Strategic Risk Management Implementation and Organizational Environment of Road Safety in Thailand

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Abstract

Accidents on the road are one of the highest causes of death and injury worldwide. 1.24 million people were killed on the world's roads and approximately 35 million were injured by road traffic crashes in 2010. UNGA announced a Decade of Action for Road Safety. The strategies of the Decade (2011-2020) aim to reduce the increasing trend in road traffic fatalities and injuries in the member countries including Thailand.

The objectives of this study are to study the relationship between organizational environment and strategic risk management implementation of road safety in the Royal Thai Police and Department of Disaster Prevention and Mitigation, Ministry of Interior, and to search for an operational approach for the implementation of strategic risk management.

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This study revealed that informal groups were not recognized on organization charts and not officially created to serve an organizational purpose. Incorporation of a road safety office could be set up. Specialists were employed in the organization and taken a roll in the formal group to help them be more effective in managing risk. The budget process of overfunding or underfunding always seemed to be significant problems of risk management. The Thai government had declared a Decade of Road Safety to be the national policy of risk management and budgets should be allocated directly for the deployment of resources to achieve specific targets.

As a result, organizations that are accountable should focus on budgeting. Further researches may investigate the financial measures for evaluating projects of road safety programs that could generate resources for the monitoring of these programs.

Keywords: Strategic Risk Management Implementation, Organizational Environment

Introduction

The World Health Organization in collaboration with the World Bank issued a report on the prevention of injuries of road accidents in 2013 and claimed that an injury from road accidents was one of the most serious types of accidents for public health. If no serious actions are taken regarding this situation by the year 2030, road accidents will be the first overall cause of death for people in the world, especially in poor countries and medium income countries. Therefore, the strategies of action for road safety took place on 19-20 November 2009 by the United Nations in Moscow, titling the year 2011-2020 as the “Decade of Action for Road Safety” that aimed to reduce death rate 10 people per 100,000 people on the year 2020.

Thailand had also realized those serious road accidents were the country's main problem for over years especially during holiday seasons. In 2012, a report of the Department of Disaster Prevention and Mitigation, Ministry of Interior showed the number of road accidents was 54,156; 7,579 deaths; 20,987 injuries; 490 million bath lost and destruction of 54,051vehicles. However, Thailand had approved the strategy of the Decade of Action for Road Safety on 29 June 2010, to be the master plan of road safety management with cooperation in each government organization, especially the Royal Thai Police (RTP) and the Department of Disaster Prevention and Mitigation, Ministry of Interior (DDP&M). This study is specifically aimed at strategic risk management of road safety in Thailand focusing on the missions of the RTP, which are; 1) To represent a good example in road safety for the public, such as, wearing helmet while riding a motorcycle, as well as providing knowledge of local traffic law to people for their own responsibilities. 2) To establish policies and procedures for police officers and other officers that involve serious rigorous and all area over time especially the motorcycle riders must wear helmet and the car users must use seat belt and stop using mobile phone. On the missions of DDP&M, which are; 1) To coordinate and integrate the various sectors for implementing road safety practices. 2) To develop the capacity for managing the prevention and relief of road safety.

The purpose of this study is specific to SRMI of road safety to determine a successful approach under the appropriate OE of four objectives: 1) To study the SRMI of road safety in RTP and DDP&M 2) To study the OE in RTP and DDP&M 3) To study the relationship between the OE and SRMI of road safety in Thailand. 4) To search for an operational approach for the implementation of strategic risk management.

The scope of the area in this study is aimed at two areas which were divided by the characteristics of two organizations: 1) The area of study of

the RTP is based in Bangkok and 2) The area of study of the DDP&M is based in Bangkok and the 18 zones of the Disaster Prevention and Mitigation Regional Center.

The research population in this study was chosen only in these two organizations with two levels of management: the administrative level and the operational level. For the RTP, the researcher's aims deal only with the officers in the strategy division who are the policy makers and operational officers. In the DDP&M, deal only with the officers in Bangkok and the 18 zones of Disaster Prevention and Mitigation Regional Center.

