Multiple-group confirmatory factor analysis for development of the Ayutthaya world heritage site, Thailand.

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Abstract

This research aimed to analyse the factor structure for the development of the Ayutthaya world heritage site. Data was collected from a questionnaire survey with a sample of 400 people involved with the Ayutthaya world heritage site. The results show that the models provided a satisfactory fit with the empirical data. Both of the factor loadings between a single group and a multiple group were greater than 0.70. In sum, male and female opinions on factor structure were not different.

Keywords: leadership, participation, development of Ayutthaya world heritage site.

Introduction

The community development around the world heritage site was based on the knowledge used to manage and protect the site. Many factors are important in management of the world heritage site were important such as sustainability and effective management. Management of the world heritage site needs to be developed to accommodate changes in the environment in each area and in the buildings so the focus should be on managing the world heritage site for the changing world of today. The City of Regensburg (2012:11-12) studied the world heritage management plan for the old town of Regensburg with Stadtamhof introducing a successful management plan for world heritage cities in nine world heritage sites located in the European Union, which offers a sustainable management approach to world heritage sites. The conservation plan explains that the management plan must be implemented in an interdisciplinary way that takes account of the relevant stakeholders in an area. This was the process of managing world heritage cities in Europe with a focus on involving stakeholders of the world heritage site.

As a result of the successful development plan of world heritage site areas in the European Union, which focused on the importance of links between stakeholder engagements and development of world heritage sites, Thailand has registered three world cultural heritage sites, namely, the historical city of Ayutthaya, Sukhothai historical city, and Ban Chiang archaeological site. This research will focus on the factors that contribute to the development of the world heritage site in Phra Nakhon Si Ayutthaya province. The concept of successful development of a world heritage site by the European Union was applied to the study, such as leadership, participatory processes, and development of the site. Finally, the result of this research will improve factors for the development of world heritage sites in Thailand.

Objective

To analyse the factor structure for the development of the Ayutthaya world heritage site.

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Literature review

For this study, the researchers conducted a literature review, which is divided into three parts in accordance with the three separate elements: effective leadership in a project, public participation, and the concept of development of the world heritage site.

Effective leadership in a project: there were five components (Juli, 2011:18) as follows:

1) Build vision: sharing the vision and goals together with the same understanding. Tracking the progress of this vision is one of the key factors in the success of the project and the team.
2) Nurture collaboration: team collaboration is important as effective teams provide mutual benefits.
3) Promote performance: planning is important. The leaders should be responsible for creating an environment that promotes performance at both the individual and the team level.
4) Cultivate learning: effective leaders should encourage their teams to explore new methods and learn from them.
5) Ensure results: deliver accurate results.

Regarding the principles of public participation, the model of rural development participation can be divided into four identified patterns (Cohen and Uphoff, 1977:8) as follows:

1) Decision making involves public participation in community decision making, whether direct or indirect decisions.
2) Implementation involves the community giving empowerment and resources to design activities to implement the project.
3) Benefits involve relevant persons receiving a benefit from project implementation or community development activities. The benefits for the community can be divided into the following issues.
    - Material benefits are the benefits of income or consumption in the community.
    - The distribution of benefits in the community should be fair and appropriate.
    - Social benefits are the benefits to the community so that society may experience an improved quality of life. In other words, the lives of the poor are made better.
    - Personal benefits are the benefits directly received by an individual in society or by the community.
4) Evaluation involves recognizing the impact on people in the community as a result of community development activities. There are three main types of evaluation: the central assessment of the community development team, evaluation from central government agencies, and evaluation of public opinion.

Regensburg's world heritage city development plan

The successful implementation of the world heritage management plan of Regensburg should include understanding the principle objective and the standard development plan for the process in that specific context, and it should have a unity of operation. The operational process should emerge from collaboration between the

community and the staff members of the government, including those who have a direct impact. This principle (City of Regensburg, 2012:50-71) is as follows:

