Influencing Factors Governance (IFG) Model for United Arab Emirates Disaster Management

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ABSTRACT

Presently the disaster management used top down approach where it does not involved the citizen. This study incorporated the peoples' participation factors in successful disaster management. However this paper presents a development and assessment of structural equation model (SEM) of Influencing Factors Governance (IFG) on disaster management for UAE. The model consisted three main elements which are Influencing Disaster Management Factors (IFDM); Peoples' Participation in Governance on Development (PPGD) and Successful Disaster Management (SDM). The model was assessed using ANOS-SEM software using data collected from questionnaire survey that involved 247 valid responses. The results at measurement model, it was found that the entire measurement model had achieved the acceptable limit of reliability, convergent validity and discriminant validity. At the structural model, it was found that the model has achieved the goodness-of-fit criterion values. In term of hypothesis testing, it was found that all the three hypotheses had achieved significant relationship. It can be concluded that Influencing Disaster Management Factors has significant relationship with Peoples' Participation in Governance on Development (PPGD); Influencing Disaster Management Factors (IFDM) has significant relationship with Successful Disaster Management (SDM) and Successful Disaster Management (SDM) has significant relationship with Peoples' Participation in Governance on Development (PPGD). The findings revealed that influential factors against governance had significantly can reduced disaster prevalence. This research could further strengthen governance structures and create a new output, an adoptable emergency management tool. In conclusion, this new model is a veritable tool for reducing natural disasters in the UAE

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Introduction

Rapid and unsustainable development can lead to disaster either naturally or man-made disasters. Usually careless development resulted to natural disasters. Generally people are not relating natural disasters from development pathways which requires governing the development in terms administration and implementation. Hence it require to investigate the impact of development and natural disasters which should be treated as inseparable [1-4]. Pertinently, the continual occurrence of naturally development-driven disasters are associated with either infrastructure development or construction [3]. Unstainable development activity resulted to turbulence ecological and geological condition, thus usually trigger the occurrence of natural disasters of varying sizes [5]. This trend has becoming worse due to unprecedented demographic burst. Resulted from uncontrolled urbanisation, negative rural-urban migration and also increase in natural growth rates. This has caused unprecedented developmental ambitions by government to cate the increase of population without any conscious attempt to evolve a veritable platform that involves citizens in the development scheme [6]. The increase of construction and development works it will alter the ecological and geological of UAE environment [3]. This is due to huge effects from several UAE constructions which may lead to natural disasters [3-4]. The prevalence of natural disasters affecting UAE may soaring above the global threshold [7].

Unfortunately the entire government's emergency management approaches are using a top-down style. This style excludes citizen participation in development and emergency management arrangements [8-10]. It is regrettable to note that the exclusion is a deviation in the development-disaster-emergency relationship [11-13]. Furthermore, typical style of administration and implementation of the development have been using top-down method [7]. This style creates disconnect between the government that act as executors of development initiatives which trigger natural disasters and its people [2]. This trend is causing problem which hamper the feedback necessary for ecological and geological relationship [14]. It activates the occurrence of natural disasters of varying sizes [15-16]. The situation has been made worse by uncontrolled urbanisation that needs to cater the increasing population [17-19]. Therefore, in this important trend this study is aimed at shedding light on some cross-cutting issues. In essence, this study seeks to deeply understand the UAE's disaster profiles. Both efforts in this research are investigate in the United Arab Emirates on disaster management issues. To order to reduce the occurrence of disasters in the UAE, it is therefore imperative to recognize the driving factors that militate governance. The research attempts to resolve the vulnerability and weakness of the current arrangement for a catastrophe. Essentially, the efforts of this study were aimed at actively creating a contemporary style and culture of development, as well as institutionalizing its functional procedures, so as to reconfigure the former model of governance of development into a comprehensive model. The new model's architecture and aesthetics are in line with the UAE government's long-term dream of permanently addressing natural disaster problems affecting people. Most interesting is the fact that this development-based model is supposed to be more flexible, reliable and detailed method for emergency management to minimize the incidence of natural disaster in the oil-rich UAE peninsular. This research fundamentally enhances the framework of government and gives it a new tool for implementing emergency management. This new model is expected to reduce the prevalence of natural disasters in the UAE. These and other questions have therefore been answered through extensive theoretical and empirical endeavours. This study identifies the influencing factors that cause disasters and as well as the factors that influence successful disaster management, including;

