EXAMINING THE CONCEPTUALIZATION AND CORRELATES OF COMPETITIVENESS OF CITIES AND MUNICIPALITIES IN THE PHILIPPINES

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ABSTRACT

In examining the conceptualization and correlates of competitiveness of cities and municipalities in the Philippines, this study established that competitiveness is multidimensional, and its factor structure differs by the type of LGU. Furthermore, the study found that IRA dependency has a negative effect on "Economic Dynamism" and the combined "Government Efficiency and Infrastructure" on LGUs of all income classes, but the effect among 5th/6th class LGUs is most pronounced. In addition, "IRA dependency" has a negative effect on the "Resiliency" of the 5th/6th class LGUs' but not on their richer counterparts. Household poverty, on the other hand, is generally negatively associated with competitiveness, although the magnitude of this relationship varied by LGU types. Through structural equation modeling, confirmatory factor analysis determined which of the several hypothetical factor structure models provided the best-fitting conceptualization of competitiveness. The final model was subjected to multiple group analysis to test its invariance across income groups. Finally, "IRA dependency" and "Household poverty" were integrated into the final model to examine their association with competitiveness. In improving competitiveness, the study recommends policymakers and local government executives target their policies, efforts, and resources on particular indicators based on the type of LGU, even as some indicators need to be addressed, established, or enhanced across LGU types.

Keywords: correlates of competitiveness, structural equation modeling, group invariance, IRA dependency and competitiveness, household poverty, and competitiveness

INTRODUCTION

Competitiveness can shape a country's future. Governments can use it as a strategy for economic development (Berger, 2008), as a basis for improving public service (Mendoza, 2020), or as an approach for improving welfare (Wang, et al., 2004).

"Competitiveness" is defined as "the set of institutions, policies, and factors that determine the level of productivity of a country" (WEF, 2016), or as how countries "manage their competencies to achieve long-term value creation" (IMD, 2021), or

as "sustainable productivity and prosperity across cities and municipalities…to improve their standards of living…." (DTI, p. 8., 2019). WEF (2016) adds how a country promotes well-being as a way to think about what makes it competitive. The recurring themes among these definitions are productivity and value creation, with an end-view of improving living standards and achieving sustainable prosperity and well-being.

The Philippines, through the Philippine National Competitiveness Council (NCC), has been producing competitiveness reports since 2012 through the Cities and Municipalities Competitiveness Index (CMCI).

The Philippine NCC developed and uses a competitiveness index as a metric for gauging cities' and municipalities' productivity based on the simple average of scores on four pillars: Economic Dynamism, Government Efficiency, Infrastructure, and Resiliency, with each pillar having ten indicators each. But the assumption that these pillars and their respective indicators are equally contributing to the concepts in question could be investigated.

OBJECTIVES OF THE STUDY

The main objective of this study was to examine the conceptualization and correlates of competitiveness of cities and municipalities in the Philippines, using the 2020 data from the Philippine Department of Trade and Industry (DTI).

Specifically, the study aimed to a) determine the factor structure of competitiveness as a latent construct; b) demonstrate whether this factor structure holds regardless of the income classification of LGU (HUC/CC, 1st/2nd class, 3rd/4th class, and 5th/6th class); and c) analyze the association between competitiveness and selected exogenous city/municipality-level variables. To address the above aims, the study sought to answer the following research questions: (a) Does competitiveness have sufficient unidimensionality as a latent construct? b) Is there evidence that the factor structure of competitiveness differs by the type of LGU, and c) Are household poverty and Internal Revenue Allotment (IRA) dependency significantly associated with competitiveness?

Significance of the Study

This study served as an opportunity to review the CMCI framework and its components to suggest possible improvements. The results could inform policymakers and local government executives on the attributes of local competitiveness and the external factors driving it, and thus help them focus their policies, efforts, and resources on priorities for improving a government unit's competitiveness.

METHODOLOGY

The study covered 1,517 cities and municipalities in the Philippines, spanning all regions in the country except the Autonomous Region of Muslim Mindanao. Of this, 1,373, or 90.5 percent were municipalities, while 144 or 9.5 percent were cities.

In analyzing the association between competitiveness and selected exogenous city/municipality-level variables, we used the 2018 Internal Revenue Allotment (IRA) and poverty estimates. This paper determined the household poverty rate by dividing the number of National Household Targeting System-assessed (Philippine Statistics Authority, 2016; National Anti-Poverty Commission, n.d.) poor households by the total number of households in 2015 according to the census.

