FIRE MANAGEMENT OF HIGH-RISE BUILDINGS:

A CASE STUDY IN HANOI, VIETNAM

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A Thesis Submitted to Asia e University in

Fulfilment of the Requirements for the

Degree of Doctor of Philosophy

January 2021

ABSTRACT

Fires can cause great damages to properties, injuries and even loss to human life. In high rises, they are mostly caused by accidents or deliberate act of arson. In most countries government relies on policies incorporated into laws, rules and procedures to control fires and managed them through the establishment of specialist organization, such as the Fire and Rescue Department. This indicates that traditionally, control structure relies heavily on bureaucracy. Little has been discussed about other control alternatives. This study was carried out to fill this void and seeks to answer three questions. First, what are the root-causes of accidental fires in HRB? Second, is bureaucratic control sufficient as a control mechanism? Third, what are the potentials that market or clan control has as an alternative control mechanism to reduce accidental fires in HRB, in Vietnam.

The study was carried out as an in-depth case study of four accidental HRB fires which occurred in Hanoi, Vietnam. Data was collected through in-depth analysis of the original reports and relevant documents such as current fire prevention regulations, building by laws and related statute enforced by the VFPPD. Insights of fire incidences was gathered through detailed face to face interviews with relevant stakeholders and those directly affected by the four fire cases. The theoretical framework employed is rooted in the concept of Organizational Control. Data was analyzed using content analysis and findings were framed for theory development based on the Grounded Theory approach.

Results showed that bureaucratic control was inadequate to be the only mechanism of control in reducing fire incidences and damages, injuries and fatalities in fire situations. It was too technical and procedural in its approach, making it insufficient as a mechanism to institute effective control. This is because guidelines or definitive legal requirements only provide parameters for rule-following and functions only as a structure to facilitate controls. It cannot guarantee obedience as people are inherently selfish. Procedures, rules and regulations abeyance happened only when those serve their self-interest. Clan control has the potential to enhance organizational control if blended with bureaucratic control. Market control is not suitable because service performance cannot be exactly defined for performance evaluation purposes.

In sum, for controls to be effective in the context of fire controls in Vietnam, the need to follow rules must be supplemented by innate sense of shared responsibility as a responsible citizen, and not only by their fear of the consequences of non-rules following. As such, this study suggests, in controlling HRB fires, residents must be educated and trained to enhance their fire prevention and fighting skills and to subconsciously develop a common belief that, collectively, they can prevent and reduce the risks of fires to their residential and workspaces.

I certify that I have supervised /read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in quality and scope, as a thesis for the fulfilment of the requirements for the degree of Doctor of Philosophy.

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DECLARATION

I hereby declare that the thesis submitted in the fulfilment of PhD degree is my own work and that all contributions from any other persons or sources are properly and duly cited. I further declare that the material has not been submitted either in the whole or in part, for a degree at this or any other university. In making this declaration, I understand and acknowledge any breaches in this declaration constitute academic misconduct, which may result in my expulsion from the programme and/or exclusion from the award of the degree.

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ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADB	=	Asian Development Bank
AFTA	=	ASEAN Free Trade Area
ASEAN	=	Association of South East Asian Nations
ASEM	=	Asia–Europe Meeting
APEC	=	Asia-Pacific Economic Cooperation
CCTV	=	Closed Circuit Television
CHQ	=	Custom Head Quarters
EMS	=	Emergency Medical Services
FDI	=	Foreign Direct Investments
FEMA	=	Federal Emergency Management Agency, USA.
GDP	=	Gross Domestic Products
HRB	=	High rise building
HCMC	=	Ho Chi Minh City
IAFF	=	International Association of Fire Fighters
IMF	=	International Monetary Fund
MC	=	Management Control
MCS	=	Management Control Systems
ODA	=	Official Development Assistance
PMS	=	Performance Management Systems
USFA	=	United States Fire Administration
VND	=	Vietnam Dong
VFPPD	=	Vietnam Fire Protection Police Department
WB	=	World Bank
WTO	=	World Trade Organization

CHAPTER 1

INTRODUCTION

1.1   Introduction

Technically,   a fire is   an occurrence of uncontrolled burning that destroys buildings, forests, or other things. Fires produced heat which can be ignited into flames if the heat is intense enough. Once ignited, a chain reaction takes place whereby fires can sustain their own heat. Further release of heat energy in the process of combustion may propagate the production of carbon dioxide, water vapor, oxygen and nitrogen, all of which has the potential to cause physical damage and hazards to life and properties.