Conceptual Framework

To determine a successful way of strategic risk management implementation (SRMI) of road safety that RTP and DDP&M, the researcher has designed a SRMI as dependent variables, while the organizational environment (OE) represents independent variables. These variables are related to the operation approach to achieve the strategy of road safety.

Initially, the conceptual framework is built on the literature review. The research studied the paradigm of road safety in the world as a guide for world co-operation on implementation of world road safety. These conceptual developments of SRMI are regarded as essential to the SRMI conceptual framework between the years 1940-2013. Since 1940s, SRMI has been a process of an action plan for an organization to achieve organizational goal by 4 steps; selecting strategy, scanning the organization's internal and external environments, turning strategy into action as strategy implementation and evaluate and control. (Thompson and Martin, 2005, pp. 8-10, p. 691) Beginning in 2000, SRMI has developed from short-term plans to long term performance and expanded the approach not only to financial, but also including investment, business and

political risk. Finally, SRMI has been designed to integrate the approach as an on-going operational process involving organizing, resourcing and change management in a dynamic environment. Therefore, the researcher has selected only four dependent variables to describe the elements of SRMI of road safety: programs, budgets, performance and evaluation.

The long history of an organization perspective has been evidenced in ancient Egypt, Greece and Chinese times by organizing the actions of people to build cities and societies or do battle. By 1920, organization had become a general term of medium-sized social system in the state, army and a commercial enterprise. Until 1946, the organizational study had been started by the publication of Max Weber's treatise on regional organization and authority. At the present, the study of this information has provided an understanding regarding the approach about how organizations dynamically interact with individuals and groups within an environment.

As the scope of this study, the researcher has studied the conceptual development of OE in SRMI from the years 1967-2013. OE in SRMI defines an open system composed of sub-systems within and beyond boundary environments that function together to achieve targets. There are six selected variables that concern the environment of this study, including three internal environment variables within the organization boundary: organization structure, organization culture and organization resources (Wheelen and Hunger, 2012, p. 146). There are also three external environment variables outside the organization boundary: socio-culture forces, political-legal forces and technological forces.

Reviewing the conceptual development in SRMI and OE and relevant research findings, this researcher has designed research hypotheses that the OE independent variable **Organizational structure**^{IV1}, **Organizational culture**^{IV2}, **Organizational resources**^{IV3}, **Socio-cultural forces**^{IV4}, **Political-legal forces**^{IV5} and **Technological forces**^{IV6} are conditions

related to the dependent variable **Program**^{DV1}, **Budgets**^{DV2}, **Performance**^{DV3} and **Evaluation**^{DV4}.

This model will develop the conceptual between OE and SRMI into **holistic hypotheses** as follows:

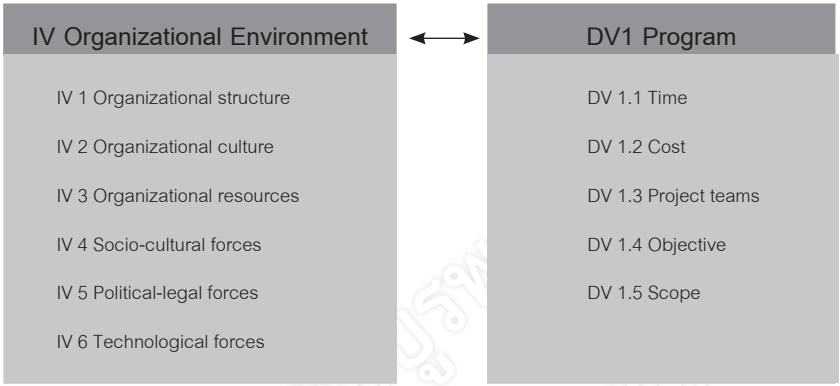
Core hypotheses are **Organizational environment**^{IV} composed of **Organizational structure**^{IV1}, **Organizational culture**^{IV2}, **Organizational resources**^{IV3}, **Socio-cultural forces**^{IV4}, **Political-legal forces**^{IV5} and **Technological forces**^{IV6} related to **Strategic risk management implementation**^{DV} composed of **Program**^{DV1}, **Budgets**^{DV2}, **Performance**^{DV3} and **Evaluation**^{DV4}. See Model 1.

