# FACTOR AFFECTING FOR PROPERTY BASED CRIME IN WESTERN PROVINCE

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**Degree of Master of Science**

**Department of Mathematics**

**University of Moratuwa**

**Sri Lanka**

**July 2018**

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**Dissertation submitted in partial fulfillment of the requirement for the degree Master of Science in Business Statistics**

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# DECLARATION

I declare that this is my own work and this thesis does not incorporate material without acknowledgement previously submitted for a Degree or Diploma in any other university or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out the research for the Master dissertation under my supervision

Name of the supervisor : Prof. T.S.G. Peiris

Signature of the supervisor : Date : 23/07/2018

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Thank you.

# ABSTRACT

Less attention has been given for statistical analyses related to crime data in Sri Lanka collected at different police stations and it is high time to give priority for such analyses and derive non subjective statistical inferences. The purpose of this study was therefore to identify the significant factors affecting property based crime in the Western province of Sri Lanka. The response variable was nominal and binary category namely: (i) crime against person ('against person') and crime against property ('against property'). The four explanatory variables considered are: (i) time (day vs night), (ii) power in political party (previous government vs current government), (iii) senior police divisions (10 divisions), and (iv) strength of police. Of those four variables, the strength of police was the only continuous variable and other three were considered as categorical variables. The necessary data from 2013 to 2017 were acquired from the crime reported division in Sri Lanka police on yearly basis. Based on the binary logistics models fitted for each variable, it was found that all four variables: time, power in political party, strength of police and senior police divisions were significantly influential ($p < 0.05$) on type of the crime. Crime against property was more likely to be occurred during night time than day time and also, crime against property was more likely to occurred during previous government than the current government. When the variable of strength of police was considered there was significantly lower occurrence of property based crimes for the high mean strength of police stations than that for low strength of police stations. There is a significant difference in the probability of occurrence of property base crimes among ten senior police divisions and among them, senior police divisions of Colombo Central and Colombo-South indicated high occurrence of property crimes. When all four variables were considered, only time, power in political party and strength of police were found to be significant ($p < 0.05$) on the occurrence of crime. When all three significance variables were considered the probability of 'against property' is 3.987 times higher than that of 'against person'. The statistical inferences obtained by this study is immensely useful for planning to reduce the crime in Western Province and it is recommended to carry out similar studies in other areas as well.

***Keywords***: Against Person, Against Property, Binary Logistics Regression, Crimes, Strength of Police

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# LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| CRD | - | Crime Reported Division |
| SP | - | Senior Police |
| GLM | - | Generalized Linear Model |
| SPSS | - | Statistical Package for Social Sciences |
| DIG | - | Director Inspector General |
| SDIG | - | Senior Director Inspector General |
| CPTED | - | Crime Prevention Through Environmental Design |
| IRC | - | Island wide Registered Criminal |
| NYPD | - | New York city Police Department |
| UCR | - | Uniform Crime Reporting |
| FBI | - | Federal Bureau of Investigation |
| IGP | - | Inspector General of Police |
| MPD | - | Mirihana Police Division |
| LR | - | Likelihood Ratio |

# CHAPTER 1

# INTRODUCTION

## 1.1. General Introduction

Since rise of grave crimes rates in Sri Lanka after the civil war which irritated life style and peace and harmony among the nationalities for 30 years (Annual Criminal Statistic Report, 2016) the study was conducted to mitigate the issue by providing comprehensive quantitative analysis to identify the factors affecting grave crimes. A developing country like Sri Lanka is heavily affected unless crimes rates are under control and it can directly influence the social and economic performances of the country. Grave crimes have large impact of social well being of human and the families daily routine and dependents' educations and satisfaction (Ratnayaka, 2015).

A crime basically means a damage or an action which harm to a body of a person or to a property. Actions against the government also is considered as crime. Crimes such as gang robberies, illegal droves, murder, deforestation were reported as severe crimes in late eighteenth centuries in Colombo city under British government. It was reported to be 404 per hundred thousand population, after permitting Tamil and Muslims to settle in Colombo. Hence, the population started increasing meanwhile crime rate also rapidly increased (Obesekara, 1975). With the industrial revolution , the society became more economically diversified and become more sophisticated. People engaged more frequently with others in the social world through the technology. In fact that made world more connected and information started flowing every seconds such actions directly influenced improvement of crime rate.

Crime is a social phenomenon which includes negative effects on the society moreover, showing rapid increase of the number of property crimes all over the country. The study focus on causes affecting the processes of investigation of reported crimes and the strengths and weaknesses of law performing sectors. Crime is an offence( Glanville, 1982) . A misdeed, and a single wrongdoing or a crime leads to two causes of action.

Those two causes of actions are explained as “Civil wrong “and “Criminal wrong”. Obviously, a crime is an offence because each criminal act embodies serious threat on the security and the virtuous life style of all in the society (Glanville, 1982). As stated in the book named “Legal Duties”. The society may not be unaffected or safe by just paying compensation for a party jeopardized by whatever criminal act (Allen, 1996). Merely due to the absence of fixed definition to determine a crime, the decision that “crime is an action with end results of a criminality which produces a process of legal action in a criminal court ( Glanville, 1982).

## 1.2. Definition of Crime

A crime is an unlawful act punishable by a state or other authority . The term crime does not have any simple or universally accepted definition, though statutory definitions have been provided for certain purposes. The content is based only on the different procedures of criminal as distinct from civil cases can serve as a reliable distinguishing mark (Sunstein, 1995). There is no legally defined delineation on Crime contained either in Sri Lanka Penal code. or in English criminal law.

It is clear that there is an inherent common meaning on Crime in all conventionally described definitions. Criminal behavior is behavior in violation of the criminal law. No matter, what the degree of immorality, reprehensibility or indecency of an act; it is not a crime unless it is prohibited by the criminal law. The criminal law in turn, is defined conventionally as a body of specific rules regarding human conduct from other rules which are, therefore, politically; specificity; uniformity and penal sanction. However, these are characteristics of an ideal, completely rationale system of criminal law; in practice the differences between the criminal law and other bodies of rules for human conduct are not clear-cut. Also, the ideal characteristics of the criminal law might not always be features of the criminal law in action.

### 1.2.1. Variation of Crimes

There are few specific features namely, doing a crime, Illegality; prevalence of a social risk, and the action subjected for a punishment etc., through which a crime can be identified. The other way of in-depth defining of crimes is to categorize the crime and to perform the defining. The categorization of crimes are attended differently in varied country contexts. The bureau of crimes in America used to categorize crimes in two ways, aggravated crimes and other crimes (Cohen and Felson, 1979).

Criminal acts namely homicides, rapes, robberies ( money / property) , assaulting, burglaries, ransacks are categorized as aggravated crimes and those crimes set on fire, defrauding property and money ; prostitution ; child abusing ; violating traffic laws ; are listed under ‘other ‘ crimes. Nevertheless, the commonly accepted categorization which is popular in most of the countries is in two groupings namely (1) crimes against the individual and (2) crimes on property. It is elaborated that crimes against individual means the misdeeds done against men or women in a harmful manner. In this type of crimes a damage caused physically is predicted. Murdering, attempted assassination; assaulting; injuring; raping; abductions are some of the examples, The crimes such as, stealing, ransacks, accepting unauthorized property or goods, cheating, harmful actions, unrighteous entrance etc. are considered as illegal acts against property. The said property can be identified in three categories, intellectual property, immovable property and movable property (Sunstein, 1995).

### 1.2.2. Legal Provisions of Crime

This can be explicated in simple terms that crimes such as avoiding justice and fairness, conspiracy, giving flawed evidence, insulting court of justice, violating traffic laws are mis-deed actions done against criminal justice, and fairness. As per the Legal provisions, the sexual crimes are the unwarranted sexual acts such as abusing women, multi marriages, oppressive sexual acts, abnormal sexual acts, prostitution..etc (Clark and Cornish). Whereas, whatever misdeed or illegal action involved by the Government

within its power structure in a country, is considered as political criminalities and when the, accused becomes the straightforward offender it is known as the victimless crime, and when the affluent social groups is involved in criminal acts by manipulating their own professional status can be briefed those actions in simple terms as "white color crimes" (Sunstein, 1995).

### 1.2.3. Social Impact on Crimes

"Crimes" are notable and specific factors within the social conspiracies being faced by current Sri Lanka as a developing country. It is unquestionable that crimes are factors disturbing the development in any country. It is also un-debatable that when the background of crimes are discussed, there are causes affected within the modern society of Sri Lanka that, those socio-economic and political re-organizations happened after the decade of 1970 and the weaknesses of the educational policies in this country (Ratnayaka, 2015). An observable factor is that the open economic policy introduced in 1978 to stimulate foreign investors, also blasting the 'closed economy' prevailed between 1972 and 1976 has influenced vigorously on the current face of criminal actions. As a result, the dimensional family systems which prevailed within the traditional society had transformed gradually to the levels of nuclear family surroundings, together with urbanization and environmental pollution and have emerged as forceful crises (Chu and Tusalem, 2013). In this context, money fronted society has emerged due to the fact that value of money has become the decisive factor in respecting the society. In the said distorted social change series of criminal actions, sexual crimes, political based crimes together with varied types of misdeeds could be identified. In contrary, specific identification was possible within Sri Lanka on the nature of wrongdoings, as well as the faces of crimes and also about the victims of varied crimes.

### 1.2.4. Crimes and Economic Crisis

One other notable factors was that murdering for money on targeted seizing of financial assets based on economic factors, kidnapping or abduction, Getting ransoms, and other property based crimes were prevalent within the Sri Lankan society either in the shape of organized economic crimes or in the faces of dis-organized economic crimes (Ratnayaka, 2015). In the cases of doing economic and physical arbitrary discretion those attended in an organized manner such crimes are denoted as 'Organized economic crimes' (Ralston, 1999).