Fires are either caused by nature or by human. Natural fires are spontaneous combustion produced when a fuel such as wood produces heat - a process called pyrolysis. This happens when there is not enough oxygen in the air. Most of these occurred by natural phenomena such as lightning and severe dry weather. These conditions led to the environment to be starved of oxygen, resulting in dry grass or underbrush to burn and, when assisted by wind, can burn land by the acres and take over everything in their paths, in just a few minutes. Fires are deemed accidental if it is not done deliberately and it occurred unintentionally. According to reports, the top causes of *accidental fires* in the home are electrical faults, carelessness such as food unattended on cooking or stove tops, careless handling of combustible materials, and those caused by using unclean cooking equipment. Arson is the most common

intentional fires. This happened when someone purposely set fire to property, either personal or belonging to someone else, deliberately and with harmful intent.

Whatever the cause, fires are costly. Depending on severity and extensiveness, fires can result in huge damage to properties, severe injuries or loss of human lives and ecological damages. Costs to repair the damages after fires are also very high. In other cases, fires may impact on organizational finances and put pressures on organizational profitability. As an example, forest fires, hotel fires, leisure center fires will affect heavily on tourism, national brand image and the national economy.

Statistics are showing that fire incidents are increasing. According to the World Fire Statistics Issue No. 23 (2018), for the period of 1993-2016, 2.5 to 4.5 million fires occurred and nearly 62,000 death were reported in 57 countries. In Wikipedia, more than 150 major building fires that resulted in the loss of human lives occurred over the last twenty years, with the September 11 attacks featuring the most damaging in terms of casualties and destructions of buildings. Many of these buildings are high rises, implying that buildings of more than 6 stories tall are potentially high risks disaster sites. This is because, in crowded and land-starved cities, demands for housing and offices spaces are forcing buildings to be built higher and higher.

In Vietnam, high rise building (HRBs) fires are getting more serious especially in big cities like Hanoi and Ho Chi Minh City. With a population of over 8 million and 9 million respectively, lack of available building spaces and rural urban migration had resulted in the mushrooming of high rises to cater for accommodation and office spaces and the development over the last twenty is the most rapid. In Ho Chi Minh City, the 81-storey

Vincom Landmark 81 (built in 2014 and completed in 2018) has now dwarf the 68-floor Bitexco Financial Tower to become the tallest building in Vietnam and the 15th in the world. In Hanoi, the Landmark 71 is a 71-storey building at 1,513 feet tall. The next highest is the 65-storey Lotte Center Hanoi. These four are amongst the more than 100 buildings that are more than 6-stories in major cities in Vietnam such as Ho Chi Minh, Hanoi, Da Nang, Na Thrang and Hoi An. On the negative side, the Ho Chi Minh ITC Fire that occurred on October 29, 2002 claimed more than 59 live and injuring more than 100. The 2011 Hai Phong Factory fire claimed 17 lives and the 20-storey Carina Plaza fire in Ho Chi Minh in March 2018 caused 13 deaths.

This study was conducted with the above in mind. Specifically, it was designed to gain deeper understanding of the root causes of accidental fires in high rise buildings. The aim was to evaluate existing control methods and mechanisms used by the authority in managing and reducing fire incidences on residential and office buildings of more than ten (10) stories tall. The main focus of this research was to evaluate existing control mechanisms employed and actions taken by the Socialist Republic of Vietnam to prevent fires, reduce the risks of fires occurring and minimize damages and possible loss of human lives due to fire incidences.

1.2   Theoretical root and background of research

Controls are actions taken to maximize congruence of objectives. In social organizations this is necessary because, by nature, human beings are selfish and will do things that can further their own self interests. As a result, an organization, as a

social entity, will have members with diverse needs, which in turn, require (control) mechanisms to bind them together, if they are to 'take on the duty of obedience" (Macintosh, 1994). In neoclassical economics, Adam Smith (1723-1790) called the 'force' which guided the 'self-interested' efforts of people to seek wealth as the 'invisible hand of the marketplace'.

To manage this plurality of wants and moderate the divergences in the achievements of common (organizational) goals due individual's self-interest, most organizations institute administrative procedures to influence behavior of members so that their actions can be aligned to achieve the broader goals of the organization. Ouchi (1976) proposed that controls in organizations can be achieved through three means – bureaucracy, markets and shared beliefs. Through bureaucracy, detailed operating rules and regulations, dividing tasks and problems into distinct slots, clear command hierarchies and decision parameters, close monitoring and detection of deviations and strict enforcement through rewards and punishments, provided the parameters to mediate possible negative impacts due to non-rule following behavior. Controls are achieved when members align their actions according to bureaucratic requirements, and by so doing, enhances the achievement of organizational goals.

On the other hand, classical economics which advocated markets as another mechanism for control reasoned that governmental should not interference in economic affairs beyond the minimum necessary for the maintenance of peace and property rights. Individuals must be allowed to pursue their own desired economic objectives, thereby achieve the best results for the society of which they were part. Their actions should be dictated more by what happens around them and according

to their own abilities. Controls are achieved when no parties, including himself or herself, are able to exert any influence to determine the outcomes of individual efforts. The best man wins and the fittest survives.