Variables and Measures

Table 1 below lists the four pillars and the ten indicators of each pillar, which comprise the CMCI framework.

Table 1
Pillars and Indicators

E= Economic Dynamism	G= Government Efficiency	I= Infrastructure	R= Resiliency
E1= Size of the local Economy	G1= Compliance to national directives	I1= Basic infrastructure: Existing road network	R1= Organization and coordination: Land use plan
E2= Growth of the local economy	G2= Presence of IPU	I2= Basic Infrastructure: Distance of City/Municipal Hall to major ports	R2= Organization and coordination: DRRMP
E3= Structure of the local economy	G3= Business registration efficiency	I3= Basic infrastructure: Availability of basic utilities	R3= Organization and coordination: Annual disaster drill
E4= Safety compliant business	G4= Capacity to generate local resources	I4= Number of public transportation vehicles	R4= Organization and coordination: Presence of an early warning system that integrates professional responders and grassroots organizations
E5= Increase in employment	G5= Capacity of health services	I5= Education infrastructure	R5= Resilience financing: ratio of budget for DRRMP to total LGU budget
E6= Cost of living	G6= Capacity of school services	I6= Health infrastructure	R6= Resilience reports: Local risk assessments
E7= Cost of doing business	G7= Recognition of performance	I7= LGU investment in infrastructure	R7= Resilience infrastructure: Emergency infrastructure
E8= Financial deepening	G8= Compliance to BPLS Standards	I8= Accommodation capacity	R8= Resilience infrastructure: Utilities
E9= Productivity	G9= Peace and order	I9= Information technology capacity	R9= Resilience of system: employed population (share of gross number of employees to total population of LGU)
E10= Presence of business and professional organizations	G10= Social protection	I10= Financial technology capacity: Number of Automated Teller Machines	R10= Resilience of system: sanitary system

Research Design. This study used Structural Equation Modelling (SEM), where two procedures are simultaneously performed, namely, Confirmatory Factor Analysis (CFA) and linear regression. Through factor analysis, the study aimed to condense several indicators or "endogenous variables" into as few latent variables as possible. Its "confirmatory" aspect tested whether or not the predefined frameworks fit the data well to determine the best factor structure. Through this approach, the study determined which of the several hypothetical factor structure models (i.e., unidimensional, four-factor, and higher-order factor models) provided the best-fitting conceptualization of competitiveness. The resulting best-fitting model was then subjected to multiple group analysis to test its invariance across income groups. Finally, the exogenous variables were integrated into the final model to examine their association with competitiveness.

The three models tested were as follows:

Unidimensional or One-factor Model. In this model, all indicators are shown as a reflection of a single construct of competitiveness. See Figure 1.

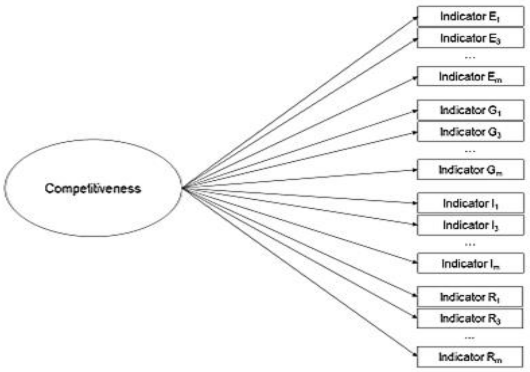

Figure 1. Unidimensional/One-factor Model (Model 1)

All indicators are a reflection of a single construct of competitiveness.

Four-factor Model. In this model, the four constructs or pillars of competitiveness are correlated. See Figure 2.

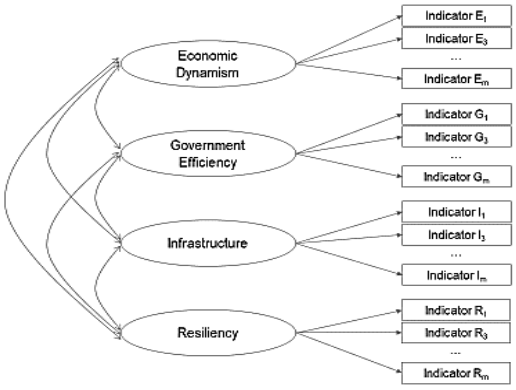

Figure 2. Correlated-four-factor Model (Model 2).