The above measures are attended purely for economic benefits and an assorted gang's culture has inherited. The degree of supremacy within criminals is so powerful, in which the legal mechanism too, has become a mallet (Ralston, 1999). It is also a notable factor that the frail status of law being adopted on criminals has been a cause of more criminals emerging in the Sri Lankan Society. An increased attention of the society has been visible on strategies of the sudden earning of money among the disorganized economic crimes. Gambling is a specific move on the same and organized gangs of criminals are endowed with in a skillful manner. The aim of these types of gangs is to grab money either from the person handling betting transactions or from the croupier (Ratnayaka, 2015). When the profit distribution is concerned there is an invisible hierarchy and even those holding positions of such chain of command do not know those who act in different positions. These types of crimes are done by breaking the law as they wish and continue in a new face with the usage of hand phones and also using computers to access internet. Also noticeable that these gangs are involved in abductions for money, provision of loans under higher rates of interest and importing harmful drugs and trafficking same (Ratnayaka, 2015). As a whole, existence of an economic hierarchy within the economic network of the country, be equipped with capabilities inherent to them, be with personalities, ganging and the political sponsorship, sub cultural identities, leaderships are the features adopted within their organizations.

### 1.2.5. Changes of Nature of Crimes in Sri Lanka

After the decade of 1970 it was possible to identify specific change in the nature of crimes within the structure of societal setting with changes based on economic factors. In 1867 crime data collection was done according to this; murders, casual murdering, poisoning for robberies, money robberies, road robbery, stealing, illegal droves, damages by flame, rapping, unnatural offends, overreaching houses, and escaping from jail, 52,157 number of crimes were reported throughout the island in 1890 and among those crimes, there were 893 murders, robberies 499, stealing of property 16284 cycle stealing, 1886, severe injuries 2190, knife injuries 7,513, were there (Obesekara, 1975). Now the rate of grave crimes (Island wide) increase and decrease yearly.

Police includes on egregious crimes within the categorization of crimes in Sri Lanka (Chamikara, Galappaththi, Nawarathna, Kodituwakku, Gunathilake and Liyanage, 2015). In line of the same, 26 egregious crimes were named while, categorizing it was divided into two categories, while one of them is related to physical and the other is related to properties. Grave crimes are very serious crimes for which a person will normally be prosecuted in a criminal court for a trial. With the data analysis done in the recent past , it was revealed that there is a higher increase and growth of property related crimes among the most egregious criminal acts. As mentioned earlier too, the root cause for large majority of crimes are economic advantages. This has been well evidenced through the flow of criminal acts happened in Sri Lanka in the recent times.

## 1.3. Worldwide Situation of Property Crimes

The UCR reported that property related crimes occur in every three seconds in America as per the reputed criminal reports published. According to the data appearing in UCR reports higher volume of property related crimes are not disclosed. Professionals of crime related dealings have identified crimes against property in different nature. Certain misdeeds are launched by amateur mobs and such moves are strategized only when the opportunities are met for which they have not followed or gained any skills. Possibly

such actions can be habitual having added to their moves. It is also famous that specialized property robbers involve in asset based crimes.

In the global setting there are historical reports on property based criminal actions (Quetelet, 2010). In America, 51.6% of property related thieves in the decade of 1970s were less than 12 years old, and 19.8% of thieves were between 12 and 22 years old. The 52.6% of those smuggled motor cars were less than 12 years in age while, 71.6% of them were less than 21 years of age (Quetelet, 2010). Also, the FBI reports signify the above figures. In 2016, there were an estimated number of 1,248,185 violent crimes. Murder and non-negligent manslaughter offenses increased by 8.6 % when compared to estimate from 2015. Aggravated assault and rape offenses had increased by 51 % and 49 % respectively during a year, and robberies also had been increased nation-wide, and there were estimated 7,919,035 property crimes, too. The estimated numbers for two of the three property crimes show declines when compared to the previous years' estimates (Cohen and Felson, 1979).. Nationwide property crimes in 2015 resulted in an estimated net loss of about 0.3 billion. Larceny-theft accounted for 71.3 percent of property crimes, burglary accounted for 19.8 percent, and motor vehicle theft accounted for 8.9 percent.

### 1.4. Sri Lankan Situation of Property Crimes

It is a common feature that in both developed and semi-developed countries the focused propensity on property related crimes compared to other crimes and also the increased number of victims emerging annually, emphasizes the existence of the criminal horror (Chu and Tusalem, 2013). Within the Sri Lankan Society as well, varied criminal actions are specified in line with the Chapter-XV11 of the Penal Code namely Theft, Robbery, dishonesty is inappropriation of property, Criminal Breach of Trust, the receiving of stolen property, cheating, fraudulent deeds and dispositions of property as well as mischief and illegal removal of wrecks. Currently, there are 437 police stations established in Sri Lanka. When the emerged volume of criminal acts are concerned, out

of total 36,937 crimes reported in 2016, 71% of those were linked to property related matters which had represented total 26,388 criminal acts. Similarly, 25,607 criminal incidences were reported in 2017` in pertinent to property based misdeeds representing 71% of the total crimes, reported in 2017 which was 35,971(Annual Criminal Statistic Report, 2017) . It is apparent that numbers of criminal actions had purely launched against the ownership, of property showing the propensities of property related irregularities those prevailing within the modern society, too. These property centered crimes are also associated with varied other misdeeds, such as stealing, ransack, or burglaries…etc.

### 1.5. Background of the Study

The study of crimes has traditionally been preserved of other disciplines such as economic status, poverty, sociology factors and psychological factors and it wasn't until 1970's that the place and the spatial dimension to crime began to be more fully explored (Rathnayaka, 2015). The new trend is techniques that included identifying patterns and concentration of crime, the exploration of the relationship between crimes and environmental, political status or socio-economic characteristics and techniques to assess the effectiveness.

The wave of crimes have been rapidly increasing in Sri Lanka as a key social problem and it is developing as a result of the poverty, wrong use of IT related technology, rising of the population and the mismatching socio-political settings. The crimes such as murder, rape, child abuse, hitting, robbery and illegal money printing have been expanding in Sri Lankan society with the current wave of crime (Ratnayaka, 2015). Nature of crimes is one of the major criterion of determining development in each country. Mainly the Property related crimes are considered by this study because such crimes are increasing in number in comparison to other criminal actions.

Early nineteenth century under the British empire, eight grave crimes which were rated as severe crimes of murder, casual murdering, robbery, raping, unnatural offence,

escaping from jail and illegal droves were considered (Ratnayaka, 2015). Grave crimes have changed in a major area over the nine decades and up to today twenty six crimes are classified (Annual Criminal Statistic Report, 2016) and those are mainly divided into two categories of crime against person and crime against property. High severity of crimes rated as grave crimes which can lead the maximum penalty for a suspect/s put into punishment of detention in lieu of death or punishment of imprisonment in lieu of death.

The crime division of the Police of Sri Lanka has several branches. Its primary mission is to protect against all types of crimes in the country. It makes appropriate coordination with civil and military agencies, apprehends criminals, and take appropriate legal actions after the commitment of crime. The department also has the Police Human Rights Division which was established in 2002 with a mandate to examine and prevent human rights violations with which their officers may be charged while on duty (Annual Criminal Statistic Report, 2016). When the strength of Police forces on criminal explorations are concerned, it is satisfactory yet, the said forces have to face a set of problems in expediting investigations. Issues such as ; lack of identity of criminals, inadequate support from the public, external interventions in particular on property crimes, absence of sufficiently done studies on time concerns (day time or night time) and the interruptions of political parties in power are some of the barriers causing problems in effective inquiries.

Classification of twenty six grave crimes categorized as person against and property against are shown in table 1.1

Table 1.1 Classification of Grave crimes

| Crime Against Person | Crime Against Property |
|---|---|
| Abduction | Arson |
| Kidnapping | Mischief over 25,000 /= |
| Grievous Hurt | House Breaking |
| Voluntarily causing Hurt by dangerous Weapons | Unlawful Assembly/Riot |
| Homicide | Robbery |
| Attempt to Homicide / Abetment to commit suicide | Extortion |
| Rape of Women over 16 years of age | Offences under the offensive weapon act |
| Statutory Rape (Woman under 16 years) with/ without consent of the victim | Cheating, Misappropriation, Criminal breach of trust in respect of over Rs 300,000/= |
| Unnatural Offence/ Grave sexual abuse | Counterfeiting Currencies and Possession |
| Cruelty to Children | Offences Against the State |
| Sexual Exploitation of children | Possession of automatic or Repeater shot gun |
| Procuration and Trafficking of person | Obstruction to police officers |
| | Praedial Product theft, cattle theft, property theft over 25,000/= |
| | The manufacture of any quantity of heroin, Cocain, Morphine, Trafficking, Import, Export or possession dangerous Drugs of and above 2mg of Heroin, 2mg or more of Cocaine, 3mg or more of Morphine, 500mgs or more opium, 5kgs or more of cannabis and 1 kgs of Hashish |

(Source : Annual Criminal Statistic Report, 2016)

## 1.6. Research Problem and Gap

In compliance with reports and data on criminal actions in Sri Lanka a higher volume of property based criminal actions prevailing in a continues manner. It is also a divulged factor that investigation on complained cases of property based crimes take longer time. It is also visible that due to the existing processes the victim needs to obtain specialized evidence against identity of the criminal etc., the victim turns to feel disappointment on the law and also having atmosphere to encourage delinquents to involve more in criminal actions. Under this circumstance, once the investigations are attended, upon complains, the next multifaceted action of settling down losses or to set of equity provisions, can become a tedious task. Similarly, the increase of property based crimes annually is a factor proved via statistical data. Hence, initiating action to control the increasing percentage of property based crimes will be a central activity.