Model 1 Hypotheses of Independent Variables from IV 1-6 with Dependent Variables from DV 1-4 (core hypotheses)

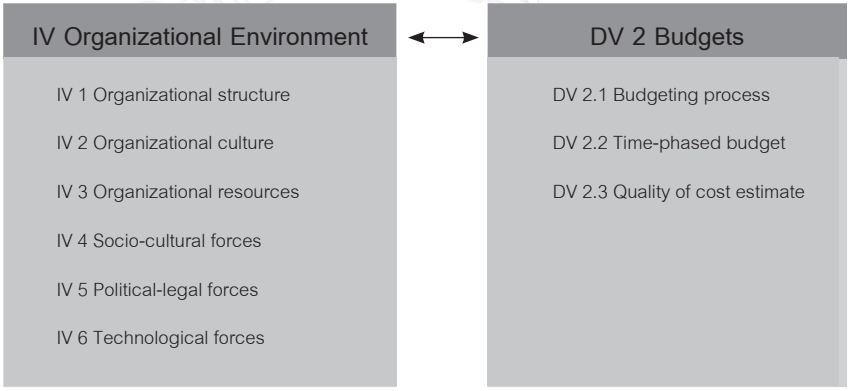
IV Organizational Environment	⟷	DV Strategic Risk Management Implementation
IV 1 Organizational structure		DV 1 Program
IV 2 Organizational culture		DV 2 Budgets
IV 3 Organizational resources		DV 3 Performance
IV 4 Socio-cultural forces		DV 4 Evaluation
IV 5 Political-legal forces		
IV 6 Technological forces		

Next, the relationship between each independent variables of OE to dependent variables of SRMI in indices of SRMI will be shown. The researcher has designed the hypotheses in detail from hypotheses 1 to 4 as follows:

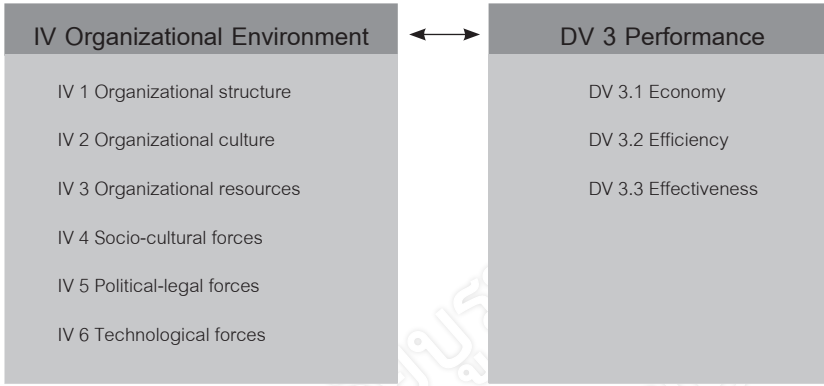
Model 2 Hypotheses of Independent Variables from IV 1-6 with Dependent Variable 1 (hypotheses 1)



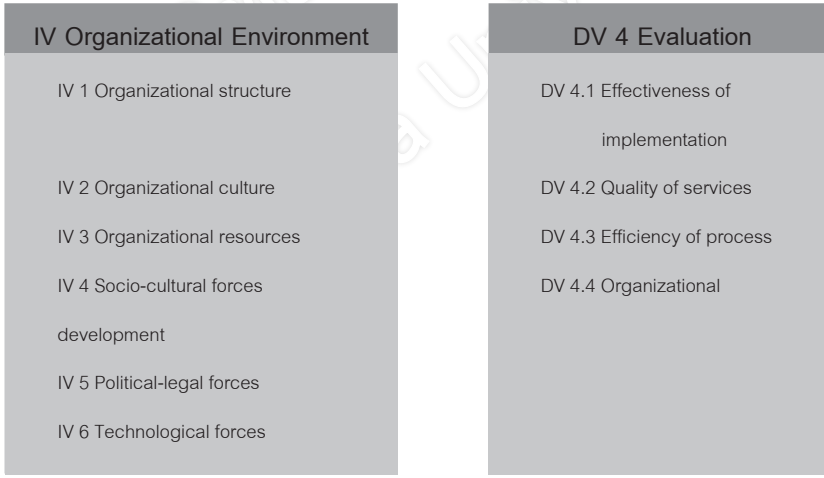
Model 3 Hypotheses of Independent Variables from IV 1-6 with Dependent Variable 2 (hypotheses 2)