The four constructs of competitiveness are correlated with one another.

Higher-order-factor Model. In this model, the four constructs or pillars load on a single general construct of competitiveness. See Figure 3.

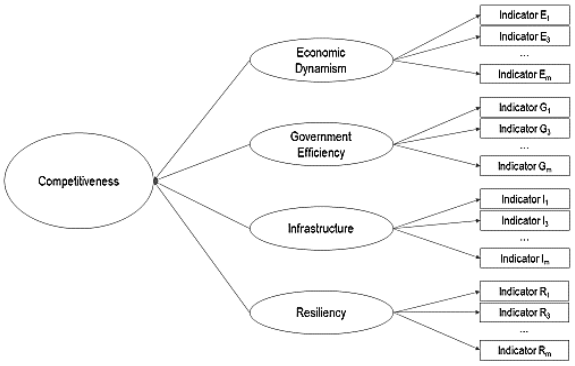

Figure 3. Higher-order-factor Model (Model 3)

The four constructs further load on a single general construct of competitiveness.

Testing Group Invariance. The resulting best-fitting model out of the three models tested was then further tested for three types of invariance across the income grouping of the LGUs (i.e., 1 – cities; 2 – first-class/second-class; 3 – third-class/fourth-class; 4 – fifth-class / sixth-class). The three types of invariance were as follows: configural invariance, wherein there is the same number of factors and pattern of loadings; weak/metric invariance, wherein the factor loadings are the same across groups; and strong/scalar invariance, wherein the factor loadings and intercepts are the same across groups.

The configural invariance model is nested within the weak invariance model, and the latter is nested within the strong invariance model. A likelihood ratio test (LRT) was utilized to compare these models. Two tests were produced: the first one compares the configural invariance model with the weak invariance model, while the second test compares the weak invariance model with the strong invariance model.

Relationship Between LGUs' Competitiveness, IRA Dependency, and Household Poverty. We next examined the association between LGU's competitiveness, IRA dependency, and household poverty. To analyze the exogenous variables' relationship with competitiveness, the configural model was modified to include three regression paths on the latent factors Economic Dynamism, Government Efficiency and Infrastructure, and Resiliency.

Statistical Test and Parameters

Evaluating SEM Performance. We evaluated the SEM performance in terms of the fit indices and their corresponding cutoffs, as suggested by Brown (2006), for a model to be considered well-fitting:

The model chi-square assessed the overall model fit. If the p-value > 0.05, then we would say that the model fitted the data similarly to the fully saturated model. However, as the chi-square is very sensitive to sample size, we also used other measures, such as those discussed below.

The Tucker-Lewis Index (TLI) indicated how the model improved the fit relative to the fully saturated ("perfectly" fitting) model. For example, if TLI is 0.713, then it would mean that the model improved the fit by only 71.3% relative to the fully saturated model. Brown (2006) recommends that TLI be greater than or equal to 0.90 to be deemed acceptable.

The Comparative Fit Index (CFI) is a version of the TLI that is less sensitive to sample size. The value of the CFI should also be equal to or greater than 0.90 for it to be deemed acceptable.

The Root Mean Square Error of Approximation (RMSEA), is a parsimony-adjusted index. An RMSEA < 0.05 is recommended for it to be deemed acceptable.

The Standardized Root Mean Square Residual (SRMR), is an absolute measure of fit derived from the difference between the observed correlation and the predicted correlation. Brown (2006) recommends that the SRMR be less than 0.08.

The estimator used was the default maximum likelihood (ML) estimator, which was

shown to be the most efficient estimator for continuous data.

Testing Group Invariance. A Likelihood Ratio Test (LRT) was used to compare the models. Two tests were produced: the first one compares the configural invariance model with the weak invariance model, while the second test compares the weak invariance model with the strong invariance model.

Examining the Relationship Between LGUs' Competitiveness, IRA Dependency, and Household Poverty. We examined the association between LGUs' competitiveness, IRA dependency, and household poverty, the latter two being the exogenous variables. To analyze the exogenous variables' relationship with competitiveness, the resulting model after testing for group invariance was modified to include three regression paths on the latent factors of the best-fitting model.