1) Tangible cultural heritage, such as historical buildings and monuments, are the most important cultural heritage. This plan is to maintain the accuracy and integrity of the historic site.
2) Culture and the tourist industry are attracting tourists to world heritage cities, which is a great benefit to the tourism system due to it being an important economic factor. The tourism system may promote the value of world heritage sites in locations across the world.
3) Economic development is when a world heritage site in an old town is the main shopping center for the city and region. Community businesses play an important role in economic development in world heritage areas. Special world heritage areas are locations for businesses such as retail stores and various services that serve both the residents and visitors. Future economic developments of the world heritage site will focus on the historical balance that is appropriate for world heritage sites.
4) Housing refers to the housing security system within the world heritage site. The housing should be appropriate for the historical heritage environment.
5) Mobility refers to an awareness of world heritage sites' assets and the preservation of the quality of world heritage sites. The transportation system should respond to the needs of the visitors to and the residents in the world heritage area, and journeys should take into account the environment. On the other hand, the impact on the world heritage area should be minimal.
6) Urban planning and development of the public spaces in a world heritage site should reflect the history of the city, and the planning must be designed and developed taking into account the design of the public spaces to meet the needs of the citizens in the community.
7) Environment and leisure, such as green areas and river banks, are a valuable natural resource in a world heritage area. Protection of the world heritage area and the buffer zone should provide space for residents and visitors to relax, which is an important part of the attractiveness of the world heritage site. It also ensures that better air quality improves the climate in the world heritage site and is a key factor in climate change.
8) Awareness-raising and research to provide basic information of world heritage site is vital to creating a positive image of the city and to delivering outstanding value of world heritage sites from both inside and outside the site. The world heritage sites should use scientific research that will promote the potential of world heritage cities to the world.

Methods

This research focused on multiple-group confirmatory factor analysis for development of the Ayutthaya world heritage site, and it used a quantitative research approach.

Population sampling: the concept of multivariate statistical analysis requires a sample size of 10-20 sample of the parameters in the model (Kline, 2016:16). This research used 20 parameters, so the sample size is calculated as 20 x 20 = 400 samples. The participants in the sample were selected using convenience sampling around the world heritage site in Ayutthaya province.

Research instrument and reliability: the researcher used a Likert scale with 5 levels, and its reliability was tested using Cronbach's alpha. The results of the reliability test show that the overall score of the questionnaire was 0.96.

Data analysis: For data analysis, confirmatory factor analysis (CFA) and multiple-group confirmatory factor analysis (multiple group CFA) by Mplus 7.0 were used.

Result

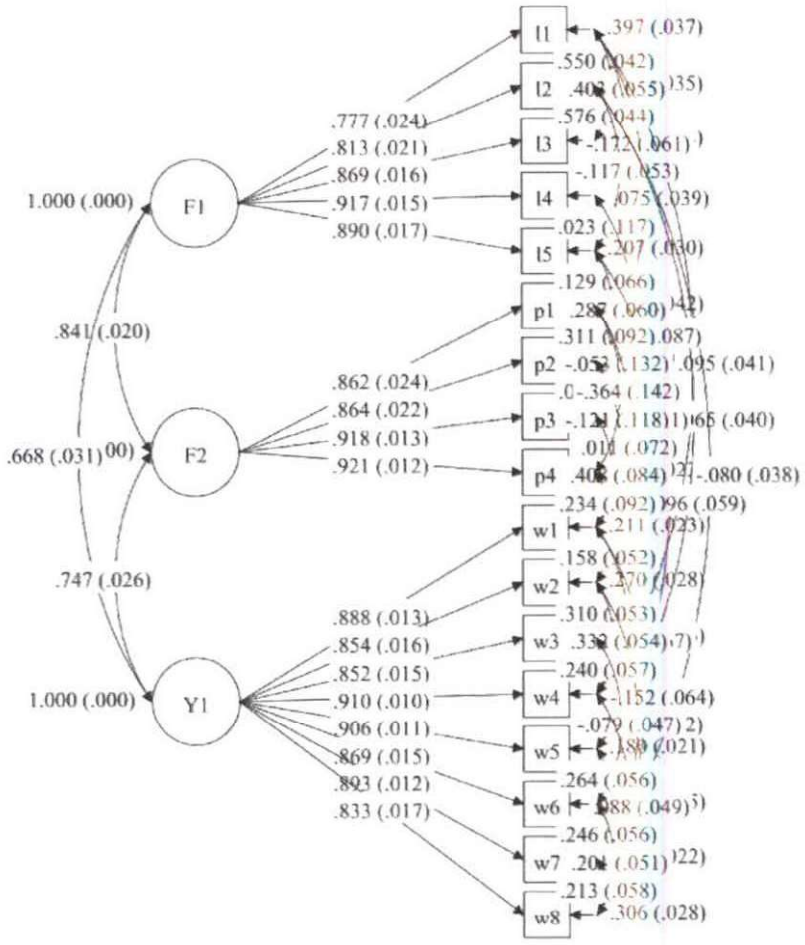
This research used multiple-group confirmatory factor analysis, which was divided into two parts: single group and multiple group.