Most of researches are published about homicide and murders and about punishment process . Social factors like household income , poverty, social ethnic groups educations.. etc were considered in Sri Lanka. Actually those publications considered reasons to makes criminals not the factors affecting the nature of crimes (Rathnayaka, 2015) and ( Obesekara 1975,) and also no publication is found yet for identification factors in property crimes in Sri Lanka even though it is the most occurrence crime. This research was aimed to analyze factors which are recorded as indicated variable within the crime incident in police entry report and considered factors for investigation and prevention by police department according to their experiences. The research built an argument to find out whether those factors have significant affect on the occurrence of property based crimes. Furthermore the number of crimes in Western province is significantly higher than that of in other provinces (Table 3.2 Justify). Therefore this study was limited to Western Province.

## 1.7. Objectives of the Study

On view of the above explanation, the objectives of the study are:

a) To analyze crime data statistically, on the motivation and viability of selected variables in connection to the property based crimes.

b) To identify the significant influence of variables on crime

c) To identify the probability of occurrence of property crimes based on each independent variables considered.

d) To examine the effects of variables on the current propensities of property based crimes

# CHAPTER 2

# LITREATURE REVIEW

The post work carried out related to property based crimes in Sri Lanka as well as in other countries are reviewed in this chapter.

## 2.1. Studies on Property Based Crime Behavior in Sri Lanka

Studying distributional patterns of urban crimes with special reference to Mirihana Police Division (MPD) in Sri Lanka, Ratnayaka (2015) points out that despite natural environmental factors, the built-up characteristics such as road network, low-income house hold, commercial clusters and high density population have been dominant and a positive relationship is shown with the factors of time, strength and distance of Police Stations and urban crimes. For example, following the time variable, the study shows that many crimes have been recorded during 12.00 to 16.00 and 16.00 to 20.00 and, more than 50 percent of the crimes are logged within these eight hours in the MPD (Ratnayaka, 2015). This study particularly focused on the urban crimes of MPD and provides overall map despite the importance of property based crimes in the Western Province of Sri Lanka

Statistic of Sri Lankan crimes show that property crimes have been increasing since 2009 more aggressively than it was (Annual Criminal Statistic Report, 2016). Year 2009 was the year of ending thirty years of civil war in Sri Lanka. Also statistics emphasize the Western Province as a high crime density area among all other provinces. Further Colombo district has the highest occurrence of property crimes in Sri Lanka and one third of the strength of police crime divisions is allocated to Western Province crime branches but still the high occurrences are reported year by year. House breaking and Robbery are the most occurred property crimes. Sometimes these crimes lead till homicide or more violence once the suspects are identified by victims (Ratnayaka,

2015). Most of Sri Lankan property crimes are the expression of poverty impulses and as such pertain to the larger problem of handling inoccupation, family size country economic inflation and inequality of source of income and also diversification of political power. (Obesekara 1975"). Although fundamental factors identified but no study has been conducted yet to identify significant factors affecting property based crime and it's occurrences.

## 2.2. Factors Influencing Property Crimes

The term property based crime has been encircled by empirical work drawn upon various aspects. This study examines existing literature and the gaps at different levels of observation according to the variables employed.

Based on a review and test to the professional literature on socio-economic conditions and property crimes following the first-order autoregressive model Ralph C. Allen (1996) states that the absolute poverty measure is negatively related to each of the crime rates, and it is statistically significant for burglary and vehicle theft. On the other hand, the relative poverty measure is negatively related to each of the crime rates, but it is not statistically significant (Allen, 1996). However, despite some socio-economic variables such as ethnicity and urban-rural deviations, the present study does not intend to follow economic factors as its objectives mainly focus on socio-political and geographical fundamentals in Sri Lanka.

(Yih-Wu and Richard,1983) have modelled the relationship between property crimes and local economic conditions by employing a multi-factor model which includes economic, apprehension, seasonal and plant closing variables as the explanatory regressors and crimes against property as the dependent variable in the Youngstown Metropolitan of Ohio, USA. The study suggests that local property crimes are highly connected with the economic conditions of the area: as local economy proposers the unemployment rate decreases removing the economic reasons for property crimes at the

growth of per capita income (Yih-Wu and Richard,1983). Moreover, the geographical variables such as weather conditions and local plant closings have been detrimental to property crimes. According to the study, the rising expenditures on uniformed police personnel in response to rising property crime can be partly explained. However, some of the selected variables of the present study such as police strength, ethnicity and urban-rural disparities have not been considered in the above study.

Meanwhile, the relationship between unemployment and property crime has been analysed as significant and complex phenomenon with the data of unemployed men and women for 20 nations using the Pearson Correlation Coefficient Model. In this study, Thomas J. Young (1993) explains that, according to the findings, a negative correlation can be seen between theft rates and the percent of unemployed men and women. Therefore, the relationship between unemployment and crime is more complex than it assumed and advanced research should be carried out using more complex models and variables such as opportunities or incentives relative to a country's standard of living, potential punishment, chance of being caught, law enforcement efforts and expenditures on theft relative to other crimes, size of the country's criminal population, education levels, and other socio-economic factors (Young, 1993).

During the 1980-1983, Kent Bausman and Richard Goe (2004) studied the relationship between employment volatility and property crimes using regression procedures across 683 U.S. metropolitan counties. According to the findings, increasing volatility of employment has resulted in higher level of property crime and, when it comes to individual basis, some less severe forms of property crimes can be examined (Bausman and Goe, 2004). Even though it does not consider the correlation between the problem of economic marginalization owing to economic instability and property based crimes, this study focuses on the relationship between demographic characteristics of urban-rural boundaries and property crimes in the context of Sri Lanka.

Roy W. Ralston (1999) examines changes in rate of property crime reported to Police in the United States from 1958 to 1995 upon the variables of changes in rates of inflation; technological, cyclical, and frictional unemployment; arrest rates for property crimes disaggregated by race; the interaction of arrest rate and technological unemployment; and a measure of police provisioning. According to the findings, a significant positive relationship was evident on inflation, cyclical unemployment, frictional unemployment, and the interaction of white arrest rates and technological unemployment but police provisioning is not found to be significant (Ralston, 1999). This study is important in several aspects: it shows a significant relationship between race and property crimes which is considered ethnicity as a variable into the present study in the context of Sri Lanka. On the other hand, the study does not show a relationship between police strength provisions and property crime in the United States

Apparently, the problem of availability of studies in Sri Lanka and the limited corporation of the studies carried out in the external contexts to identify the specific importance of variables of the present study in relation to property based crimes have been the major issues in order to constitute the rationale of this study. Even though Ratnayaka (2015) shares many of similar variables with the present work, it has particularly focused on the urban crimes of MPD and provides overall map despite the importance of property based crimes in the Western Province of Sri Lanka. In some of the studies, although the seasonal effects is a vibrant dynamic to property crimes, it cannot be applied to a tropical context of the Western Province of Sri Lanka. Moreover, despite some of the traditional socio-economic standards such as unemployment, punishments, living standards etc., this study intends to employ relatively specific variables to identify the contextual factors of property crimes.

### 2.3. Day – Night Time Crimes

According to routine activities approach “rational” choices are carried out every single day life routine activities such as on the way to shopping, while going to office work,

out station works, day night shipment works, school, private tuition away from home..etc Some of these activities take place mainly during the day and others during the night time. The benefits and risks of burglary might vary by time and location. Offenders attempt to make rational decisions which could shape the urban burglary pattern differently by day or by night.( Lorena, Marinne and Yfke , 2014).

Research about property crimes has targeted on how offenders choose targets and carry out offences. Rational choice theories assumes that offenders pursue normal goals likes action that maximizes gain and minimizes costs and risks. (Clark & Cornish, 2010). Burglary is mostly opportunistic and often take place at an opportune moment when occupants are clearly absent and the house is perceived as vulnerable (Cromewell & Olson 2004) Within the environment, the built environment has a prominent place. Crime Prevention through Environmental Design (CPTED) concepts represents an operationalization of environmental models of crime (Lorena, Marinne and Yfke , 2014). The CPTED approach states that the proper design and effective use of the built environment can lead to reduction in the fear and incidence of crime and an improvement in the quality of life(Coupe and Blake, 2006). The CPTED concepts are widely used by governments as guidelines for "designing out crime" in Netherlands, For example these concepts can be identified in the police Marque secured Housing, a certification scheme for new and old houses that can be requested for individual houses. The prime target of built environment is prevent burglary(Gibson, 2013) The CPTED one main factor considered the security specially burglary in day – night time. (Gibson, 2013).

Daytime and night time burglaries focus on different type of houses (Coupe and Blake, 2006), Daytime burglars target detached, semi detached low density houses in higher income neighbourhoods while night time burglars target townhouse in lower income neighbourhoods.( Lorena, Marinne and Yfke ,2014) Burgled houses are often accessed by the front door during the day, while access is more often through the rear window during the night-time(Coupe and Blake, 2006). It's remarkable that daytime burglars

prefer to break in through the front door even when a back door is present. The burglars are only partially rational decision makers. It is therefore expected that different types of houses will be burgled by day and by night (Coupe and Blake, 2006).

Day time burglars differ in several respects from night-time burglars (Coupe and Blake 2006). Older offenders choose to operate alone at night usually relatively close to home (Lorena, Marinne and Yfke, 2014) . Day time burglars often travelled three times as far by car to targets. Younger offenders commonly perpetrated day time burglary in pairs and on foot, exposing themselves to greater risks or being seen and arrested(Coupe and Blake 2006). Younger offenders seems more avers to victim encounters likes older offenders who often risked encountering a victim when burgling occupied houses at night (Coupe and Blake 2006). It's found that day time burglaries are easier to predict since the explained variance (i.e $R^2$) for day time burglaries is 33% while for night time burglaries is 60% (Coupe and Blake 2006).