Model 4 Hypotheses of Independent Variables from IV 1-6 with Dependent Variable 3 (hypotheses 3)



Model 5 Hypotheses of Independent Variables from IV 1-6 with Dependent Variable 4 (hypotheses 4)



Research Methodology

Using a qualitative approach, the researcher reviewed documents about the paradigm development of OE and SRMI and in-depth interviews with executive level officers in departments who are involved with SRMI of road safety. Its results conducted found not only variables to indices, but

also found each indicator that had become criteria values by using the abstract subject of variables that are the observation survey and using indices which are semi abstract and concrete in the interview.

In the quantitative, the researcher has applied the concrete subject of indicators to the questionnaire as a tool of this study which are designed as closed questions. The index of item variable congruence techniques (IVC) has been applied for testing the validity of the questionnaire. (Jirakraisiri, 2013, pp.109-351). Generally, the score of the index of item variable congruence should be above 0.7 which would determine that the questionnaire is congruence and content validity. As a result, all dependent variables show high congruence, which is 0.958. Also the results of all independent variables show high congruence, which is 0.964. The statistics for analyzing these data of variables are percentage, mean, and standard deviation. Especially, in describing mean, the researcher divides the data into five scales.

To study the relationship between OE and SRMI with holistic hypotheses has been tested by canonical correlation analysis that in the general form of canonical analysis is expressed.

Testing hypotheses by canonical correlation provides a level of correlation between independent variables and dependent variables and a sequence of important indices which affects the relationship of both variables. The researcher developed a model for strategic implementation of road safety which enhances the efficiency of road safety management in Thailand. This model also transfers new knowledge for managing road safety projects in other countries. The path analysis model is a suitable regression analysis for creating a model and forming a structural equation model to identify direct and indirect effect among variables in the model. The analysis includes standard regression analysis and multiple regression analysis with significance at .05. The result leads to a path diagram.

Research Results and Discussion

Regarding the research population, most respondents are male (54.2%) and female (45.8%) who work in the DDP&M (92.9%), RTP (4.2%) and other (2.9%). Those with positions at the operational level are 64.1% and 35.9% at the administrative level which have experienced working for over sixteen years (39.5%) and between 6-10 years (25.6%).

The framework of this study concerns the dependent variables of SRMI that effects road management in programs, budgets, performance and evaluation. And also the independent variables of OE affect road safety, which compose of organizational structure, organizational culture, organizational resources, socio-culture forces, political-legal forces and technological forces. The research questions are centered on these variables and tested by those respondents.

From the results of the quantitative analysis, it could be concluded on the objectives of the study by means to measure central tendency and standard deviation to measure dispersion of the score spreading out from the center are as follows:

1. **First objective:** the SRMI of road safety in the RTP and DDP&M concerns activities and choices in the operation process of actions to be taken in the strategy plan. The results found average moderate level of means in the variable and indices of SRMI. Variables are: **Programs**^{DV1}, **Budgets**^{DV2}, **Performance**^{DV3} and **Evaluation**^{DV4} which those are composed of: 1) **Programs**^{DV1} represent the activities that are limited by indices: **Time**$^{DV\ 1.1}$, **Cost**$^{DV1.2}$, **Project teams**$^{DV1.3}$, **Objective**$^{DV1.4}$ and **Scope**$^{DV1.5}$. 2) **Budgets**^{DV2} allocates resources (in numerical terms) to run the project that are required indices: Budgeting **process**$^{DV2.1}$ by whom, **Time-phased budget**$^{DV2.2}$ for work package and **Quality of cost estimate**$^{DV2.3.}$ 3) **Performance**^{DV3} is an output of activities that provides the basis for

continual improvement to judge performance by indices: **Economy**$^{DV3.1}$, **Efficiency**$^{DV3.2}$ and **Effectiveness**$^{DV3.3.}$ 4) **Evaluation**^{DV4} will yield appraisal of the achieved objectives on performance that requires indices: Effectiveness of **implementation**$^{DV4.1}$, **Quality of services**$^{DV4.2}$, **Efficiency of process**$^{DV4.3}$ and **Organizational development**$^{DV4.4.}$