RESULTS AND DISCUSSION

1. Model Fit Comparison

1.1. Unidimensional or One-factor Model (Model 1)

The one-factor model (Model 1) had the worst fit, as suggested by its very low CFI (0.496) and TLI (0.469), indicating that competitiveness is not a unidimensional concept. At the very least, there is no evidence that the indicators load onto a single construct of competitiveness. Hence, we turn to multidimensional models.

1.2. Four-factor Model (Model 2) and Resulting Reduced-four-factor Model (Model 2a)

The correlated four-factor model (Model 2) also did not have a satisfactory fit (TLI = 0.593, CFI= 0.617, SRMR= 0.118, RMSEA= 0.096), which could be explained by the several indicators with very low factor loadings. When all indicators with standardized factor loadings less than 0.10 were removed, we produced the reduced four-factor model (Model 2a), which resulted in a significantly improved model fit (TLI = 0.763, CFI= 0.788, SRMR= 0.096, RMSEA= 0.103). Models 2 and 2a, however, were flagged for having a nonpositive definite (NPD) covariance matrix, indicative of high correlation or model misspecification. An obvious source of this issue is the high correlation between Government Efficiency and Infrastructure (correlation = 1.084, an invalid value). The issue of an NPD covariance matrix was no longer a problem when all indicators of Government Efficiency and Infrastructure had been combined, as in Model 4 (Fig. 4).

1.3. Higher-order-factor Model (Model 3)

The analysis yielded no solution, indicating model misspecification.

Even after increasing the number of iterations, the higher-order factor model failed to converge and reach a solution. This indicates that the model is non-identified or misspecified; that is, the number of unknown parameters exceeds the number of pieces of information in the input variance-covariance matrix (Brown, 2006).

So, we proceed to Model 4.

1.4. Reduced three-factor Model (Model 4)

Here we combined all indicators of Government Efficiency and Infrastructure. In doing this, the issue of an NPD covariance matrix was no longer a problem.

It is to be noted that Model 4 still had a less than satisfactory fit (TLI = 0.760, CFI= 0.783, SRMR= 0.097, RMSEA= 0.103) if the proposed cutoffs are to be followed. Insofar as we have explored and modified possible factor structures of competitiveness, the source of unsatisfactory model fit is likely the inappropriateness or inadequacy of the measurable indicators themselves. However, this does not mean that the model lacks substantive utility. That Model 4 provided the best fit among all factor structures

considered is an important finding in itself, and it can be further utilized to analyze the patterns of factor loadings, its consistency across the type of LGUs, and the correlates of competitiveness.

Figure 4 presents the path diagram for Model 4. The latent constructs are represented by ellipses, while the observed indicators are represented by rectangles. The values arrows from the latent constructs to their indicators refer to the standardized factor loadings, while the paths between pairs of latent constructs are the covariances. Finally, the dashed circles on the right of the indicators refer to the measurement errors, wherein a smaller value corresponds to more accurate estimates.

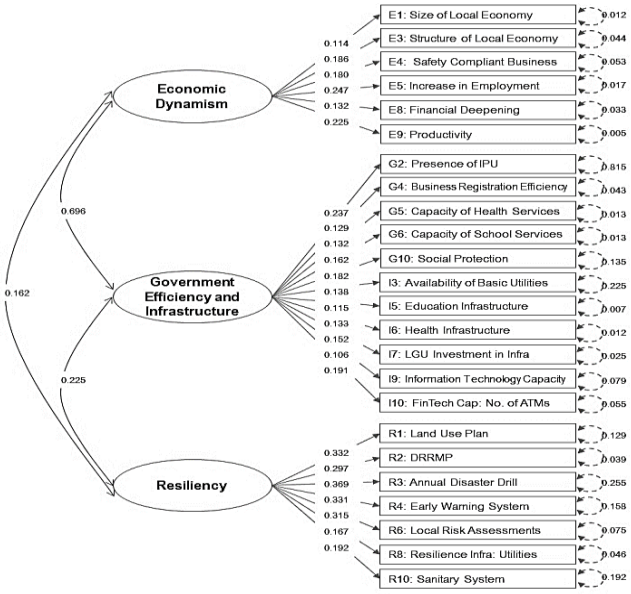

Figure 4. Reduced-three-factor Model (Model 4)

2. Testing Group Invariance

For the first test, the *p*-value is significant (<2.2e-16), suggesting that the fit of the weak invariance model is different from that of the configural model. Thus, the test rejects the hypothesis that the factor loadings are the same across groups. Moreover, the *p*-value (<2.2e-16) in the second test is also significant, suggesting that it would be inadvisable to compare the latent means (or the competitiveness scores) across the three groups of LGUs.

