Open IS - Seminar

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The Effect of Critical Success Factors on IT governance Performance in Public Sector Organizations in a Developing Country

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Presentation Outline

- Background
- Methodology
- Findings
- Future Research Directions

IT Governance

- **IT governance** is considered to be ”*an integral part of enterprise governance and have potential to provide mechanisms for leadership and organizational structures and processes that ensure the organization’s IT sustains and extends the organization’s strategies and objectives”* (ITGI, 2003).

- “According to Weill and Woodham (2002) “An effective IT governance structure is the single most important predictor of getting value from IT”

- The difference between *IT management and IT governance* is in opinion of Wilbanks (2008) the following: “If a company wants to grow and be successful, it must not only manage its IT resources, but also use those resources throughout the company as part of the governance structure”.

- In opinion of Weill and Ross (2004) the successful application of IT Governance can provide the mechanisms to increase the effectiveness of IT and "*Firms with superior IT Governance have at least 20% higher profits than firms with poor governance, given the same strategic objectives*“.

Critical Success Factors (CSFs)

- The Critical Success Factors (CSFs) are “the limited number of areas in which satisfactory results will ensure a successful competitive performance for the individual, department or organization” (Rockart and Van Bullen, 1986).

- According to: (Ward and Pepper, 2002) a critical success factors-basic process should follow the steps:

  - What objectives are central to organization?
  - What are the CSFs for meeting the objectives?
  - What information can be used in achieving those CSFs considered?
  - How information systems/information technology help to achieve the CSFs?

- CSFs are areas of activity that should receive constant attention from the management.

- In the research performed by Gil-Garcia and Pardo (2005) on CSFs in e-government they are mentioning for example: top management commitment, linkage to business, knowledgeable personal, user involvement, etc.

Public Sector Organizations

- According to OECD (2006) the public sector “comprises the general government sector plus all public corporations including the central bank”.

- Boardbent and Guthrie (2008) cited in Grant et al. (2010; p.141) mentioned four key domains of the public sector: central government; local government; public institutional systems which although funded through taxation and maybe separate from local and central government; and public business enterprises.

- Today, IT has become pervasive in many organizations in the public sector to support & evolve public services delivery.

Need for Effective IT Governance

- An effective IT governance means an actively designed set of IT governance mechanisms that encourage behaviours consistent with the organization's mission, strategy and culture (Weill & Ross, 2004).
- In the public sector there is a need for an effective IT Governance caused by a critical dependency on IT that in this sector involves a complex mix of political, organizational, technical & cultural concerns. On the other hand such varieties of concerns/challenges hinder its optimal contribution.

Keeping IT Running

Regulatory Compliance

Value/Cost

- Such concerns lead to a need of management that ensure:
  - *IT investments are reasonable, aligned with business strategy & deliver public sector stakeholder value*
  - *Cost-Effective use of IT for resources utilization, growth & business flexibility*