2. **Second objective:** the OE in the RTP and DDP&M concerns the relationship between the internal and external environment whose function it is to achieve targets that interact with their environment. The results found average moderate level of means in variables and indices of OE. Variables are: internal environment composed of **Organizational strucutre**^{IV1}, **Organizational culture**^{IV2} and **Organizational resources**^{IV3} and external environment: **Socio-cultural forces**^{IV4}, **Political-legal forces**^{IV5} and **Technological forces**^{IV6} which are characteristics composed of: 1) **Organizational strucutre**^{IV1} identifies the formalize pattern of interaction and also indicates responsibility and hierarchical relationship in indices: **Departmentalization**$^{IV1.1}$, **Formal structure**$^{IV1.2}$ and **Decision-making**$^{IV1.3.}$ 2) **Organizational culture**^{IV2} deals with an index of **Organization values**$^{IV2.1}$ that is a common set of beliefs to guide the behavior of an organizational member. 3) **Organizational resources**^{IV3} are an organization's assets using the indices: **Physical resources**$^{IV3.1}$, **Financial resources**$^{IV3.2,}$ **Human resources**$^{IV3.3}$ and **Information resources**$^{IV3.4.}$ 4) **Socio-cultural forces**^{IV4} concerns with a society's attitudes and cultural values in indices: **Demography**$^{IV4.1}$ and **Cultural forces**$^{IV4.2.}$ 5) **Political-legal forces**^{IV5}: **Government regulations**$^{IV5.1}$ is an index that an organization must recognize. 6) **Technological forces**^{IV6}: **Technological progress**^{IV6}.1 is an index that is a combination of knowledge, skills, equipment, etc. to be used.

3. **Third objective:** the relationship between OE and SRMI of road safety.

Hypothesis 1 - 4 and holistic hypothesis are tested by canonical correlation analysis to provide a level of correlation between OE variables and SRMI variables and a sequence of important indices that affects the relationship of both variables. These show the model of path diagram and consider the significant is at $p < 0.01$. The results of hypothesis show as follows:

Hypothesis 1 is acceptable that **Organizational environment**^{IV} relates to **Programs**^{DV1} at higher positive value ($r = 0.782$) in the component of **Organizational structure**^{IV1} and **Organizational resources**^{IV3} that relate to **Project teams**$^{DV1.3}$ and **Scope**$^{DV1.5.}$

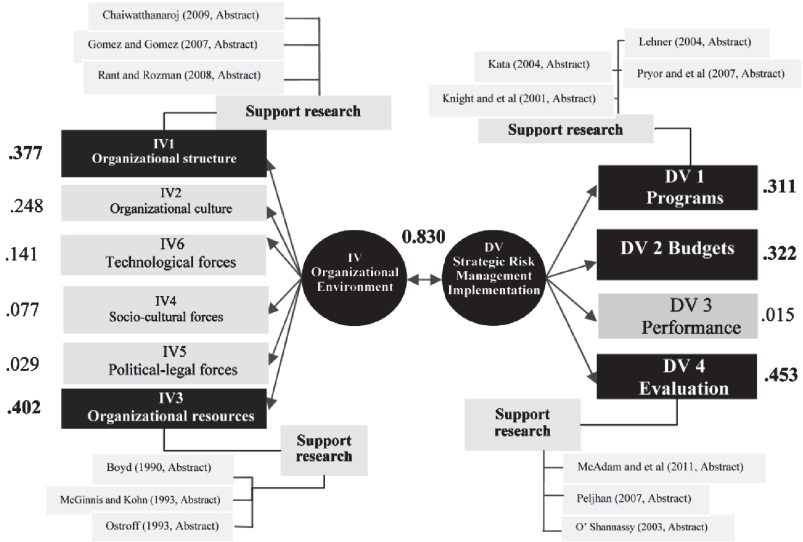
Hypothesis 2 is acceptable that **Organizational environment**^{IV} relates to **Budgets**^{DV2} at higher positive value ($r = 0.743$) in the components of **Organizational structure**^{IV1} and **Organizational resources**^{IV3} that relate to **Quality of cost estimate**$^{DV2.3.}$