In general, the factor loadings and the latent means of the reduced three-factor model vary by the type of LGU. We thus refer to the factor loadings and covariance in Table 2 and intercepts in Table 3 generated from the configural model.

Several things are worth noting. First, the contribution of economic indicators to economic dynamism is most pronounced among HUCs/CCs, which may be explained by the high economic activity in these areas. Moreover, increases in employment, productivity, and the structure of the local economy are the most important indicators of economic dynamism, as evident in their respective factor loadings, most especially in HUCs/CCs and 5th/6th class municipalities.

Table 2
Standardized Factor Loadings and Covariance by LGU Type

Indicator	Income Classification			
	Cities	1st / 2nd	3rd / 4th	5th / 6th
Economic Dynamism				
E1 – Size of the local economy	0.243	0.040	0.093	0.079
E3 – Structure of the local economy	0.320	0.185	0.180	0.188
E4 – Safety compliant business	0.307	0.108	0.174	0.179
E5 – Increase in employment	0.453	0.157	0.163	0.285
E8 – Financial deepening	0.247	0.186	0.083	0.098
E9 – Productivity	0.407	0.123	0.174	0.216
Government Efficiency and Infrastructure				
G2 – Presence of IPU	0.035	0.190	0.361	0.387
G4 – Capacity to generate local resources	0.288	0.161	0.099	0.111
G5 – Capacity of health services	0.252	0.126	0.043	0.074
G6 – Capacity of school services	0.329	0.110	0.027	0.040
G10 – Social protection	0.453	0.250	0.196	0.055
I3 – Basic infrastructure: existing road network	0.082	0.133	0.203	0.293
I5 – Education infrastructure	0.228	0.060	0.027	0.036
I6 – Health infrastructure	0.234	0.120	0.065	0.048
I7 – LGU investment in infrastructure	0.365	0.084	0.016	0.043
I9 – Information technology capacity	0.139	0.106	0.109	0.230
I10 – Financial technology capacity: no. of ATMs	0.405	0.194	0.163	0.091
Resiliency				
R1 – Land use plan	0.214	0.139	0.324	0.491
R2 – Annual disaster drill	0.208	0.109	0.303	0.476
R3 – Disaster Risk Reduction and Management Plan	0.203	0.267	0.368	0.553
R4 – Integrative early warning system	0.201	0.144	0.303	0.565
R6 – Local risk assessments	0.213	0.124	0.317	0.499
R8 – Utilities	0.161	0.167	0.163	0.211
R10 – Sanitary system	0.160	0.136	0.209	0.173
Covariance				
economy ~~				
Government	0.908	0.961	0.698	0.700
Resiliency	0.128	0.255	0.226	0.229
government ~~				
Resiliency	0.138	0.28	0.392	0.592

Model fit: $\chi 2 = 4867.82$; RMSEA = 0.101; SRMR = 0.075; CFI = 0.770; TLI = 0.745

Table 3

Intercepts by LGU Type

Indicator	Income Classification			
	Cities	1st / 2nd	3rd / 4th	5th / 6th
Economic Dynamism				
E1 – Size of the local economy	0.155	0.031	0.059	0.049
E3 – Structure of the local economy	0.434	0.232	0.334	0.304
E4 – Safety compliant business	0.439	0.156	0.335	0.374
E5 – Increase in employment	0.403	0.137	0.176	0.301
E8 – Financial deepening	0.472	0.270	0.221	0.232
E9 – Productivity	0.347	0.100	0.145	0.202
Government Efficiency and Infrastructure				
G2 – Presence of IPU	2.444	2.042	1.807	1.587
G4 – Capacity to generate local resources	0.285	0.195	0.181	0.205
G5 – Capacity of health services	0.309	0.129	0.081	0.173
G6 – Capacity of school services	0.475	0.155	0.072	0.121
G10 – Social protection	0.534	0.353	0.630	0.124
I3 – Basic infrastructure: existing road network	2.124	2.178	1.805	2.006
I5 – Education infrastructure	0.361	0.113	0.068	0.094
I6 – Health infrastructure	0.355	0.169	0.110	0.097
I7 – LGU investment in infrastructure	0.474	0.194	0.068	0.166
I9 – Information technology capacity	0.627	0.358	0.492	0.662
I10 – Financial technology capacity: no. of ATMs	0.468	0.165	0.259	0.122
Resiliency				
R1 – Land use plan	2.369	2.383	2.293	2.111
R2 – Annual disaster drill	2.429	2.429	2.373	2.281
R3 – Disaster Risk Reduction and Management Plan	2.295	2.326	2.221	2.131
R4 – Integrative early warning system	2.483	2.444	2.377	2.262
R6 – Local risk assessments	2.465	2.464	2.398	2.257
R8 – Utilities	1.842	1.811	1.773	1.728
R10 – Sanitary system	1.835	1.741	1.544	1.396