The third mechanism that organizational control can be achieved is through reliance on social orders - established through traditions and inherited rights given to a person or institutions by traditions, customs and beliefs. Ouchi & Mcguire (1975) argued that as a member of a social unit, an individual is expected to share a common belief which in turn works in ways so as to maintain social harmony within the society in which they live. This "shared belief" can be by birth (such as the Indian cast systems), by affiliations (such as doctors and teachers), by marriage (especially if such marriage gets one into a new clan like the Chinese marriages where the off-springs carry the father's family name) or through inductions or indoctrinations such as the Yakuza or members of a secret society. Similarly, professional organizations such as for doctors, teachers and other professionals, admit members into their group or fraternity to form a special 'clan', to protect their interests as group with similar skills and interests. Once a member is accepted into this group, he or she is amongst equals – colleagues. The logic is, by one accepting this social order, and so are the rest of the members of that society, everyone's interest will eventually be protected. In short, when everyone has a similar objectives and expectation that the social order will regulate behavior within their society, such belief in itself provides the mechanisms which will influence and thereby control how individuals within the society behaved.

In Vietnam, the administration, prevention and control of issues related to fires are the responsibility of the VFPPD which is under the purview of the Ministry of Public Security. These responsibilities are carried out through various statutes and laws under the *Government's Decree No. 35/2003/ND-CP dated April 04, 2003 on guidelines for the Law on Fire prevention and fighting; the Government's Decree No. 46/2012/ND-CP dated May 22, 2012 on amendments to the Government's Decree No. 35/2003/ND-CP; and the Government's Decree No. 130/2006/ND-CP dated November 08, 2006 on compulsory fire insurance (hereinafter referred to as the Decree No. 35/2003/ND-CP).* The VFPPD was established in 1954 and was formalized recognized officially established in 1961. It has since grown to establish itself in all provinces with a total of almost 70,000 fire fighters, 1,200 fire engines and almost 10,000 of firefighting assets.

In all, the development of VFPPD is much related to the economic development of the country and the political ideology Vietnam adopts. The original firefighting unit was established in 1934 to perform, among others, the duties to guard against demonstrations against the government of the day. However, in line with the growth and development of fire departments throughout the world, VFPPD has grown to become a very large organization entrusted with the duties and responsibilities to manage and control all aspects of fire incidences and preservation of public order. Its roles had evolved from reactive duties to fight fires to much more proactive responsibilities of preventing and reducing risks of fires from becoming hazards to properties and humans. In addition, VFPPD is also now involved in providing professional services to the larger community related to preservation of public safety.

However, the growth and development of VFPPD to its present state are much dictated by the state's governance ideology which is rooted in socialism. As such, much of fire control systems of the state are very bureaucratic, relying on various statutes and regulations which the VFPPD monitors. However, currently, most of the rules and regulations related to firefighting and prevention are related to providing design parameters and guidelines on the use of materials in constructions and the installations firefighting equipment in newly built buildings, all of which are aimed at reducing the risks of fires and severe casualties in cases fires occur.

1.3   Statement of the problem and research questions

Theoretically, rules and regulations are to provide boundaries for actions and are more preventive in nature. But non-rule following, though immoral or illegal, might not lead to any disaster. It just increased the chance of something unwanted from occurring. As such, the rules in themselves cannot stop self-interested individuals from flouting them if the people concerned believed that the costs of such (non-rule following) actions will be lesser than economic benefits he or she will get, or any social costs he or she will have to bear. It is in this context that Ouchi's concept of 'clan control' can provide huge potentials in enhancing controls. Clan control can coerce compliance behavior of rule-following dictated by bureaucracy with behavior control dictated by common belief developed through members' socialization processes. The shared values will unconsciously provide a common understanding of the way how members of the community are expected to behave.

But, is this possible? Are fire incidences caused by inadequacies of bureaucratic control or simply by non-rule following actions or non-compliance behavior of interested parties? It is only by confirming that the root-cause of fires were due to those reasons that 'clan-control' can enhance the effectiveness of controls.

In essence, this study is to investigate the effectiveness of bureaucratic control adopted by the VFPPD in carrying out its tasks of managing, controlling and preventing fires, especially in high-rise buildings. Therefore, the main questions are;

a.   Are current rules-based approach to firefighting, fire management and fire prevention enough or adequate to control and reduce occurrences of fires? If it is, why are fire incidences increasing? Contrary, if it is not, what other forms of controls or control systems can be initiated to reduce the risks of fires, especially in high-rise buildings.

b.   Is clan control as suggested by Ouchi (1979) a possible alternative mechanism to be employed in controlling fire incidences or preventing them from occurring? Can clan control replace bureaucratic control or supplement it?