Hypothesis 3 is acceptable in that Organizational environmentIV relates to **Performance**^{DV3} at higher positive value ($r = 0.685$) in the components of **Organizational culture**^{IV2} and **Organizational resources**^{IV3} that relate to **Efficiency**$^{DV3.2}$, and **Effectiveness**$^{DV3.3.}$

Hypothesis 4 is acceptable in that **Organizational environment**^{IV} relates to **Evaluation**^{DV4} at higher positive value ($r = 0.790$) in the component of **Organizational structure**^{IV1}, **Organizational culture**^{IV2} and **Organizational resources**^{IV3} that relate to **Efficiency of process**$^{DV4.3}$ and **Organizational development**$^{DV4.4.}$

Core Hypothesis is acceptable that **Organizational environment**^{IV} related to **Strategic risk management implementation**^{DV} at higher possible value ($r = 0.830$) in the components of **Organizational structure**^{IV1} and **Organizational resources**^{IV3} that is related to **Programs**^{DV1}, **Budgets**^{DV2} and **Evaluation**$^{DV4.}$ See Model 6

Model 6 (Core Hypotheses) Relationship between Organizational Environment and Strategic Risk Management Implementation



4. **Fourth objective**: an operational approach for the implementation of strategic risk management.

Regarding the results by canonical correlation analysis of testing the core hypotheses depicted the relationship between OE and SRMI and found that there are two independent variables of OE: Organizational structureIV1 and Organizational resourcesIV3 related to SRMI at a higher positive value (r = 0.830) in the component of **Programs**^{DV1} by indices of **Project teams**$^{DV1.3}$ and **Scope**$^{DV1.5}$, **Budgets**^{DV2} by an index of **Quality of cost estimate**$^{DV2.3}$ and also **Evaluation**^{DV4} by indices of **Efficiency of process**$^{DV4.3}$ and **Organizational development**$^{DV4.4}$.

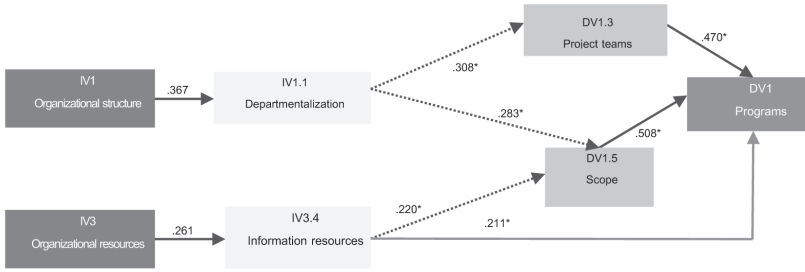
Path Analysis Results of Organizational Environment and Strategic Risk Management Implementation Model

To determine the direction of relationship between independent variables and dependent variables, this research can be explained by path analysis. This analysis uses multiple regression analysis with significance at .05 for creating a model and forming a structural equation. Results from the multiple regression analysis found three structural equation models that were applied for specifying the relationship of the variables to the appropriate model as follow:

1. Structural Equation Model of Programs

Model 7 shows the results from path analysis which examined the direction of **Organizational environmentIV** and **Programs**^{DV1}. Two indices of **Organizational structure**^{IV1} and **Organizational resources**^{IV3}: **Departmentalization**$^{IV1.1}$ and **Information resources**$^{IV3.4}$ associated with two indices of **Programs**^{DV1}: **Project teams**$^{DV1.3}$ and **Scope**$^{DV1.5.}$

Model 7 Structural Equation Model of ProgramsDV1

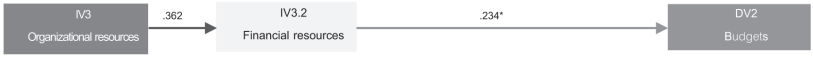


* Statistic significance 0.05

2. Structural Equation Model of Budgets

Model 8 shows the results from path analysis which examined the direction of **Organizational environmentIV and Budgets**^{DV2}. The index of **Organizational resources**^{IV3} is **Financial resoucres**$^{IV3.2}$ which are associated with **Budgets**^{DV2}.