A. Influencing Disaster Management Factors (IFDM)

i. Institutional Factors (IF),
ii. Environmental Factors (EF),
iii. Human/Technology Factors (HTF),
iv. Natural Factors (NF),

B. Peoples' Participation in Governance on Development (PPGD), and

C. Successful Disaster Management (SDM) through the Influencing Factor Governance (IFG) model.

Methodology

The data collected from field surveys were analysed using SPSS and AMOS-SEM software. The data was analysed in 3 phases where the first phase was examined respondent characteristics and descriptive analysis. The second phase involved exploratory and confirmatory factor analyses. The final phase was examined the path analysis of the structural to determine the impact of influencing factors on disaster Prevalence reduction in the United Arab Emirates. Also, second-order analysis was performed on paper goals results. To fully capture all targeted activities, the study of the three hypotheses set out to quantify interrelationships between all variables and constructs must be renamed into constructs and variables (independent and dependent). A contemporary design incorporated the end product of all the experimental and numerical efforts proposed. This development was rendered with the use of Moments of Structures Analysis (AMOS Version 23), a software package operationalized by the use of Structural Equation Modelling (SEM) techniques on all research constructs and variables. It was hoped that the quantitative approach would allow for a wide range of views, especially at the pilot survey level. This is important to form the queries of calibration objects, against which the literature and real-life observations identified several of the influencing factors. Such queries of objects are latent structures evaluated for better understanding. This is intended to provide an incisive forum that will provide relevant information on the main issues posed in this study. Due to the latitude of public experience on natural disasters, these anticipated views are considered important. There was also an expected view of growth from the officials of the relevant government ministries, departments and agencies (MDAs) as they are responsible for administration and execution of development governance. Key investors include those interested in emergency management operations.

Evaluation of Measurement Equation Model

This study examined the assumptions of normality at univariate level, and at multivariate level. For the skewness and kurtosis values, the acceptable scores should be between -1 to +1 and this implies that the assumption is satisfied with indication of no deviation in normality. Confirmatory Factor Analysis is to check redundancy between constructs in the model. Influencing Disaster Management Factors (IFDM), IF, EF, HTF, NF, SDM, and PPGD are all the measurement models constructs. Figure 1 shows the measurement models that did not fit well based on the indexes shown in Table 1. TLI and CFI were less than 0.90 and NFI was less than 0.80.

Table 1 - Fitness Indexes for All Constructs (Initial CFA Model)

Name of Index	Level of Acceptance	Index Value	Comments
Chisq/df	Chisq/df ≤ 3	2.371	The required level is achieved
TLI	TLI ≥ 0.9 means satisfactory	0.715	The required level is not achieved
CFI	CFI ≥ 0.9 means satisfactory fit.	0.731	The required level is not achieved
NFI	NFI ≥ 0.80 suggests a good fit	0.615	The required level is not achieved
GFI	GFI ≥0.80 suggests a good fit.	0.676	The required level is not achieved
RMSEA	RMSEA ≤ 0.08 mediocre fit.	0.073	The required level is achieved

Model is not accepted

Fig.1 shows the initial measurement model for all integrated constructs that did not fit have a TLI or CFI below 0.90 and a NFI below 0.80. According to Hair et al. (2010), one important consideration is the size of the factor loading. High loadings on a factor indicate they converge at a common point, which is the latent construct in the case of high convergent validity. All factor loadings should be statistically significant at a minimum. Since a substantial load could still be relatively weak in strength, a good rule of thumb is that standardized load estimates should be 0.5 or higher. According to [18], for the first step any measuring item with a factor loading less than 0.6 should be deleted from the measurement model. The fitness indices for the initial CFA run were not within the recommended levels, requiring that items EF4, EF5, EF6, EF7, PPG2, PPG5, PPG6, PPG7, NF1, NF2, IF1, IF6, IFDM1, SMD1, SMD2, SMD8, and SMD9 be deleted. After deleting items with have factor loading less than 0.6, the researcher checked the Modification Indices (MI). According to [3], if modification indices show high covariance and regression weights, a covariance between measurement errors with the highest Modification Indices (MI) should be made. Thus, the measurement model was re-run as recommended after dropping these problematic items.