There is evidence of distinctive and consistent differences between day and night time burglary. Daytime burglars target low density, less guarded up market houses that have vegetation cover. Night time burglars target down market and more heavily guarded properties(Coupe and Blake, 2006), They also conclude that day and night time burglars are two different categories of offenders that choose to distinct burglary strategies. CPTED principles of territoriality, surveillance, access control, target hardening, image maintenance and activity support underpin the study of the relation between residential property and its surroundings and Day – Time residential burglary.( Lorena, Marinne and Yfke , 2014) .

## 2.4. Strength of the Police

The variable police agency size represents an important structural characteristic of American policing, with the industries' extreme fragmentation into approximately 15,000 departments. (Gary W Cordner 1989). Although the mean number of employees

per agency in these presumed shortcomings of small police departments were strongly challenged (Ostrom, 1978). According to the research conducted by Indiana University, smaller agencies devote a greater proportion of their personal to direct service delivery, smaller agencies provide more patrol presence per capita, many smaller to medium sized agencies are as effective or more effective than large agencies when compared to a variety of measures(Ostrom, 1978). The Ostrom's studies resurrected faith in small police department and raised doubts about the effectiveness of large agencies. This shift in viewpoint was later challenged by Langworthy (1985) who demonstrated that large agencies varied considerably in their allocation of personnel to operational and administrative duties (Gary W Cordner 1989). Robert, H. Langworthy showed that size by itself did not mandate any particular allocation of resource but rather determined the range of option available to a police organization. Although larger agencies did assign a greater proportion of their personnel to administrative functions such as records, planning. Etc, the proportion of personnel assigned to supervisory duties decreased with size. This seems to indicate a size increases, the resources needed for one from of overhead increases while resources devoted to another form of overhead (supervision) proportionately decreases.( Gary W Cordner 1989).

The major crime decline in New York raises the important question of what was responsible. While scholars have pointed to a number of potential factors contributing to the crime decline both nationally and in New York (Blumstein & wallman, 2000). The strong conclusion about the impact of policing or any other factors that contributed to the new York crime decline, the key reason for this is simply that the NYPD did not make an effort early enough to collect and identify data, or to construct or design its policing.

According to police department practice, crime analysis systematically identify both long and short term hot spots. These short term geographic cluster of crime are called "crime pattern hot spots" by police (Santos and Santos 2015 ). The micro time hotspots and the effectiveness of police response, particularly directed patrol, in these areas. A

crime “flare up” once the flare up occurs, it can either immediately dissipate or last for several weeks or months before running its occurs (Santos and Santos 2015 ). Some studies have found that micro time hot spots can occur within long term, stable hot spots or separate from them. The number of police officers on duty could manage macro time hotspots for the quicker responds and trace suspects within the shorter time under the crime division.

All the facts sufficiently explain that strength of police directly influence for the prevention rate of burglar crimes or related property crimes further crimes are less likely to be occurred when space and time are converged to suitable targets and motivated offenders (Cohen and Rotton, 2000) . One of the other main factor of preventions of crimes guardianship which is a supervision of old citizen in fact guardianship makes one of the defenders factor which can be discouraged crimes through supervision, presence and intervention (Cohen and Rotton, 2000) . Related studies support facts for the significant relationship of guardians and sufficient police strength causes to reduce the number crimes in particular police division. Decrease level of guardianship and lack of police heads were related to increase risk of burglary crimes and direct- contact predatory crimes were found from studies conducted by United kingdom and United States (Garofealo and Clark, 1993).

Theoretical back ground strongly supported for the strong police involvement for the property based crimes and degree of it. Although a significant study hasn’t conducted in Sri Lanka it is believed to be affect factors even descriptive statistical shows some sort of influence of police strength for the number crimes in Sri lanka.

### 2.5. Power in Political party

The political changes and involvement towards crime prevention and detection were studied in many researchers. Economical and political parties in power makes significant influences for the violent crimes and violent groups who made a real threat for the social

wellbeing (Anderesen, 2012). The move from authoritarian to democratic regimes can be seen as a serious disruption to the normative and institutional order, creating period of anomie that could lead to increase crime rates (Janet, 2017). The studies of Stamatel 2009a, 2009b , Pridemore, 2003 found that rapid social changes may cause to rise in violence during the transition phase. The social changes believed to be affected on property crimes as well but it wasn't rigorously tested until recent studies (Janet, 2017). To assess whether the same influences of political powers for homicide variations apply to property crimes the data from Central and Eastern European countries during the post communist transformations were analyzed (Janet, 2017).

After falling communism in Eastern European region in 1989, property crime had risen and suggested several possible explanations for such increase, growing inequalities, inadequate law enforcement strain from social changes and unregulated economic activities were studied. (Lotspeich, 1995). Arises of property crimes due political changes this region had not been analyzed as rigorously as homicide rates. Therefore the differences of political and economic configurations after the fall of communism 1989 and before expansion of European union in 2004 was explained under categories of property crimes across Central and Eastern Europe and controlling for traditional predictors of cross national crime variations(Janet, 2017). The type of new political party influenced for the macro level crimes rates thus social needs were not straight to be obtained so political connected people went for illegal and offensive alternatives which could lead informal social mechanism. Institutions such as schools, workplaces, families, churches ... etc operations were set within the boundaries in informal social control and propagating social values (Adler, 1983). Many countries in Central and Eastern Europe replaces the authoritarian political systems of communism with liberal democracies. The dismantling of totalitarian and paternalistic states fundamentally changed the nature of formal social control and loosened the role of the state in regulating informal social control institutions.(Janet, 2017). The rapid political changes lead to increases in violence (Chu and Tusalem, 2013) but the stability of democracies causes to make lower the crimes rates than other kind of political system (Nivette and

Eisner, 2013). Argument has been developed regarding the developing countries greater political freedom generated higher level of anomie (Neapolitant, 1995) and also shown that property crimes increased between 1960 and 1984 in democratic nations but remained constant in non democratic societies (Bennet and Lynch, 1997).

## 2.6. SP Divisions

The SP division can be applied to a large territorial subdivision of province. Higher levels of urbanization and population density in a country are used to represent increased interactions between potential offenders and suitable targets. As a complementary theoretical perspective, the Routine Activity Theory focuses on how the convergence of motivated offenders, suitable targets and lack of guardianship creates opportunities for criminal activity (Cohen and Rotton, 2000). The intellectual roots of routine activity theory are varied, but primarily found in the ecological tradition. The work of Chicago School researchers such as Burgess and Shaw, McKay and their colleagues (Shaw and McKay 1942) is important to routine activity theory because they show that there is a systematic, spatial pattern to crime. Specifically, the Chicago School group found that crime was associated with proximity to the city center. Moreover, they argued that certain areas of the city consistently displayed characteristics such as poverty, large percentage of ethnic inhabitants, physical deterioration, and transient population. Thus, these "zones in transition" seem to breed "traditions of delinquency" and thus act as less effective agents of community social control (Shaw and McKay, 1942). The effect of proximity to offenders using cities as the units of analysis examined the relationship between city size and criminal opportunity. Drawing on traditional ecological theories of urban life (Cohen and Rotton, 2000) argues that larger cities (defined as having 25,000 or more residents) have more problems of attenuated informal social controls than smaller cities and thus more crime.

## 2.7. Theoretical Model

Traditionally logistic regression is used by social analysis researchers analyzing dichotomous dependents variables(Long 1997). This technique is problematic with multi level independent variables because the error variance in traditionally logistic regression models do not account for the level two differences in error variance (Kreft and de leeuw, 1998). Specially, the parameter estimates standard errors tend to be underestimated (Barcikowski, 1981) , ( Guo and Zhao, 2000).

When the respond variables are categorical and binary mostly we need to rely on binary logistic regression to measure the likelihood (Bryk and Raudenbush, 1992). Even independent variables also categorical and continuous all the categorical variable has to be coded into binary by taking one category as reference level. Sometimes Poisson regression or Negative binomial regression also taken place (Barcikowski 1981 ; Guo and Zhao 2000). GLM was successfully tested for the crime against person by James. A Marley and Sarah Buila (1999) in their vital research on Crime against people with mental illness declared that : Types, Perpetrators and influencing factors. The survey had been conducted mainly under three sessions Demographic and clinical information , Experience of being victim and Specific contextual information about the crime. Following independent variable were considered Diagnosis, Gender and substance. Individual effect of those variable considered towards to person against then interaction effect with each variables were considered further they have considered the three way interaction also. Similar research conducted on violence and mental illness and victimization and mental illness.

Multilevel modelling provides accurate standard errors, confidence interval(Parameter estimates), and significances tests by portioning the variance in the outcome variable into within group and between group components allowing the calculation of magnitude and significance for the variance components (Bryk and Raudenbush, 1992). Specially, generalized linear modelling (GLM) afford the benefits of multilevel modelling with

dichotomous dependent variable. Multilevel analysis of individual level and area level data leads to better specified model than single level approach(Guo and Zhao 2000)

# CHAPTER 3

# METHODOLOGY

This chapter contains a research paradigm philosophy and design instrument then move on to the conceptual frame work and the analysis the techniques used to achieve the objectives statistically by using appropriate statistical tools.

## 3.1. Data Description

For this study, the secondary data acquired by the Criminal Record Division (CRD) of Sri Lanka Police has been considered. The CRD used to collect large amount of data related to a particular crime incident, crime against person or against property along with twenty other variables. Variables of SP division that the crime took place, time that the crime occurred, number of police officers attached to the crime branch of the relevant SP division and political party in power when the crime occurred are the only variables considered for this study as they are theoretically impacted towards property base crime according to literature reviews . Except the police strength of a SP division, all other variables are categorical variables. A brief description of these five variables is given in the table 3.1. The relevant data were acquired from 2013 to 2017 in the Western province and were considered for the analysis without selecting a sample. The total number of observation is fourteen thousand and eight hundred fifty nine (14859) as considered. Variables of offence , time and power were coded as binary where reference type is kept as zero(0) and other is one (1) , the crime against person was referenced to offence variable and power in previous government was used as reference type for the variable of power in the political party, for the variable of time the night time was considered as reference type as most property crimes were occurred during day time according to statistics. Other variable of SP division in Western province coded as ten SP divisions and SP division Negombo is the first rate division in Western province according to administrative report in police department therefore it was taken for the

reference category for the ten SP divisions and the strength of police was only discrete variable in this study.