Model 8 Structural Equation Model of Budgets^{DV2}

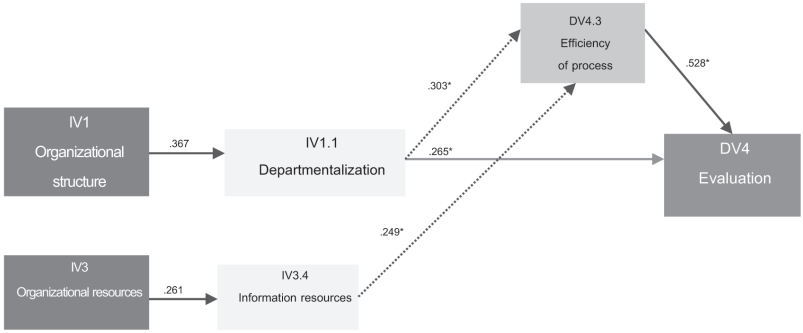


* Statistic significance 0.05

3. Structural Equation Model of Evaluation

Model 9 shows the results of path analysis which examined the direction of **Organizational environment**^{IV} and **Evaluation**^{DV4}. Two indices of **Organizational structure**^{IV1} and **Organizational resources**^{IV3} which are **Departmentalization**$^{IV1.1}$ and **Information resources**$^{IV3.4}$ associated with **Efficiency of process**$^{DV4.3}$ and indices of **Evaluation**^{DV4}.

Model 9 Structural Equation Model of Evaluation^{DV4}

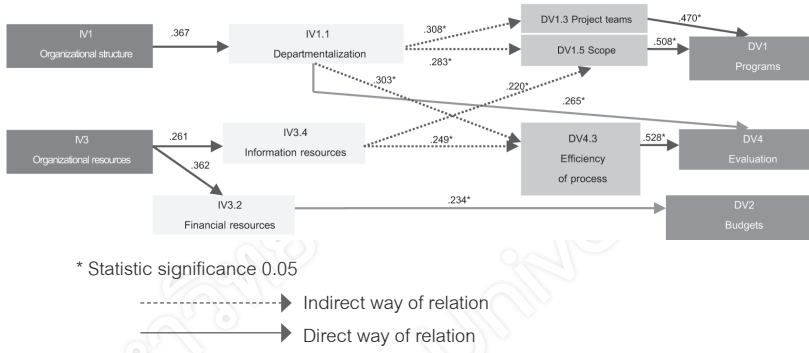


* Statistic significance 0.05

4. Hypothesized Model

Moreover, those three structural equation models were processed to identify direct and indirect effects among 5 variables: **Organizational structure**^{IV1}, **Organizational resources**^{IV3}, **Programs**^{DV1}, **Budgets**^{DV2} and **Evaluation**^{DV4}. See Model 10.

Model 10 Causality in the Hypothesized Model of Relationship among Variables



Model 10 describes the direct and indirect causal relationship between **Organizational environment**^{IV} and **Strategic risk management implementation**^{DV} as follows:

The Organizational environment^{IV} concerns the relationship between the internal and external environment. The internal environment within an organization views the organizational capabilities to achieve the desired goal, while **Organizational structure**^{IV1} represents the functions of management in **Departmentalization**$^{IV1.1}$ and involves **Project teams**$^{DV1.3}$ and **Scope**$^{DV1.5}$ in **Programs**^{DV1}. Also, **Departmentalization**$^{IV1.1}$ groups people together working in work units that have resulted in **Efficiency of process**$^{DV4.3}$ in **Evaluation**$^{DV4.}$

However, **Organizational resources**^{IV3} which are the organization's assets, especially **Financial resources**$^{IV3.2}$, are the direct effect of **Budgets**^{DV2} and **Information resources**$^{IV3.4}$ which are useful and meaningful for **Efficiency of process**$^{DV4.3}$ in **Evaluation**^{DV4}.