1) In the single group model, the results show that the p-value was not significant at 0.062; as it was more than 0.05, it passed the standard of criteria. Chi-square statistics (χ^2/df) at 1.25 passed the standard of criteria. Standardized Root Mean Square Residual (SRMR) at 0.022 passed the standard of criteria. Comparative Fit Index (CFI) at 0.997 passed the standard of criteria. Tucker Lewis index (TLI) at 0.996 passed the standard of criteria. Finally, the single group model showed a good fit with the empirical data.

Table 1 Represented symbol

Represented symbol					
F1	=	Leadership	Y1	=	Development of the World Heritage
L1	=	Build vision	W1	=	Tangible cultural heritage
L2	=	Nurture collaboration	W2	=	Culture and tourism
L3	=	Promote performance	W3	=	Economic development
L4	=	Cultivate learning	W4	=	Housing
L5	=	Ensure results	W5	=	Mobility
F2	=	Participatory	W6	=	Urban planning and development
P1	=	Decision making	W7	=	Environment and leisure
P2	=	Implementation	W8	=	Awareness raising and research
P3	=	Benefit			
P4	=	Evaluation			

Figure 1 The single factor model of the development of the world heritage site in Phra Nakhon Si Ayutthaya province.



Chi-Square = 100.239, Chi-Square/df = 1.25, df =80, p-value = 0.062, RMSEA = 0.025, CFI = 0.997, TLI = 0.996, SRMR = 0.022

Table 2 The factor loading of the development of the world heritage site in Phra Nakhon Si Ayutthaya province.

Indicator	Factor loading	SE	t	R^2
F1				
L1	0.777	-	-	0.603
L2	0.813	0.040	25.813	0.661
L3	0.869	0.045	24.139	0.755
L4	0.917	0.056	19.004	0.840
L5	0.890	0.061	17.242	0.793
F2				
P1	0.862	-	-	0.743
P2	0.864	0.041	24.819	0.747
P3	0.918	0.043	22.539	0.842
P4	0.921	0.052	20.043	0.849

Indicator	Factor loading	SE	t	R^2
Y1				
W1	0.888	-	-	0.789
W2	0.854	0.039	25.564	0.730
W3	0.852	0.041	23.634	0.726
W4	0.910	0.039	27.105	0.828
W5	0.906	0.043	24.955	0.820
W6	0.869	0.041	24.331	0.754
W7	0.893	0.043	24.609	0.798
W8	0.833	0.044	22.463	0.694

2) For the multiple group model, the result shows that the p-value was not significant at 0.062; as it was more than 0.05, it passed the standard of criteria. Chi-square statistics (χ^2/df) at 1.171 passed the standard of criteria. Standardized Root Mean Square Residual (SRMR) at 0.029 passed the standard of criteria. Comparative Fit Index (CFI) at 0.996 passed the standard of criteria. Tucker Lewis index (TLI) at 0.994 passed the standard of criteria. Finally, the multiple-group model (Gender) showed a good fit with the empirical data.

The factor loading of the confirmation factor in the development of the world heritage site in Phra Nakhon Si Ayutthaya province (Group male) shows that all of factor loading scores were in the range of 0.794 – 0.933. The factor loading of the confirmation factor in the development of the world heritage site in Phra Nakhon Si Ayutthaya province (Group female) showed that all of factor loading scores were in the range of 0.772 – 0.938. Consequently, the factor of the development of the world heritage site in Phra Nakhon Si Ayutthaya province was the best factor for measurement in this case.