Security

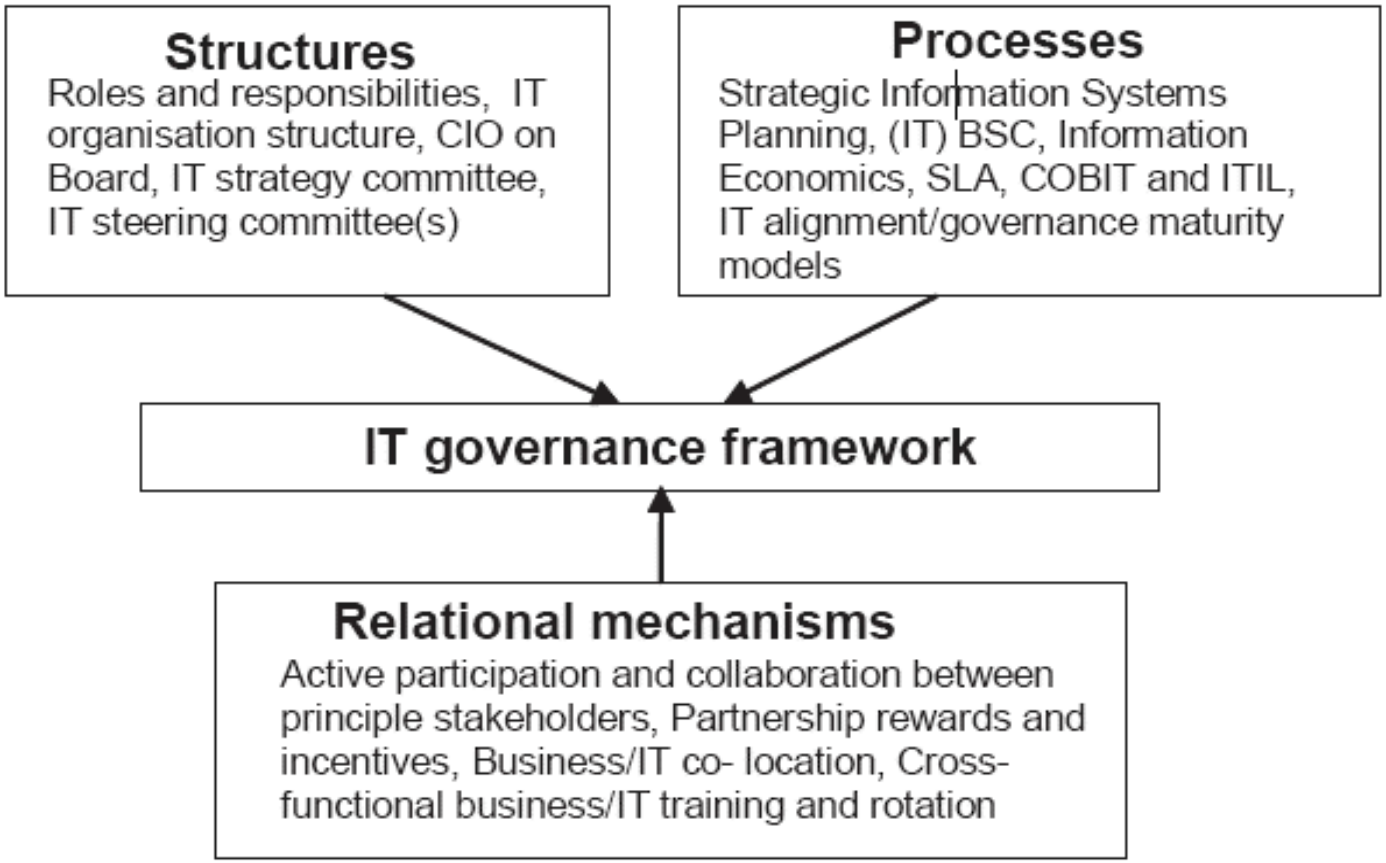
Aligning IT with Business

Managing Complexity

Need of ITG (ITGI, 2007) etc

IT Governance (ITG) Implementation

Successful implementation of ITG this will due to increase it's effectiveness and add value to the business.



Necessary Elements for IT Governance Implementation (Van Grembergen & De Haes, 2007)