Selected variables for the study and their descriptions are shown in the table 3.1

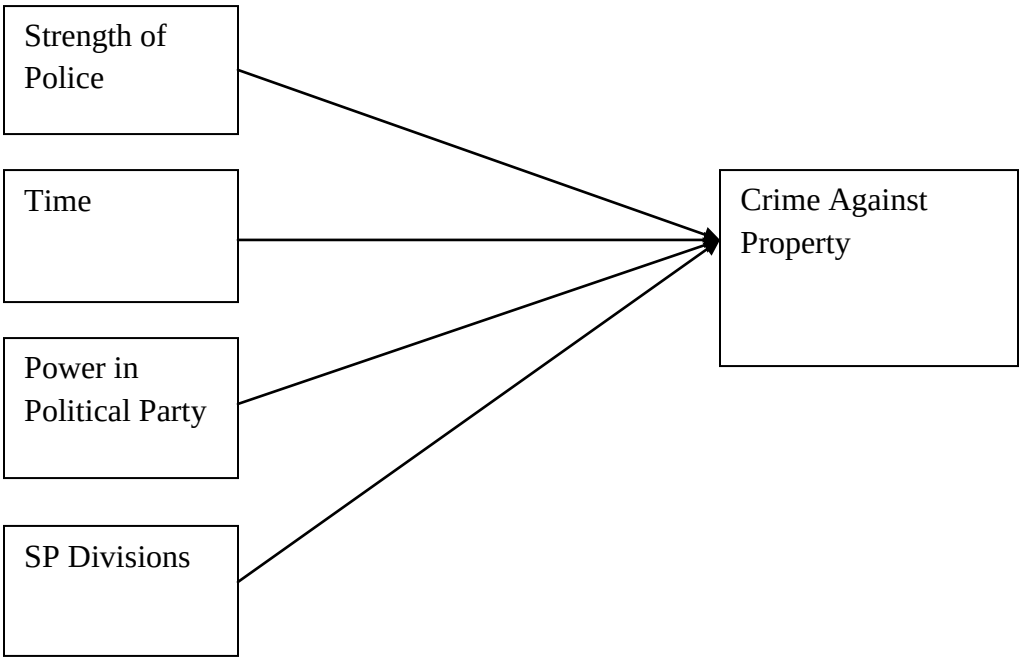
Table 3.1 Type and description of variables selected for further study

| Variable | Type |
|---|---|
| Dependent variable offence | Two categories, (1) Person against offence and (2) Property against offence |
| Independent variable time | Two categories (1)Night time and (2)Day time |
| Independent variable SP division | Ten categories in Western Province , (1)Negombo, (2)Gampaha, (3)Kalaniya, (4)Colombo North, (5) Colombo Central, (6) Colombo South, (7)Nugegoda, (8) Mount Laviniya, (9)Panadura and (10) Kalutara |
| Independent variable strength of police | Discrete variable which includes number of police members including rank officers under the crime division |
| Independent variable power in political party | Two categories (1)current government (2)previous government |

## 3.2. Conceptual Frame Work

The conceptual framework for this study is shown in figure 3.1

Figure 3.1 Conceptual Framework (Secondary Data)




## 3.3. Research Paradigm, Philosophy and Approach

In any research study it is essential to decide on the research paradigm on which the study is planned to carry out. The research paradigm influences on what to be studied , how the research should be done and how the result need to be interpreted. Positivistic paradigm has been chosen to analyze the problem statement which assumes that only the factual knowledge gained through the observations, including measurement is truthful (Dudovskiy 2016). In positivism research findings can be generalized to a higher extent in which the data for the same subject matter with different social context can be

collected (Shiraszi 2015). It facilitate the researcher to remote his/herself from biasness and conducts the research in an objective manner by minimizing the interaction with the sample which helps to act independently (Cohen & Crabtree 2006). In contrast interpretivism paradigm usually focus on interpretation of elements of the study the human behavior which is of highly subjective nature (Dudovskiy 2016). Thus interpretivism paradigm is not followed in this study due to this subjective nature and the limited time and resource constraints.

Deductive approach is used in the study which believes that there is a well established role for existing theory and the researcher formulates a particular conceptual framework to test that available theory (Ali & Birley 1999). Researcher adopts deductive approach in this study as offence against property not yet researched area in Sri lanka.

### 3.4. Statistical Methods and Tools

The secondary data gathered from CRD were fed to excel sheets. The required data was filtered within the excel before they were imported to SPSS for data analysis conducted using SPSS. All the data were recorded to numeric after importing to the SPSS soft ware by using the record into different variable technique in SPSS. The descriptive analysis was performed to summarize percentages of occurrence of all both the offence island wide with respect to twenty six grave crimes and also to emphasize the research limitations why the western province was selected over the other provinces and also importance mitigation offences against property. Sequences of reporting and solving property crimes rates over the years also summarized under the descriptive analysis.

In order to find the significant contributing factors towards property crimes, a binary logistic regression was fitted separately for each explanatory variable by taking dependent variable as binary where crime against property($y = 1$) and crime against person($y = 0$). Strength of Police, time, SP division and power in political party were considered as independent variables for the binary logistic regression model. The

second stage of the analysis was effect of all the variables of time, power in political party, strength of police and SP divisions together on property base crimes. All the statistical analysis conducted under the 0.05 level of Significant. Statistical Package for Social Sciences (SPSS 22.0) was used for the data acquired.

### 3.5 Binary Logistic Model

The logistic frame work is designed for analyzing the determinants of categorical dependent variables or qualitative. Typically dependent variable is binary and coded 0 or 1; however it may be multinomial and coded as an integer ranging from 1 to k or 0 to k-l

If $p(x)$ is the probability of the occurrence of interest in the response variable for an observation with factor 'X' having two levels, a logistic model can be written as

$$\log it\big(p(x)\big) = \log\left(\frac{p(x)}{1-p(x)}\right) = \beta_0 + \beta_1 x \ldots\ldots\ldots\ldots\ldots\ldots (1)\ ;$$

where $p(x) = p(y = 1 \mid x = 0)$

Where $\beta_0$ is the intercept and $\beta_1$ is effect of level one (say) of the factor X. Logistic regression is also called logit model and is used to model dichotomous variables

From (1) $$p(x) = \frac{\exp(\beta_0 + \beta_1 x)}{1 + \exp(\beta_0 + \beta_1 x)} \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

This model can be extended to many variables as well.

# CHAPTER 4
# EXPOLONATARY DATA ANALYSIS

## 4.1. Distribution of Grave Crimes

Distribution of grave crimes shows the statistical distribution of grave crimes for the last five years in Sri Lanka. The most occurrences of types of property and persons against crimes were discussed to identify what type property crimes should be mitigated .

Table 4.1 Types of grave crimes during year 2013 to 2017 in Sri Lanka

| Types of Grave Crimes | Number of Cases reported | | | | | Number and percentage of crimes for five years |
|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2016 | 2017 | |
| 1. Abduction / Kidnapping | 2.3% | 2.3% | 1.4% | 3.4% | 2.9% | 5027 (2.7%) |
| 2. House breaking and Theft | 33.8% | 33.4% | 17.9% | 34.1% | 28.5% | 63073 (33.7%) |
| 3. Grievous Hurt | 3.0% | 3.1% | 1.8% | 4.0% | 3.4% | 6408 (3.4%) |
| 4. Homicide / abetment / to commit suicide | 1.2% | 1.2% | 0.2% | 0.5% | 0.5% | 1635 (0.9%) |
| 5. Rape Incidences | 0.4% | 4.5% | 2.9% | 1.2% | 5.5% | 6332 |
| 6. Robberies | 10.0% | 9.4% | 56.6% | 11.5% | 10.7% | 19816 (10.6%) |
| 7. Cheating/Misappropriation C B Trust over Rs.300,000/= | 21.9% | 19.2% | 7.8% | 18.2% | 19.8% | 36266 (19.4%) |

Table 4.1 Continued.

| Types of Grave Crimes | 2013 | 2014 | 2015 | 2016 | 2017 | Number and percentage of crimes for five years |
|---|---|---|---|---|---|---|
| 8. Theft of property over Rs. 5,000/= /cycle/cattle heft irrespective of their values. | 24.0% | 24.4% | 9.1% | 20.2% | 19.6% | 41085 (21.9%) |
| 9. Drugs/ (Heroin Etc.) related offenses : | 3.4% | 2.6% | 2.3% | 6.9% | 9.1% | 7684 (4.1%) |

Table 4.1 shows the number of different types of grave crimes during year 2013 to 2017. When the yearly percentages considered The offence of "House breaking theft " , "Cheating/Misappropriation C B Trust over Rs.300,000/=" and "Theft of property over Rs. 5,000/= /cycle/cattle heft irrespective of their values" were the most occurrences for each year during 2013 to 2017. Overall occurrences of five year considered the offences of "House breaking theft " , "Cheating/Misappropriation C B Trust over Rs.300,000/=" and "Theft of property over Rs. 5,000/= /cycle/cattle heft irrespective of their values" were the most occurrences (33.7%, 19.4%, 21.9% ) respectively compare to other reported grave crimes. The person against crimes of "Grievous Hurt" and "Rape Incidences" were equally reported (3.4%) during the 2013 to 2017.