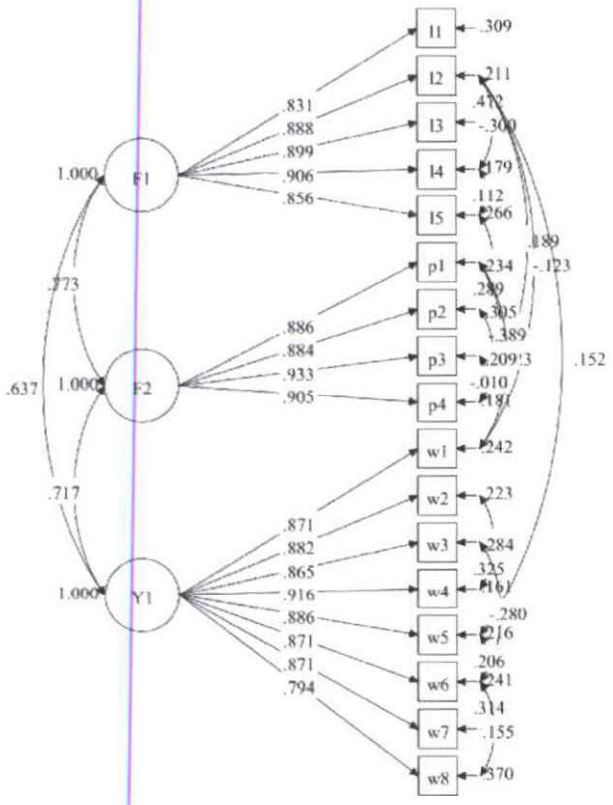
Table 3 The factor loading of the confirmation factor in the development of the world heritage site in Phra Nakhon Si Ayutthaya province (gender).

	Group Male				Group Female			
Indicator	Factor loading	SE	t	R^2	Factor loading	SE	t	R^2
F1								
L1	0.831	-	-	0.691	0.772	0.046	14.012	0.596
L2	0.888	0.076	13.343	0.789	0.824	0.047	14.811	0.679
L3	0.899	0.081	13.731	0.809	0.882	0.043	16.461	0.779
L4	0.906	0.079	13.422	0.821	0.899	0.038	17.184	0.808
L5	0.856	0.085	12.095	0.734	0.938	0.049	14.136	0.881
F2								
P1	0.886	-	-	0.785	0.868	0.039	16.291	0.753
P2	0.884	0.060	15.434	0.781	0.869	0.040	17.203	0.756
P3	0.933	0.071	12.819	0.871	0.927	0.034	19.044	0.859
P4	0.905	0.078	11.300	0.819	0.935	0.040	18.166	0.875
Y1								
W1	0.871	-	-	0.758	0.877	0.035	17.783	0.769
W2	0.882	0.071	14.905	0.777	0.868	0.037	17.132	0.753
W3	0.865	0.073	14.213	0.748	0.855	0.036	16.887	0.731
W4	0.916	0.067	16.074	0.839	0.918	0.035	19.220	0.844

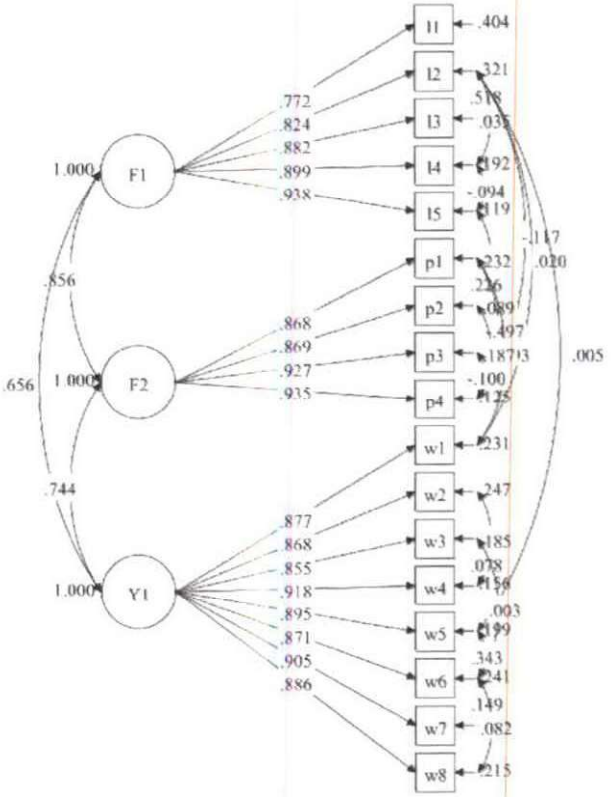
Indicator	Group Male				Group Female			
	Factor loading	SE	t	R^2	Factor loading	SE	t	R^2
W5	0.886	0.069	14.945	0.784	0.895	0.037	18.324	0.801
W6	0.871	0.071	14.371	0.759	0.871	0.035	17.493	0.759
W7	0.871	0.072	14.423	0.758	0.905	0.036	18.674	0.820
W8	0.794	0.077	12.103	0.630	0.886	0.037	17.897	0.785