3. Relationship Between LGUs' Competitiveness, IRA Dependency, and Household Poverty

Table 4 shows the standardized factor loadings and covariances, while Table 5 shows the regression estimates, based on the configural model with exogenous variables. First, when compared with Table 2, the standardized factor loadings and covariances changed, although not to a structural extent. Second, as expected, IRA dependency and household poverty were generally negatively associated with competitiveness, although the magnitude of this relationship varies by LGU type.

Table 4

Standardized Factor Loadings and Covariance by LGU Type Based on Configural Model with Exogenous Variables

Indicator	Income Classification			
	Cities	1st / 2nd	3rd / 4th	5th / 6th
Economic Dynamism				
E1 – Size of the local economy	0.193	0.03	0.074	0.083
E3 – Structure of the local economy	0.263	0.143	0.175	0.155
E4 – Safety compliant business	0.249	0.083	0.166	0.15
E5 – Increase in employment	0.362	0.12	0.265	0.143
E8 – Financial deepening	0.201	0.145	0.09	0.071
E9 – Productivity	0.325	0.095	0.202	0.155
Government Efficiency and Infrastructure				
G2 – Presence of IPU	0.029	0.16	0.375	0.325
G4 – Capacity to generate local resources	0.236	0.135	0.107	0.091
G5 – Capacity of health services	0.204	0.106	0.071	0.037
G6 – Capacity of school services	0.266	0.092	0.038	0.022
G10 – Social protection	0.367	0.21	0.052	0.163
I3 – Basic infrastructure: existing road network	0.064	0.112	0.279	0.179
I5 – Education infrastructure	0.184	0.05	0.034	0.022
I6 – Health infrastructure	0.189	0.101	0.045	0.054
I7 – LGU investment in infrastructure	0.295	0.071	0.041	0.013
I9 – Information technology capacity	0.112	0.089	0.219	0.097
I10 – Financial technology capacity: no. of ATMs	0.329	0.163	0.086	0.136
Resiliency				
R1 – Land use plan	0.203	0.134	0.485	0.319
R2 – Annual disaster drill	0.197	0.108	0.471	0.297
R3 – Disaster Risk Reduction and Management Plan	0.193	0.261	0.548	0.361
R4 – Integrative early warning system	0.19	0.144	0.559	0.297
R6 – Local risk assessments	0.202	0.121	0.493	0.311
R8 – Utilities	0.152	0.163	0.209	0.16
R10 – Sanitary system	0.151	0.13	0.171	0.205
Covariance				
economy ~~ Government	0.873	0.954	0.666	0.59
Resiliency	0.006	0.239	0.198	0.149
government ~~ Resiliency	0.023	0.262	0.587	0.359

Model fit: $\chi 2 = 5519.81$; RMSEA = 0.099; SRMR = 0.075; CFI = 0.756; TLI = 0.728