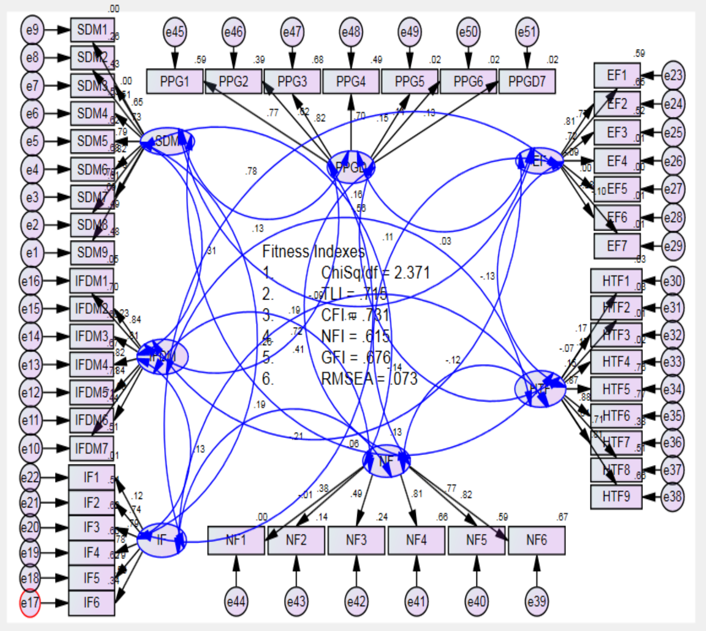

Fig.1 - Initial CFA Model

Fig.2 shows the CFA model. The CFA model fits the fitness indexes as shown in Table 2 and Fig.2. TLI and CFI were above 0.90; NFI and ChiSq/df <3 were above 0.80; and RMSEA was below 0.08.

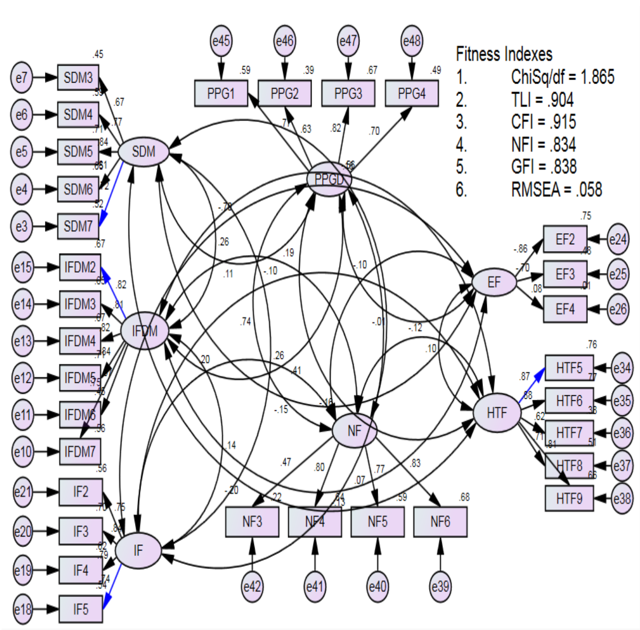

Fig.2- Final CFA Model

All fit indices for the measurement model achieved the recommended values as shown in Table 2.

Table 2- results of fitness index values for final measurement models

Name of Index	Level of Acceptance	Index Value	Acceptable level
Chisq/df	Chisq/df ≤3	1.865	achieved
TLI	TLI ≥ 0.9 means satisfactory	0.904	achieved
CFI	CFI ≥ 0.9 means satisfactory fit.	0.915	achieved
NFI	NFI ≥ 0.80 suggests a good fit	0.834	achieved
GFI	GFI ≥ 0.80 suggests a good fit.	0.838	achieved
RMSEA	RMSEA ≤ 0.08 mediocre fit.	0.058	achieved
Model is accepted			

Next step to assess measurement model is to examine convergent validity and discriminating validity. According to Pallant (2013), convergent validity is related construct validity while and discriminant validity is unrelated construct validity. It is investigating an items relationship with other constructs. For convergent validity, the Average Variance Extracted (AVE) should be ≥ 0.5. AVE estimates two factors higher than the square correlation provide evidence of discriminant validity (Hair et al., 2010). According to Fornell & Larcker (1981), if the AVE is higher than the square of the coefficient of correlation between the constructs, discriminant validity is satisfied. Furthermore, reliability was assessed by construct reliability (CR 0.60) in this study. Table 3 shows two reliability measurements for the measurement model, construct reliability (CR), and Average Variance Extracted (AVE).

