a suitable analysis algorithm, recognizing data patterns and creating distribution rules. The reliance of the analysis model can be obtained by employing it upon the analysis data. The cluster method will be applied for the inference of data and k fold cross validation will be chosen for data validation. The cluster analysis will be utilized for splitting up the data into suitable subsets for interpretations and inference of patterns.

Reports

The reports will be populated based on the requirement of the end user. The QlikView tool will be considered for designing the reporting layer. The dashboards will be used for providing insights regarding the past and current data. The QlikView tools associative engine assists in connecting any amount of data roots extending a platform to explore data. Further, the reports aid in arriving at a decision based on the data overview obtained from the dashboards. Some of the reports aimed at are listed below. Though the reports below are projecting the high-level data, the model will focus on reflecting even the lowest granularity of details.

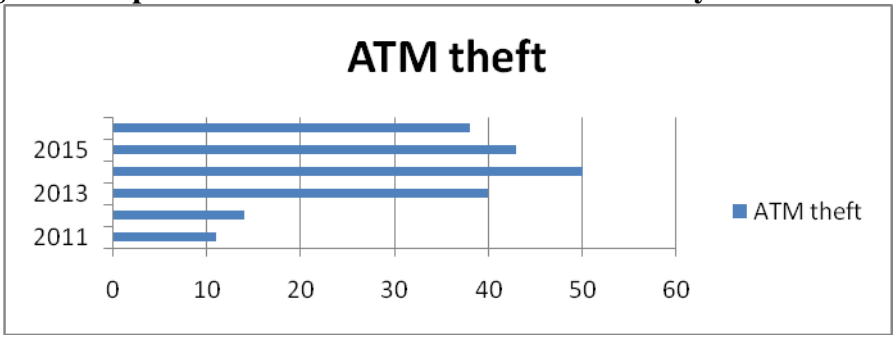
ATM and Bank theft report:

The increase of banks in a growing economy has produced with its corresponding increase in the incidence of banks and ATM-related crimes. Although the theft in banks and ATMs constitute a small section of all other types of thefts, it is exponentially rising in the current years.The table 2 and Figure 2 indicate the theft occurrence in ATM from year 2011 to 2016 from the SCRB records.

Table 2: Represents the SCRB theft data from year 2011 to 2016

	2011	2012	2013	2014	2015	2016
ATM theft	11	14	40	50	43	38

Figure 2: Represents the statistics of ATM theft from year 2011 to 2016

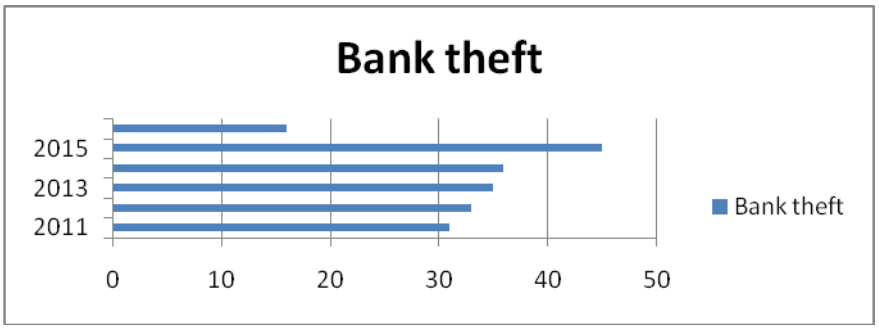


The table 3 and figure 3 indicate the theft occurrence in bank from year 2011 to 2016 from the SCRB records.

Table 3: Represents the SCRB theft data from year 2011 to 2016

	2011	2012	2013	2014	2015	2016
Bank theft	31	33	35	36	45	16

Figure 3: Represents the statistics of Bank theft from year 2011 to 2016

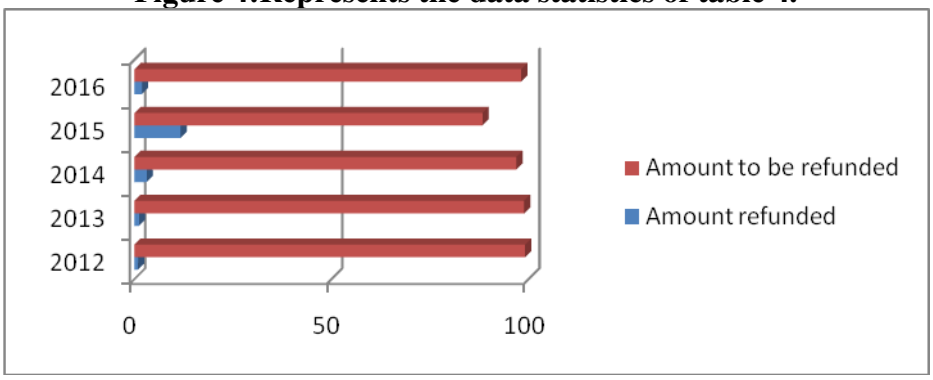


On analyzing the State crime records bureau (SCRB), the Non-banking financial institutions have played a significant role in defaulting payment towards its investors. As per the SCRB record of the year 2016 about 26,439 depositors have deposited Rs.127.27 crores with the defaulting financial institutions. The reports further project that only 1.88 percentage of the amount has been refunded this implies that just 2.413 crores have been repaid.