1.4   Purpose of Research

In principle, this research seeks to determine the effectiveness of bureaucratic controls – reliance on existing policies, laws, rules and regulations, in fighting and preventing fires, especially in HRBs in Vietnam. Specifically, the objectives were:

a. To evaluate the effectiveness of existing policies, laws, rules and regulations adopted by the VFPPD to prevent and fight fires especially in HRBs in Vietnam.

b. To explore the reasons why fires occur and to explain the root causes of fires based on an analysis of several cases of fires in high-rise buildings in Hanoi.

c. To study the impacts that these policies, laws, rules and regulations have on the attitude and behavior of people living in high-rise buildings in Hanoi.

d. To offer suggestions to improve fire control systems in controlling and preventing high-rise buildings fires in Vietnam.

It was the intention of this study to contribute to a better understanding about controls of fires in Vietnam. There are many literatures on fire prevention and fighting but not many discussed the issue of control of fires from behavioral perspective. It was hoped that the study would contribute to better policing and management of fires in Vietnam in general and in HRBs in particular. This is critical to Vietnam because it is a developing economy with rather a less developed

firefighting force due to limited financial resource for fire protection as the country prioritizes its other development projects.

1.5 Scope and conduct of the study

This study was carried out as a case study that examined in detail four (4) incidences of major HRB fires which occurred in Hanoi over the last ten years. The cases were conveniently chosen for data availability and ease of access to those involved in them. Principally this study adopted a deductive methodology that is more biased towards the qualitative method of research, and is more in line with the method proposed by Miles & Huberman (1994) and Miles et al. (2014). This was thought necessary because much of the data collected will be qualitative and contextual in nature. Further, as the main objective of research is to find out and understand the underlying factors that causes fires (why don't people follow rules knowing that such actions risks fires to occur and damages to be incurred), despite the existence of many rules and regulation. It is believed that a deeper understanding of the context and the environment in which fire incidences occurred can only be achieved using the qualitative research method as argued by many previous researchers.

Data were collected in various ways. The primary data was collected based on face-to-face interviews of those directly related to the four fire cases, mainly the affected residences, building managers and fire fighters. Interviews were also carried out with higher ranking officers of the VFPPD to further illuminate policy issues that

resulted in the passing of decrees and laws through the Ministry of Public Security. Secondary data which are mostly documented evidences including specific fire reports and relevant publications in the VFPPD archives were referenced to under the specific details of each fire cases.

In all, data collection, both for the primary and secondary data, were guide by the need to determine the cause of fires, compliances or breaches of specific statutes and guidelines, opinions and actions of those involved in that specific fire incidence, and reasons for their actions and inactions. Data from documents was processed and analyzed using the pattern matching technique based on the concept of Content Analysis propagated by Krippendorff & Bock (2008). Further, since individual cases of fire incidences was studied in detail, parallel matching of details was carried out to draw out similarities and differences in those cases.

In theory building, this research adopted the approach based on the grounded theory methodology. Conclusions were drawn based on the data collected and analyzed. Explanations to these conclusions were mapped out with relevant management, organizational, economic, sociological and psychological theories. This was done to accommodate the richness of data collected from the various methods employed.

1.6   Significance of the study

Control has been studied from many perspectives. However, there is a lack of comprehensive research to study control from a country level perspective and none

still from the point of adopting Ouchi's clan control concept in terms of the provision of public goods and services. The potential of clan control to supplement bureaucracy as a mechanism to control behavior is huge due to the fact that bureaucracy itself was designed to develop rule-like behavior. If rules, regulations and administrative mechanisms can be utilized to be parameters which constrained behavior, the social system of which members are social units too can become a powerful tool to coerce compliance. The contention is, individuals as social units will behave in a certain way within a social group if they shared a belief that such a way is an accepted behavior demanded by the society they live in.

Secondly, controls are essential processes taken by the management to maximize the achievement of its objectives. It is a prerequisite to overcome resistance and to exercise authority over others and control actions of subordinates to achieve a common objective. Moderating competing interests so that members could work together for common good cannot be coaxed through rule-following alone. This is because not all people will share the need to act in a prescribed manner, if the benefits accrued from no-rule following exceeds the costs (in economic terms) incurred or the social consequences (social costs) they will have to bear. As such, rule following dictated by social norms and "to behave in a socially in a responsible manner" can be a powerful tool to illicit compliance. It is in this context that Ouchi's clan based control concept can add value to rules-based control actions.

Thirdly, control is an essential element of management. It is a successor to planning. This implies that, without proper control, eventual outcomes might differ greatly from what is being planned. Hence control is a crucial element to the success