Table 5

Regression Estimates by LGU Type

Regressions	Estimate	Std. Err.	z-value	P-value
Cities				
Economy ~				
IRA Dependency ***	-2.242	0.588	-3.813	0.000
Household Poverty *	-0.018	0.008	-2.247	0.025
Government ~				
IRA Dependency ***	-2.35	0.587	-4.001	0.000
Household Poverty *	-0.016	0.008	-1.966	0.049
Resiliency ~				
IRA Dependency	0.776	0.556	1.396	0.163
Household Poverty ***	-0.028	0.008	-3.526	0.000
1st Class / 2nd Class				
Economy ~				
IRA Dependency ***	-3.798	0.413	-9.194	0.000
Household Poverty ***	-0.019	0.003	-5.786	0.000
Government ~				
IRA Dependency ***	-2.985	0.391	-7.628	0.000
Household Poverty ***	-0.014	0.003	-4.618	0.000
Resiliency ~				
IRA Dependency	0.504	0.421	1.196	0.232
Household Poverty ***	-0.013	0.003	-3.668	0.000
3rd Class / 4th Class				
Economy ~				
IRA Dependency ***	-3.766	0.707	-5.325	0.000
Household Poverty	-0.003	0.003	-0.994	0.320
Government ~				
IRA Dependency ***	-2.883	0.819	-3.518	0.000
Household Poverty	-0.004	0.004	-1.036	0.300
Resiliency ~				
IRA Dependency	-0.877	0.697	-1.258	0.208
Household Poverty	-0.005	0.004	-1.461	0.144
5th Class / 6th Class				
Economy ~				
IRA Dependency ***	-4.222	0.461	-9.154	0.000
Household Poverty ***	-0.009	0.002	-3.975	0.000
Government ~				
IRA Dependency ***	-3.837	0.535	-7.166	0.000
Household Poverty ***	-0.016	0.003	-5.9	0.000
Resiliency ~				
IRA Dependency ***	-1.495	0.456	-3.279	0.001
Household Poverty	-0.004	0.002	-1.58	0.114

Significant: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

CONCLUSIONS

Multidimensionality of Competitiveness. Many factors drive competitiveness; the indicators do not form a single construct of competitiveness. It is multidimensional.

Different Factor Structure of Competitiveness by Type of LGU. Competitiveness also differed by the type of LGU, as indicated by the scores or loading of the indicators.

Household Poverty. Household poverty is generally negatively associated with competitiveness, although the magnitude of this relationship varies by LGU type.

However, the causes and effects of poverty, on the one hand, and poverty's association with competitiveness, on the other hand, are complex.

On the whole, addressing poverty and improving social protection help address social and economic issues that could contribute to the competitiveness of LGUs, while, in turn, enhancing the competitiveness of LGUs could help address poverty and improve social protection. We could, then, view poverty alleviation and social protection as means and ends of competitiveness.

Other Findings

Low Factor Loadings. The generally low factor loadings suggest that the indicators do not sufficiently capture the latent variables under study (Brown, 2006).

Strong Correlation Among the Pillars. Government Efficiency and Infrastructure were flagged for having a nonpositive definite (NPD) covariance matrix, indicative of high correlation or model misspecification, prompting us to combine all Government Efficiency and Infrastructure indicators into one pillar. We also found a strong correlation, on the one hand, between "Economic Dynamism" and "Government Efficiency and Infrastructure" and between "Government Efficiency and Infrastructure" and "Resiliency," on the other hand.

RECOMMENDATIONS

To address the generally low factor loadings, DTI-NCC could explore other indicators or other ways of measuring the existing indicators, which could also help address the strong correlation among the pillars. In addition, DTI-NCC could explore regrouping the indicators among the current pillars or consider adding new pillars or removing and combining others, while ensuring that indicators and sub-indicators are not duplicates or close proxies of each other.

While measuring and monitoring the indicators and the pillars that they support are essential, equally important are keeping the foundation strong on which the pillars stand and preventing or addressing factors that may erode or weaken such foundation—such as the need to address poverty, social protection, and resilience.

Similarly, to help promote quality and timely data and information in developing, implementing, and reporting the results of a scoring management system, Rayel (2008) recommended routinizing the collecting, processing, and reporting of data and integrating them in the ordinary course of an organization's workflow. Thus, we need to establish approaches such that data gathering is made part of the regular operations of the LGUs and not as an ad-hoc task or procedure.

This study adopts Rayel's (2008) approach when transitioning from a current system that needs to be improved towards the desired system and, thus, recommends that DTI-NCC plans four phases to include (a) implementing an interim system, (b) working towards an ideal system—laying the groundworks and requirements needed, (c) developing the ideal system, and (d) updating the system and identifying the factors that would trigger such updating.

Noticeably absent in the indicators is the available human resource competencies and skills in an LGU, which Ketels (2016) points out as a core component in many competitiveness frameworks. So, this study recommends including human resources-related indicators in the Philippines competitiveness framework.

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