Figure 2 Multiple-group confirmatory analysis of the development of the world heritage site in Phra Nakhon Si Ayutthaya province (Gender).

Group Male



Group Female



Chi-Square = 199.218, Chi-Square/df = 1.171, df =170, *p-value* = 0.062,
RMSEA = 0.029, CFI = 0.996, TLI = 0.994, SRMR = 0.029

Discussion

The discussion is divided into three parts as follows:

The section of leadership: both males and females agreed with the idea that leadership can improve the world heritage site. They focused on the ensure results factor, which relates to working with the public servant, so they should share information with people in the world heritage site. The community leader should bring in experts in the development of world heritage sites to meet with people to design a policy or plan as well as experts who might be able to incorporate new technology into the task. However, when the community leader provides an open space for participation in accordance with Habermas (1989:27), who explained that the public sphere is public space for people join together with comments or assessments to monitor the actions of the government or local state, it can increase the sphere of influence of the public

authorities. The making of a public space in the world heritage site will improve the balance of power between state authorities and the community, so it is important that the community leader is a talented actor in driving the activity for the development of the world heritage site.

Public participation in the community: males and females had a different point of view on the participation factor. Males focused on the benefit factor, but females focused on participation in the evaluation factor. This result shows males need to benefit from participation factor in the development of the world heritage site to provide an income for their families, while females focus on the evaluation factor of action in government and so need transparency in the development of the world heritage site. Therefore, the development of the world heritage site should focus on the public participation factor. Additionally, this result is consistent with Pui yu chan (2016:3-36), who studied community participation in heritage management, focusing on Macau. The result show that not only was participation one element of modern conservation, but it was crucial for successful of the project. Moreover, participation for cultural conservation requires public participation to link the government and community so they can work together. According to Interreg Europe (2017:2), who explored citizen engagement in the protection of cultural heritage in the *document A Policy Brief from the Policy Learning Platform on Environment and Resource Efficiency*, in heritage conservation strategies, the local community will support participating in and coordinating all operations in the development. Consequently, the approach to conservation in the world heritage site in Europe and Asia used public participation for the policy making process for the community.

Development of the world heritage site: both male and female participants focused on the housing factor. This indicates a problem with the increasing congestion in the community. When a community expands, the change affects people in the area with issues such as increases in traffic jams, garbage, pollution, and crime. Johansson (2015) investigated life in a world heritage city using as a case study the discussions and contested values in Angra do Heroísmo, the Azores. The research found that a community located in a world heritage site can inspire two different feelings in members of the community: while people have pride in their own community when it is located in the world heritage site area, the community will face many barriers to daily life and difficulties in developing the community. In summary, the development of the world heritage site factor will concern the housing factor, when people raised in the community will influence decision making in the world heritage site in Phra Nakhon Si Ayutthaya province.

Conclusion

The development of the world heritage site in Phra Nakhon Si Ayutthaya province identified which key factors in the design provide a balance between the community and the development of the world heritage site. The factor for development of the world heritage site comprised eight elements for development, such as Tangible cultural heritage, Culture and tourism, Economic development, Housing, Mobility, Urban planning and development, Environment and leisure, and Awareness raising and research. However, any approach adopted for the development of the world heritage site must include leadership and community participation. This research indicates that these two factors are essential to the development of the world heritage site.

Recommendations for further studies

For next study, it would be beneficial to use qualitative research to analyze the stakeholders involved in the world heritage site in Ayutthaya that led to the development of a mechanism for an effective policy that is appropriate to the surrounding community.

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