Table 3: Reliability and convergent validity Measurements

Construct	Item	Factor Loading	CR (≥ 0.6)	AVE (≥ 0.5)
	SDM3	0.69		
	SDM4	0.73		
	SDM5	0.73		
	SDM6	0.79	0.764	0.678
SDM	SDM7	0.82		
	SDM8	0.75		
	SDM9	0.61		
	IFDM1	0.71		
	IFDM2	0.83		
	IFDM3	0.79		
IFDM	IFDM4	0.86	0.865	0.682
	IFDM5	0.83		
	IFDM6	0.62		
	IFDM7	0.65		
	IF2	0.81		
	IF3	0.81		
IF	IF4	0.85		
	IF5	0.70	0.834	0.641
	IF6	0.74		
	EF4	0.66		
	EF5	0.76		
EF	EF6	0.70	0.851	0.579
	EF7	0.71		
	HTF4	0.91		
	HTF5	0.87		
HTF	HTF6	0.89	0.835	0.692
	HTF7	0.64		
	HTF8	0.72		
	HTF9	0.80		
	NF3	0.52		
	NF4	0.78		
	NF5	0.77	0.749	0.589
NF	NF6	0.81		
	PPGD1	0.77		
	PPGD2	0.62		
PPGD	PPGD3	0.80	0.781	0.594
	PPGD4	0.72		
	PPGD5	0.65		

Results of discriminating validity of the measurement models are as in Table 4. The diagonal values in bold is square root of AVE is compared with other values of the correlation between the respective constructs. When a diagonal value is higher than other values in the row and column then discriminant validity is achieved.

Table 4- Discriminant Validity

Construct	SDM	IFDM	IF	EF	HTF	NF	PPGD
SDM	(**0.655**)						
IFDM	0.122	(**0.797**)					
IF	0.291	0.295	(**0.754**)				
EF	0.271	0.098	0.218	(**0.712**)			
HTF	0.182	0.085	0.154	0.152	(**0.744**)		
NF	0.053	0.516	0.189	0.128	0.164	(**0.782**)	
PPGD	0.120	0.145	0.148	0.114	0.009	0.069	((**0.732**)

Hence the entire measurement models had achieved the requirements of reliability, convergent validity and discriminant validity. The following step is to tie these measurement models into a structural equation model for goodness-of-fit and hypotheses testing.

Evaluation of Structural Equation Model

The structural model consisted of exogenous and endogenous constructs arranged according to the proposed conceptual framework. The arrangement are the exogenous variables are Influencing Disaster Management Factors (IFDM), Institutional Factors (IF), Environmental Factors (EF), Human/Technology Factors (HTF), Natural Factors (NF) and Peoples' Participation in Development Governance (PPGD)) and endogenous variable (Successful Disaster Management (SDM)). The graphical link between each construct is as shown in Fig.3.

Table 5 shows the fitness indices for the structural measurement models to be accepted for the model's goodness-of-fitness. Fig.3 presents the final IFG structural model which shows perfect compliance with the goodness-of-fit criterion.