Table 4: Represents the amount refunded and to be refunded by the non-banking financial institutions.

Year	Amount refunded	Amount to be refunded
2012	0.9	99.1
2013	1.16	98.84
2014	3.11	96.89
2015	11.7	88.3
2016	1.88	98.12

Figure 4:Represents the data statistics of table 4.



Drugs seizure report year 2016

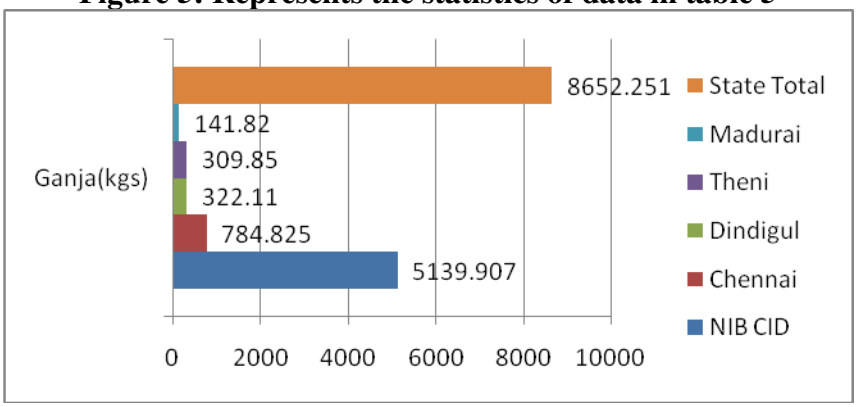
The data on the seizure of illegal drugs for the year 2016 is listed below total of 3,424 cases were registered under the Narcotic Drugs and Psychotropic substances act, 1985.The 3424

cases include the1871 cases registered by the narcotics intelligence bureau (NIB) in Tamil Nadu along with the 302 petitions filed in Chennai,142 cases recorded in Theni,136 cases filed in Madurai and 97 cases registered in Dindigul. The total kgs of drug seizure at the state level amount to 8652.251 kgs.

Table 5:Represents the drug seizure data

Agency/District	Ganja(kgs)
NIB CID	5139.907
Chennai	784.825
Dindigul	322.11
Theni	309.85
Madurai	141.82
State Total	8652.251

Figure 5: Represents the statistics of data in table 5



Need for the model.

The accurate forecast and predictions are required for building a decision support system. The emerging technology and trends are paying the way for new patterns with regards to economic crimes. The hacking of the bank systems and dwindling of funds online are on the rise. The traditional method of crime detection will overlook the new trends in economic crimes. A model with a high customizable feature is the need of the hour. When the world economy is moving towards digitization and artificial intelligence a top precision crime detection system will help in building the economy of a country. The stable economy will assist in achieving sustainable growth. Constant check on the natural resources and illegal trade of natural resources can also be monitored using this model. Unmonitored economic crimes will lead to the growth of petty robbers into established goons. A classic example of the above scenario is Veerappan, a poacher who was active for nearly 30 years in the forests in the states of Karnataka, Tamil Nadu, and Kerala. Veerappan committed his first crime in 1962.He gunned down tusker and injured three police officers. The atrocities of Veerappan grew from then until 2004 during which he was killed by Tamil Nadu Special Task Force members. A simple model or system in place would have provided an insight into the pattern of crime and would have aided the law enforcement agents to have solved this crime far ahead with respect to Veerappan's case. This model will help in measuring the gravity of the crimes based on which the resource personnel can be deployed based on the requirement.

Conclusion

Economic Crime Management in a developing country like India is the necessity of the moment. This model proposed here aims to provide members of law enforcement agencies with a technical solution to fight economic crimes. The combined features of technology with experience and knowledge of economic crime from a localized perspective will help in addressing the issues based out of the regions across India. The focus of the model will be on fraud strategies, economic crime challenges, and on implementing technological and analytic resolutions. The model has been proposed to adhere to the growing demands of professional's personnel in law enforcement agencies and government. As an extension of this research, the modules built across various geographies can be centralized, and this centralized model will be proposed for economic detection.

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