Statistic of number of minor and major crimes occurred and victim ratio per hundred thousand population in Sri Lanka during year 2017 by provincial wise is shown in table 4.2

Table 4.2 Number of all crimes and ratio of victims in year 2017

| Province | Population | No. of crimes took place | Percentage of all crimes | Ratio of victims: 100,000 |
|---|---|---|---|---|
| North Central | 134,9000 | 2438 | 7% | 181 |
| Western | 6081000 | 15847 | 44% | 261 |
| Southern | 2611000 | 3742 | 10% | 143 |
| Central | 2722000 | 2584 | 7% | 95 |
| Northern | 1119000 | 1577 | 4% | 141 |
| Eastern | 1677000 | 1609 | 4% | 96 |
| Sabaragamuwa | 2028000 | 3287 | 9% | 162 |
| North Western | 2508000 | 3462 | 10% | 138 |
| Uwa | 1349000 | 1425 | 4% | 100 |
| Total | 21444000 | 35971 | 100% | 168 |

Table 4.2 shows statistic of grave crimes occurred in Sri Lanka during in 2017 by provincial wise. Although highest population province is North central province(134,9000), the most number of crimes took a place in Western province and it is percentage is almost the majority (15847, 44%). The victim ratio also high in western province (261 per hundred thousand) This ratio is the universal standard ratio according to criminology. At the end of 2017 the reported number of victims those affected due to the wave of criminal actions was reached up to 21,444,000 in the whole country and it is not necessary to explain the extent of damages caused to the population of Sri Lanka due to the critical

Table 4.3 Distribution of offence against person and offence against property

| Offence | Frequency | Percent |
|---|---|---|
| Offence against person | 2956 | 19.9 |
| Offence against property | 11903 | 80.1 |
| Total | 14859 | 100.0 |

Table 4.3 shows that more than 80% of the total crimes were against property(80.1%) from 2013 to 2017 in Western province, Further more it clearly indicates offence against property is significantly higher than that offence against person. The research has endeavored to identify propensities of the growing menace of property related criminal actions through recognized set of variables in turn these variables are fundamentals and extremely important for the institutions involved in anti-criminal actions specifically the police. It was revealed that in contrast to the other crimes, if there are long term disparities of land ownership or any property related case is found, it is not possible to address the said disparities without sufficient study on the causes affected. It is a usual fact that in a crime happened due to a dispute of land ownership it takes a long duration for the investigations and also unavoidable that the victimized party of property related crimes has to undergo further exertions. Due to the absence of tactics to identify the criminals, time need to get confirmed corroborate on evidence received are certain causes affecting the time duration. Also, on property related crimes murdering some parties can be a usual feature in Sri Lanka.

Table 4.4 Distribution of grave crimes among SP divisions

| | SP Divisions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Offence | Negombo | Gampaha | Kalaniya | Colombo North | Colombo Central | Colombo South | Nugegoda | Mount Laviniya | Panadura | Kalutara |
| Offence Against Person | 384<br>25.7 % | 388<br>26.3 % | 386<br>20.8 % | 129<br>17.9 % | 88<br>9.4% | 120<br>9.0% | 449<br>15.9 % | 283<br>18.9 % | 284<br>23.8 % | 445<br>29.2 % |
| Offence Against Property | 1109<br>74.3 % | 1087<br>73.7 % | 1466<br>79.2 % | 591<br>82.1 % | 844<br>90.6 % | 1220<br>91.0 % | 2383<br>84.9 % | 1215<br>81.1 % | 908<br>76.2 % | 1080<br>70.8 % |
| Total | 1493<br>10.0 % | 1475<br>9.9 % | 1852<br>12.5 % | 720<br>4.8 % | 932<br>6.3 % | 1340<br>9.0 % | 2832<br>19.1 % | 1498<br>10.1 % | 1192<br>8.0 % | 1525<br>10.3 % |

Table 4.4 shows the crimes distribution among the SP divisions in western province and very noticeable figure was offence against property were the highest percent in each division which implies even for SP divisions property crimes were the major grave crime other than crimes against person. Colombo SP divisions North, Central and South and Nugegoda were the high occurrences of property crimes within the SP divisions (82.1%, 90.6%, 91.0% and 84.9% respectively) compare to person against crimes. Considerably most reported person against crimes belong to SP divisions of Kalutara, Negombo and Gampaha (29.2%, 26.3% and 25.7% respectively) but still leading crimes were property against for each of them. Most of the crimes occurred in SP division Nugegoda (19.1%) mean while the lowest was occurred in Colombo North (4.8%). Most of the grave crimes in Western Province occurred in Colombo district SP divisions of Colombo North, Central, South and Nugegoda (39.2%).

Table 4.5 Distribution of property crimes occurrences in day/night time.

| Day / Night Time | Frequency | Percent |
|---|---|---|
| Night | 7201 | 49.1 |
| Day | 7528 | 49.9 |
| Total | 14729 | 100.0 |

Result in table 4.5 indicate that there is no significant differences between the occurrences of property crimes in night time and day time (49.1% , 49.9%) respectively. Which implies occurrences of property crimes equally occurred during night time and day time during the year 2013 to 2017 in Western province.

Distribution of strength of police mean and maximum and minimum with year according to each SP divisions is shown in table 4.6.

Table 4.6 Distribution of police strength

| SP Divisions in Western province | Number of crimes | Minimum | Maximum | Mean |
|---|---|---|---|---|
| Negombo | 1493 | 91 (2017) | 129 (2014) | 110 |
| Gampaha | 1475 | 116 (2017) | 130 (2015) | 123 |
| Keliniya | 1852 | 128 (2014) | 145 (2016) | 136 |

Table 4.6 Continued

| SP Divisions in Western province | Number of crimes | Minimum | Maximum | Mean |
|---|---|---|---|---|
| Colombo North | 720 | 60 (2013) | 82 (2017) | 73 |
| Colombo Central | 932 | 87 (2014) | 117 (2017) | 96 |
| Colombo South | 1340 | 100 (2013) | 153 (2017) | 121 |
| Nugegoda | 2832 | 136 (2013) | 150 (2016) | 145 |
| Mount Laviniya | 1498 | 84 (2015) | 105 (2017) | 92 |
| Panadura | 1192 | 72 (2013) | 90 (2016) | 83 |
| Kalutara | 1525 | 95 (2014) | 120 (2017) | 103 |

According to table 4.6 the maximum average allocation of police officers including rank officers for the crime branch in SP division of Nugegoda(145) and minimum mean allocation reported for SP division Colombo- north (73) meanwhile SP divisions of Kalaniya, Gampaha and Negombo indicated comparatively high mean allocation of strength of police (136, 123, 110 respectively). The maximum strength of police allocation for the SP divisions except SP divisions of Gampaha and Kalaniya reported during year 2016 and 2017 and highest allocation is reported in SP division Colombo – south during year 2017 (153.). The minimum strength of police reported in SP division Colombo – north during year 2013 (60).

# CHAPTER 5
# MODELING VIA BINARY LOGISTIC REGRESSION

In this session, all the independent variables were individually analyzed with offence variable thus individual effect of independent variables of Time, SP division , Police strength and power in political party for the occurrence of property base crimes were analyzed separately by using binary logistic model. The two categories for the binary logistic base were 1 = offence against property, 0 = offence against person.

## 5.1. Impact of Time on Property Base Crimes

Table 5.1 Distribution of time and grave crimes

| Offence | Time | | |
|---|---|---|---|
| | Night | Day | Total |
| Offence against person | 1310 | 1590 | 2900 |
| | 45.2% | 54.8% | 100.0% |
| Offence against property | 5938 | 5891 | 11829 |
| | 50.8% | 49.2% | 100.0% |
| Total | 7201 | 7528 | 14729 |
| | 48.9% | 51.1% | 100.0% |

According to table 5.1 majority of property crime reported during the night time (50.8%) compare to day time but majority of offence against person reported day time (54.8%) which implies there is a high possibility to occur an offence against property during night time other than day time.

Table 5.2 Estimate coefficients of the model for day/night

| | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| TIME | -.186 | .042 | 19.941 | 1 | .000 | .831 |
| Constant | 1.503 | .030 | 2422.230 | 1 | .000 | 4.493 |

Results in table 5.2 indicate that Time is a significant factor on property crimes ( P value = 0.000 ), Further more the percentage of occurring property base crimes during night time is significantly higher than that of during day time as Beta value of Day time shows negative (-0.186). Therefore the fitted logistic model can be written as

$Odd = \frac{\hat{P}}{1-\hat{P}}$ ; $\hat{P}$ = Predicted probability of property crimes

$\log(Odd) = 1.503 - 0.186 \times Time$ $Time = 1$ "Day Time"

$Time = 0$ "Night Time"

Odds for day time $= e^{1.503-0.186} = 3.732$

Odds for night time = $e^{1.503} = 4.495$

Above results indicates that during night time 4.495 times more likely to have crime against property than crime against person and also during day times 3.732 times more likely to have crimes against property than crime against person.

$$\text{Odd ratio} = \frac{4.495}{3.732} = 1.204$$

Odd ratio indicates that crimes against property during night time are 1.204 times more likely to occur than that of occurring crimes against property during day time. According

to the results in table 5.2, it's convinced that the occurrence of the property base crimes is significantly affected by time and it is less probability occurrences compare to night time which can be predicted that most of the property crime has been occurred in night time which non working time of the people. According to the model built , the probability of occurrences of property crimes during night time $\hat{P} = 0.818$ compare to day time and also occurrences of property crimes during day time $\hat{P} = 0.789$ compare to night time. According to probability of occurrence property day/night time, more crimes against property in Western province reported during the night time twelve hours in fact that most of property crimes in Western province has significant impact on day and night time and also shows the controllable factor is occurring property crimes during night time.