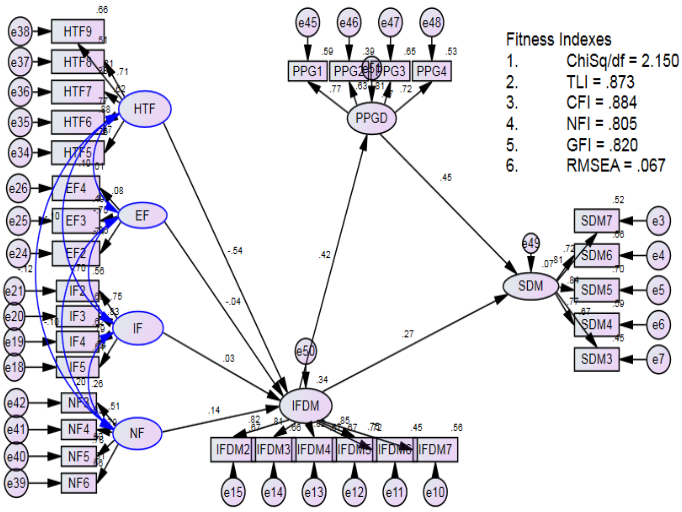

Fig.3-Influencing Factor Governance (IFG) structural Model

Table 5- The Fitness Indexes for the Proposed Structural Model

Name of Index	Level of Acceptance	Recorded Value	Acceptable level
Chisq/df	Chisq/df ≤ 3	1.614	achieved
TLI	TLI ≥ 0.9 means satisfactory	0.905	achieved
CFI	CFI ≥ 0.9 means satisfactory fit.	0.912	achieved
NFI	NFI ≥ 0.80 suggests a good fit	0.800	achieved
GFI	GFI ≥ 0.80 suggests a good fit.	0.804	achieved
RMSEA	RMSEA ≤ 0.08 mediocre fit.	0.047	achieved

The square multiple correlation (R^2) and path coefficient (β) of each path were used to evaluate the structural model. The R^2 of the endogenous variables was assessed to be substantial (R2 0.26), moderate (R2 0.0.13), and small (R2 0.02) according to Cohen (1988, 2003). It is shown in Fig.3 that the endogenous construct of SDM has R^2 value of 0.24, which indicates that the developed model has moderate explanatory power. When evaluating the path coefficient of β value for all the structural paths, it was found that the maximum path coefficient value of EF was 0.77 which means EF shares a high variance value with SMD. Table 6 shows the standardized model of regression, path weights, and significance for IFG factors, which indicates that the hypothesis was supported.

Table 6- results of path analysis of Influencing Factor Governance (IFG) Model

Path	Standard Beta ≤0.85	p-value	Status
PPGD<--- IFDM	0.42	0.000**	Supported
SDM <--- IFDM	0.27	0.0 00**	Supported
SDM <--- PPGD	045	0.026**	Supported

Note: * p < 0.05; ** p < 0.01; *** P< 0.001

Hypotheses of the structural model was based on the literature review regarding the relationship between the exogenous and endogenous constructs. Based on results in table 6, the outcome of the hypothesis testing are as follow;

i. H1: there is significant relationship between Influencing Disaster Management Factors (IFDM) with Peoples' Participation in Governance on Development (PPGD).
ii. H2: There is a significant relationship between Influencing Disaster Management Factors (IFDM) with Successful Disaster Management (SDM).
iii. H3: There is a significant relationship between Successful Disaster Management (SDM) with Peoples' Participation in Governance on Development (PPGD).

Hence, this research empirically supports this hypothesis of the structural model.

Conclusion

Disaster issues are caused by the deterioration of the UAE government's current emergency management system, which has failed to address the country's immense natural disaster challenges. This thesis seeks to address this arrangement's vulnerability and inability. The efforts of this study were aimed at actively establishing a contemporary style and culture of development, as well as institutionalizing its functional procedures, so that the current model of development governance can be reconfigured into a comprehensive model. This research aims to develop a model of influencing factors governance (IFG) to reduce the prevalence of disasters in the UAE. This paper provides data collection and detailed analysis to provide insight into respondent perspectives on the factors causing effective management of disasters in the UAE. A questionnaire survey was involved in the collection of data. The questionnaire was built from the literature review with 42 factors listed. Before the actual survey of the questionnaire, a pilot study was conducted to validate factors found from the literature that influence disaster mitigation. For all concepts, descriptive research was performed, accompanied by an EFA test. The paper also used the CFA model to clarify data analysis. The updated measurement model provided adequate data fit and heavy loading of all indicators on their respective variables. Every variable construct's consistency and validity was then tested. In terms of reliability, Cronbach alpha and CR have been tested. The results showed the quality of all the houses. Therefore, to validate the validity of each construct, convergent and discriminating validity were also evaluated. There was strong evidence that the structures in this analysis were true and appropriate for testing the hypotheses in the next stage (structural model).

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