5. Integrated model in Social Science

The injury from road accidents is one of the most serious types of accidents for public health risk events and is usually caused by human error, accident, or natural phenomena. Risk management becomes an essential topic aimed at reducing system errors, operational malfunctions and uncontrolled human behavior. Risk management is expanded to include other risk transfers and risk control strategies into strategic risk management which is a more comprehensive approach (National Association of College and University Business Officers, NACUBO, 2000, p. 12). These developments are related to the aims of improving processing efficiencies and operating effectiveness to corporate performance. (Anderson and Schroder, 2010, pp. 78-80) with regards to the **strategic risk management implementation**^{DV} conceptual framework between 1940-2013, the integrated operational process involves organizing resourcing and change management. (Suksiwong, 2011, p. 55).

In summary from Model 10, a social science model has been placed into the integrated model to indicate variables that show the causal relationship (direct and indirect effects) between **Organizational environment**^{IV} and **Strategic risk management implementation**^{DV} of the road safety scheme to achieve the target of WHO (that death rate 10 people per 100,000 people by the year 2020) and also will be presented for approval of the project of road safety scheme.

Model 11 Integrated Model in Social Science

In Model 11, the approval projects of the road safety scheme require **Programs**^{DV1} as the action plans are taken by **Project teams**$^{DV1.3}$ to take advantage of **Scope**$^{DV1.5.}$ **Budgets**^{DV2} allocated resources to run the project by **Financial resoucres**$^{IV3.2}$. **Also Evaluation**^{DV4} is used to be the performance assessment with **Efficiency of process**$^{DV4.3}$ to appraise the achieved objectives.

Organizational environment^{IV} concerns the relationship between the internal and external environment. The internal environment within an organization views the organizational capabilities to achieve the desired goal, **Organizational structure**^{IV1} represents the functions of management in **Departmentalization**$^{IV1.1}$ and involves **Project teams**$^{DV1.3}$ and **Scope**$^{DV1.5}$ in **Programs**$^{DV1.}$ All so **Departmentalization**$^{IV1.1}$ groups people together working in work units that have resulted in **Efficiency of process**$^{DV4.3}$ in **Evaluation**^{DV4}.

However, **Organizational resources**^{IV3}, which are the organization's assets, especially **Financial resources**$^{IV3.2}$ are the direct effect of **Budgets**^{DV2} and **Information resources**$^{IV3.4}$ which are useful and meaningful for **Efficiency of process**$^{DV4.3}$ in **Evaluation**^{DV4}.

16,654 cars. The target to reduce the death rate from accidents should focus on motorcycles and focus on three methods for accident prevention: legal, humanitarian and economic arguments, respectively.

2. With tasks and responsiveness on road safety programs by the committee who comes from different ministry organizations, specific teams for specific purposes could be set up as informal groups. However, informal groups are not recognized on organization charts and are not officially created to serve an organizational purpose. Incorporation of a road safety office could be set up and be used as specialists who are employed in the organization and who take a roll in the formal group to help them be more effective in managing risk.

3. Budgets always play an important role in the entire process of strategic risk management implementation. A budget is a plan for allocating resources and it is also a monitoring and controlling program. The activities of a program are supported by allocating resources that can be a measured as an activity of outcomes to measure the difference between the actual and planned uses of resources. Generally, the outcomes of the allocation budget do not satisfy the director of the organization who is under budget constraints. The budget process of overfunding or underfunding always seems to present possible problems of risk management. DDP&M occasionally has these problems in ways that the budget is used to carry out road safety programs without government support. As the Thai government has declared a Decade of Road Safety to be the national policy of risk management, budgets should be allocated directly for the deployment of resources to achieve specific targets.

Regarding this suggestion on budget, further research will investigate the finance measures for evaluating projects of road safety programs that can generate resources for the adequate monitoring of these programs.

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