## 5.2. Impact of Strength of Police on Property Base Crimes

Table 5.3 Estimate coefficients of the model for strength of police

| | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| Strength of Police | .003 | .001 | 12.663 | 1 | .000 | 1.003 |
| Constant | 1.058 | .096 | 121.890 | 1 | .000 | 2.881 |

Table 5.3 shows independent variable of Strength of Police is significantly affected on occurrence of property base crime (P value = 0.00 ), further more the percentage of occurring property base crimes is significantly higher for the high number of allocation of police officers as Beta value shows positive (+ 0.003). This implies higher the strength of police significantly affected for the high occurrence of property base crimes. Therefore the fitted logistic model can be written as

$$Odd = \frac{\hat{P}}{1-\hat{P}}$$

$$\ln(Odd) = 1.508 + 0.003 \times Strength$$

Where

Strength = Strength of police

Only discrete variable in the study is strength of police . The probability of property crimes can be computed for the mean value of strength of police per year in particular SP division in Western province by using above model. $\hat{P}$ represents the probability of property crimes occurred due mean strength of police in each SP divisions in Western province.

Table 5.4 Mean and probability distributions of strength of police for SP divisions

| SP Division | Mean of Police Strength | Odd values | Probability of Property Crimes $\hat{P}$ |
|---|---|---|---|
| Negombo | 110 | 6.284 | 0.863 |
| Gampaha | 123 | 6.534 | 0.867 |
| Kalaniya | 136 | 6.794 | 0.875 |
| Colombo North | 73 | 5.624 | 0.849 |
| Colombo Central | 96 | 6.025 | 0.858 |
| Colombo South | 121 | 6.495 | 0.867 |
| Nugegoda | 145 | 6.980 | 0.875 |
| Mount Laviniya | 92 | 5.954 | 0.856 |
| Panadura | 83 | 5.795 | 0.853 |
| Kalutara | 103 | 6.153 | 0.860 |

Results in table 5.4 shows that for the high strength of police in Nugegoda division (mean = 145) has high probability of occurring property crimes ($\hat{P} = 0.875$) but low

strength of police allocation of SP division likes Colombo North (mean = 73) has comparatively low probability of occurring property crimes ( $\hat{P} = 0.849$).

The results imply that high occurrence of property crimes as the strength become larger. Police strength is allocated base on previous year crime density, expecting to reduce the number of crimes during the succeeding year but results shows there is significantly impact of number police officers towards to occurring of property crimes. It shows high strength of police would not be able to gain lower occurrences of property base crimes.

### 5.3. Impact of Power in Political Party on Property Base Crimes

Table 5.5 Estimate coefficients of the model for power in political party

| | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| Power in Political Party | -0.119 | .049 | 6.001 | 1 | .014 | 1.126 |
| Constant | 1.364 | .023 | 3.373E3 | 1 | .000 | 3.913 |

Results in table 5.5 indicate that Power in political party is a significant factor on property crimes ( P value = 0.014 ), Further more the percentage of occurring property base crimes during previous government is significantly higher than that of during current government as Beta value of current government (-0.119). This shows the government change has made significant impact on occurring of property base crimes. The fitted logistic model can be model as follows

$Odd = \frac{\hat{P}}{1-\hat{P}}$ ; $\hat{P}$ = Predicted probability of property crimes

According to table 5.5 results , the model can be written as fallows for the variable of power in political party.

$$\log(Odd) = 1.364 - 0.119 \times Power \qquad Power = 1 \text{ "Current Government"}$$
$$Power = 0 \text{ "Previous Government"}$$

Where

Power = Power in political party

Odds for current government = $e^{1.364-0.119} = 3.473$

Odds for previous government = $e^{1.364} = 3.913$

Above results indicates that during previous government 3.913 times more likely to have crime against property than crime against person and also during current government 3.473 times more likely to have crimes against property than crime against person.

$$\text{Odd ratio} = \frac{3.913}{3.473} = 1.127$$

Odd ratio indicates that crimes against property during previous government is 1.127 times more likely to occur than that of occurring crimes against property during current government.

Other factor for the occurrence of property base crime was power in political party it was significantly less occurrences of property base crimes compare to previous government. This results enable for the discussion of political involvement towards to property crimes. It could be administrational factors such as appoint suitable and uncorrupted people for the administrational level, faster mechanism for the punishment, conducting public awareness program..etc. Literature discussed this factor for both crimes in other countries now it is significantly proved for the Sri Lanka also. According to the model developed current government influenced to make 0.776 of probability occurrences of property base crime compare to previous government. It is a less probability of influence. The probability of occurrences of property base crimes

during previous government is 0.796 compare to current government. There is significant influence to reduce the property base crime during the current government control.

### 5.4. Impact of SP Divisions on Property Base Crimes

Table 5.6 Estimate coefficients of the model for SP division

| | SP Divisions | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|---|
| | Negombo | | | 341.214 | 9 | .000 | |
| | Gampaha | -.030 | .084 | .132 | 1 | .006 | .970 |
| | Kalaniya | .274 | .082 | 11.066 | 1 | .001 | 1.315 |
| | Colombo - North | .461 | .114 | 16.442 | 1 | .000 | 1.586 |
| | Colombo - Central | 1.200 | .127 | 89.732 | 1 | .000 | 3.321 |
| | Colombo - South | 1.259 | .113 | 125.124 | 1 | .000 | 3.520 |
| | Nugegoda | .609 | .078 | 60.185 | 1 | .000 | 1.838 |
| | Mount - Laviniya | .396 | .089 | 19.993 | 1 | .000 | 1.487 |
| | Panadura | .102 | .090 | 1.272 | 1 | .009 | 1.107 |
| | Kalutara | -.174 | .082 | 4.529 | 1 | .033 | .840 |
| | Constant | 1.061 | .059 | 320.836 | 1 | .000 | 2.888 |

According to table 5.6 results, SP division of Gampaha, Kalaniya, Colombo-North, Colombo-Central, Colombo-South, Nugegoda, Mount laviniya,Panadura, and Kalutara are significant factors on property base crimes (P values < 0.05 ). Furthermore the percentage of occurring property base crimes in SP divisions of Gampaha and Kalutara

are significantly lower than the SP division Negombo as their beta values are negative (-0.30, -0.174) but SP divisions of Colombo-North, Colombo-Central, Colombo-South, Nugegoda, Mount laviniya and Panadura are significantly higher than that of SP division Negombo with different degree level as Beta values of those SP divisions are positive (0.174, 0.448, 0.635, 1.374, 1.432, 0.782, 0.570, 0.276 respectively). This shows different SP division make different level of significant impact on occurring of property base crimes. The fitted logistic model can written as

$Odd = \frac{\hat{P}}{1-\hat{P}}$ $\hat{P}$ = Predicted probability of property crimes

$\log(odd) = 1.061 + \beta_i \times SP_i$

$SP_1 = 0$; "Negombo"

$\beta_2 = -0.03$ , $SP_2 = 1$ ; "Gampaha"

$\beta_3 = 0.274$ , $SP_3 = 1$ ; "Kalaniya"

$\beta_4 = 0.461$ , $SP_4 = 1$ ; "Colombo North"

$\beta_5 = 1.200$ , $SP_5 = 1$ ; "Colombo Central"

$\beta_6 = 1.259$ , $SP_6 = 1$ ; "Colombo South"

$\beta_7 = 0.609$ , $SP_7 = 1$ ; "Nugegoda"

$\beta_8 = 0.396$ , $SP_8 = 1$ ; "Mount Laviniya"

$\beta_9 = 0.102$ , $SP_9 = 1$ ; "Panadura"

$\beta_{10} = -0.174$ . $SP = 1$ ; "Kalutara"

Where

SP = SP Division

Table 5.7 Odd values and odd ratios of SP divisions

| SP Division | Odd Value | Odd ratio |
|---|---|---|
| Negombo | 2.888 | - |
| Gampaha | 2.804 | .970 |
| Kalaniya | 3.799 | 1.315 |
| Colombo North | 4.581 | 1.586 |
| Colombo Central | 9.593 | 3.321 |
| Colombo South | 10.176 | 3.520 |
| Nugegoda | 5.312 | 1.838 |
| Mount Laviniya | 4.293 | 1.487 |
| Panadura | 3.199 | 1.107 |
| Kalutara | 2.428 | .840 |

Results in table 5.7 indicates that SP divisions of Gampaha and Kalutara 0.97 and 0.84 times more likely to have crimes against property than crime against person compare to SP division Negombo. These is less time of occurring compare to SP division Negombo therefore SP division Negombo is considered, it is 1.03 times more likely and 1.19 times more likely to have crimes against property than crimes against person compare to SP division Gampaha and Kalutara respectively but other SP divisions of Colombo North, Colombo Central, Colombo South, Nugegoda, Mount laviniya, Panadura and Kalutara (3.799, 4.581, 9.593, 10.166, 5.307, 4.293 and 3.199 respectively) times more likely to have crimes against property than crime against person compare to SP division Negombo. Among them the SP divisions of Colombo Central and Colombo South have high odd ratios (9.593, 10.176) of crimes against property than crime against person compare to SP division Negombo.

Table 5.8 Predicted probability of property crimes in SP divisions

| SP Division | Predicted probability of property crimes $\hat{P}$ |
|---|---|
| Negombo | 0.743 |
| Gampaha | 0.737 |
| Kalaniya | 0.792 |
| Colombo North | 0.821 |
| Colombo Central | 0.906 |
| Colombo South | 0.911 |
| Nugegoda | 0.842 |
| Mount Laviniya | 0.811 |
| Panadura | 0.762 |
| Kalutara | 0.708 |

Table 5.8 results shows that all SP divisions except Gampaha and Kalutara in Western province have high probability occurrences of property crime compare to SP division Negombo. Furthermore SP divisions of Colombo Central and Colombo South have reported the highest probability of occurring property crimes (0.906, 0.911 respectively) but SP divisions of Gampaha and Kalutara indicated significantly lower probability of occurring property crimes compare to SP division Negombo.

According to the results in table 5.7 and 5.8, There is a significant impact of SP division on the occurrences of crime against property. SP divisions represent the different geographical area and administrative level which implies occurrences of crime against property is influenced by these factors as difference SP divisions indicated different level of probability of occurring property base crimes. SP divisions of Colombo North and Colombo South have high probability of occurring crime against property than

crime against person among the other divisions which implies these two SP divisions more likely to have property crimes.

### 5.5. Combined Effect of Four Variables

In order to find the combined effect of four variables of time, strength of police, SP divisions and power in political party, the stepwise binary logistic model was carried out under (1) Forward LR, (2) Backward LR, (3) Forward Wald, (4) Backward Wald methods. The model was carried by fitting entry and removal methods under 0.05 probability.

The final outputs obtained after carrying binary logistic model by each method are shown from table 5.9 to 5.12

Table 5.9 Variable identified at different steps under forward LR method

| | | | Score | df | Sig. |
|---|---|---|---|---|---|
| Step 1 | Variables | SP Divisions | 1.295 | 1 | .255 |
| | | Power in Political party | 5.546 | 1 | .019 |
| | | Strength of Police | 12.470 | 1 | .000 |
| | Overall Statistics | | 21.921 | 3 | .000 |
| Step 2 | Variables | SP Divisions | 3.554 | 1 | .059 |
| | | Power in Political party | 5.894 | 1 | .015 |
| | Overall Statistics | | 9.453 | 2 | .009 |
| Step 3 | Variables | SP Divisions | 3.556 | 1 | .059 |
| | Overall Statistics | | 3.556 | 1 | .059 |

Results in table 5.9 indicate that when all four variables were considered SP divisions was not included to the model as variable of SP division was not included during all the three steps (P values = 0.255, 0.59, 0.59 respectively) under Forward LR method.

Table 5.10 Variable identified at different steps under backward LR method

| | | Score | df | Sig. |
|---|---|---|---|---|
| Variables | SP Divisions | 3.556 | 1 | .059 |
| Overall Statistics | | 3.556 | 1 | .059 |

.

Result in table 5.10 also indicates that variables of SP divisions was not included to the model (P value = 0.59) under the method of backward LR

Table 5.11 Variable identified at different steps under forward wald method

| | | | Score | df | Sig. |
|---|---|---|---|---|---|
| Step 1 | Variables | SP Divisions | 1.295 | 1 | .255 |
| | | Power in Political Party | 5.546 | 1 | .019 |
| | | Strength of Police | 12.470 | 1 | .000 |
| | Overall Statistics | | 21.921 | 3 | .000 |
| Step 2 | Variables | SP Divisions | 3.554 | 1 | .059 |
| | | Power in Political Party | 5.894 | 1 | .015 |
| | Overall Statistics | | 9.453 | 2 | .009 |
| Step 3 | Variables | SP Divisions | 3.556 | 1 | .059 |
| | Overall Statistics | | 3.556 | 1 | .059 |

According to table 5.11 results also show that variables of SP divisions was not included to the mode during all the three steps (P value = 0.255, 0.59, 0.59 respectively) carried out under the method of forward wald

Table 5.12 Variable identified at different steps under backward wald method

| | | Score | df | Sig. |
|---|---|---|---|---|
| Variables | SP Divisions | 3.556 | 1 | .059 |
| Overall Statistics | | 3.556 | 1 | .059 |

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Result in table 5.12 shows that variables of SP divisions was not included to the model (P value = 0.59) under the method of backward wald

Results in table 5.9 to 5.12 confirm the variable SP divisions was not included to the model. Therefore the final binary logistic model was carried out via the three variables of time, power in political party and strength of police.

Table 5.13 Estimate coefficients of the combined model

| | B | S.E. | Wald | df | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| Time | -.188 | .042 | 20.367 | 1 | .000 | .829 |
| Power in Political Party | -.118 | .049 | 5.889 | 1 | .015 | .888 |
| Strength of Police | .003 | .001 | 12.812 | 1 | .000 | 1.003 |
| Constant | 1.254 | .106 | 140.526 | 1 | .000 | 3.505 |

Results in table 5.13 indicate that time, power in political party and strength of police are significant factors on property crimes when they all considered as on model ( P value = 0.00, 0.015 and 0.000 respectively ), Further more the percentage of occurring property base crimes during night time is significantly higher than that of during day time as beta value of day time is negative (-0.188) when all three variable considered together. Meanwhile percentage of occurring property base crimes during previous government is significantly higher than that of during current government as beta value of day time is negative (-0.118) and percentage of property crimes due police of strength is significantly higher as beta value is positive (0.003).

$Odd = \frac{\hat{P}}{1-\hat{P}}$ ; $\hat{P}$ = Predicted probability of property crimes

The predicted probability of occurring property base crimes can be calculated according below model

$$\log(odd) = 1.254 - 0.188 \times \text{Time} - 0.118 \times \text{Power} + 0.003 \times \text{Strength}$$

Power = Power in political party
Strength = Strength of police

Mean strength of police in Western province 108.2 is considered for the combined model.

Odd value of combined model = $e^{1.364-0.188-0.118+0.325} = 3.987$

Above results indicates that crime 3.913 times more likely to have crime against property than crime against person and also during current government 3.473 times more likely to have crimes against property than crime against person.

Where Time = 1 "Day time"

Time = 0 "Night time"

Power = 1 "Current government"

Power = 0 "Previous government"

The maximum and minimum predicted probabilities of combined effect of variables time and power in political party are shown in table 5.14

Table 5.14 Predicted probability of property crimes for combined model

| Time | Power | Predicted Probability $\hat{P}$ | |
|---|---|---|---|
| | | Maximum | Minimum |
| 0 | 0 | 0.836 | 0.826 |
| 1 | 0 | 0.808 | 0.797 |
| 0 | 1 | 0.820 | 0.808 |
| 1 | 1 | 0.789 | 0.777 |

Results in table 5.14 show that the maximum and minimum probability of occurring property base crime during night time in previous government control is (0.836, 0.826) and also the probability of occurring property base crime during day time in current government is (0.808, 0797). The maximum and minimum probability of occurring property crimes during night time under the control of current government is (0.820, 0.826) and the occurring of property base crimes during the day time under current government control is (0.789, 0.777).

According to the above results, occurring of property crimes during current government control is significantly lower than the previous government when all the variable considered together. The maximum probability of occurring property base crimes during night time under previous government is significantly lower than the previous

government similarly the minimum probability of occurring property base crime is also significantly lower than previous government. Probability statistic shows that maximum and minimum probabilities of property base crime during day time are significantly lower than the previous government control. Therefore theses results shows that there is significant impact to power in political party to reduce the occurrence of property base crimes during day/ night times. When the combined models of three independent variables of time, power in political party and strength of police considered, there is lower occurrence of property base crimes during the current government furthermore combination of these three variable make significant impact for the occurrence of property base crimes.

# CHAPTER 06

# CONCLUSIONS AND RECOMMENDATIONS

The objectives of this study were (1) To analyze crime data statistically, on the motivation and viability of selected variables in connection to the property based crimes, (2) To identify the significant influence of variables on crime, (3) To identify the probability of occurrence of property crimes base on each independent variables considered, (4) To examine the effects of variables on the current propensities of property based crimes. Based on the results of the statistical analyses for the data acquired and consequent discussion in Chapter 5, the conclusions. and recommendations along with the possible direction for future research are given in this Chapter.

## 6.1. Conclusion

- The most of crimes against property and crimes against persons are reported in SP division Nugegoda although SP division Nugegoda has reported the highest mean allocation of strength of police in Western Province.

- The occurrences of crimes against property during night is 4.495 times more than crimes against person irrespective of SP division.

- The occurrences of crimes against property during day is also 3.732 times more than crimes against person irrespective of SP division

- The occurrences of crimes against property during previous government 3.913 times more than crimes against person where as during current time it is reduced to 3.473 times of crimes against person.

- High strength of police does not cause to reduce the occurrences property crimes as high mean allocation strength of police in SP division Nugegoda and Kalaniya have high probability of crimes against property.
- The high occurrences of crimes against property in SP divisions Colombo – Central and Colombo South. It is 3.321 and 3.520 times more than SP division Negombo

- Geographical effect and different administrative level considered by the variable of SP divisions is not significant when all the variables considered together.

- Factors of time, power in political party and strength of police significantly influence to change the occurrences of property base crimes when all factors considered together.

- Probability of crime against property 3.913 times more than crime against person when the three variable of time, strength of police and power in political party considered together.

- Occurrences of property crimes during day/ night time is significantly lower than the previous government.

## 6.2. Recommendation

- Based on the results derived in this study, department of police can make public awareness program to prevent occurring property crimes during night times.

- Other factor is power in political party made less occurrences of property crimes compare to previous government which implies current government strategies and mechanism have made positive impact to mitigate property crimes therefore they can enhance their system to reduce further in island wide.

- Allocation of police strength should be done precisely especially in SP divisions in Nugegoda and Kalaniya with more responsibilities for the police officers because high number police members do not cause to reduce of property crimes.

- There should be a fixed number of strength for the each SP divisions at least for two years without changing yearly basics then the police officers can make effective works of solving crimes.
- It is shown under the results of SP divisions that occurrence of property crimes in each SP divisions are not the same therefore SDIGs or DIGs should find allocate more experienced ranked officers for those identified SP divisions.
- Similar studies should be carried out very often for Western Province as well as for other provinces.

### 6.3. Further Research

- Other factors which likely to be affected for the property base crime such as participants of suspects whether it is single or group , suspect age , victim gender …etc.
- Time more split than day and night police department records them twenty four hours breakdown and also whether participants IRC registered or not.

- Check whether the same factor considered in this study effected for all the types of property base crimes such as House breaking, Robbery and cheating / Misappropriations of money.

- Homicide crimes also reported within the property crimes, so study can be conducted to identify the factors affecting for aggravation of property crimes or relationship between aggravation and civil status.

- Psychological factor affection of occurring of crime against person and study of reason or motive to make homicide and grievous hurt and also suspect educations, family back ground, urban or rural, economy status, house hold income..etc are very identical factors to test the significant affect towards to a grave crime

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