Research Problem and Motivation

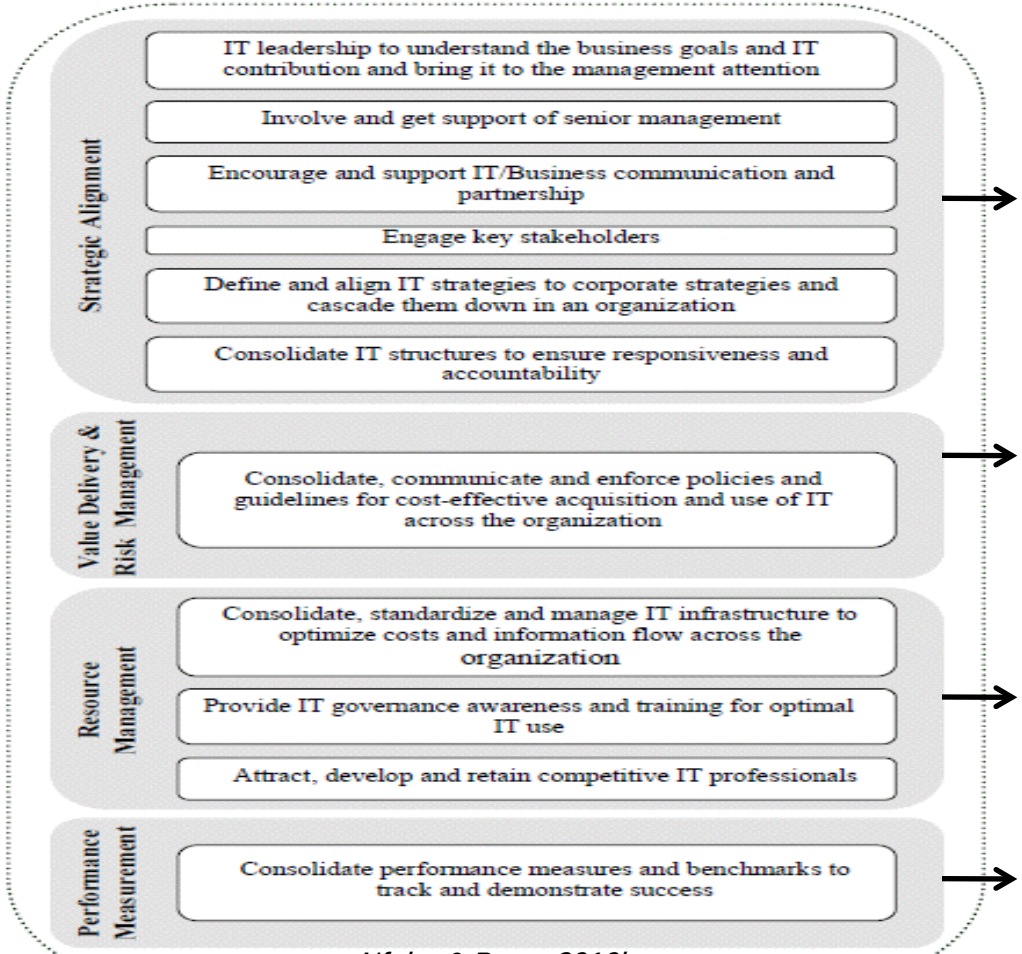
Problem

Inadequate governance effectiveness over the organizations' IT resources in Tanzanian public sector with negative consequences to IT contribution in public service delivery.

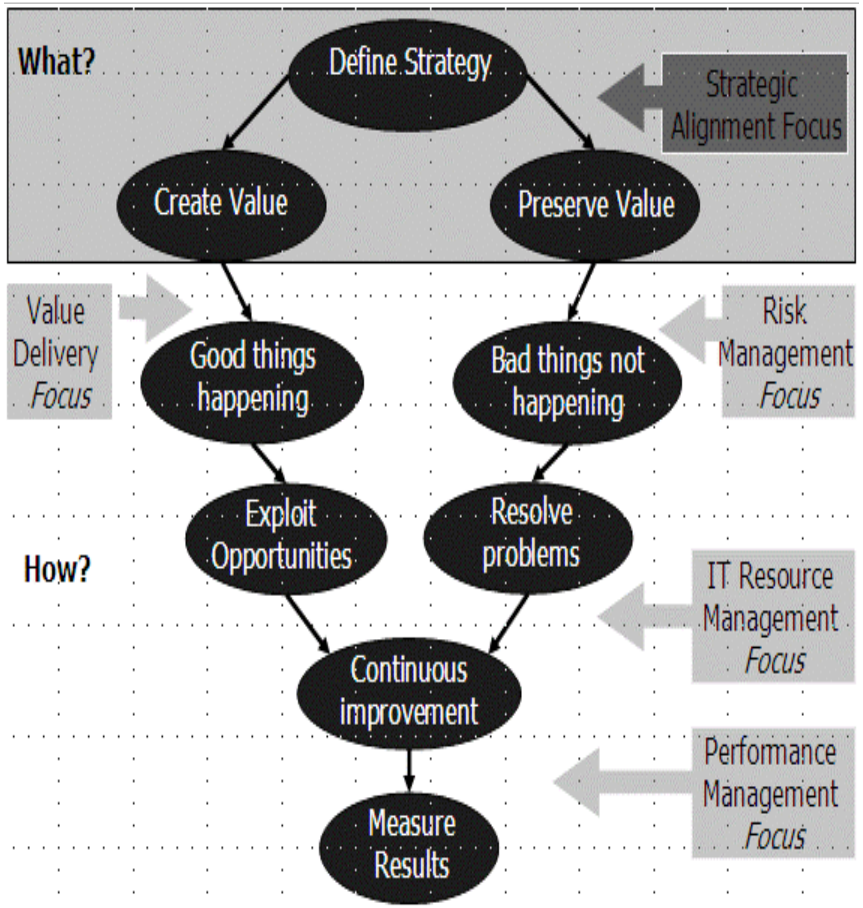
- Several studies have been done on such governance effectiveness and necessary success factors in public sector organizations.
- However none of them in context of a developing country like Tanzania (environment) , which has a low degree of industrialization and standard of living.
- Such environment, apart from increased demand and use of IT for a responsive public sector, is characterized by fragmented IT initiatives, in and across these organizations.
- In addition the governance concern is amplified by constraints on IT resources, knowledge and culture, implying focused best practices to manage such situations cost-effectively.

Research Problem and Motivation ...

- However based on key ITG focus areas and five organizations in this environment, an exploratory study to address such a gap was pursued (Nfuka & Rusu, 2010b).
  - This study identified CSFs considered as *essential elements for organization to achieve its mission of implementing effective ITG*.



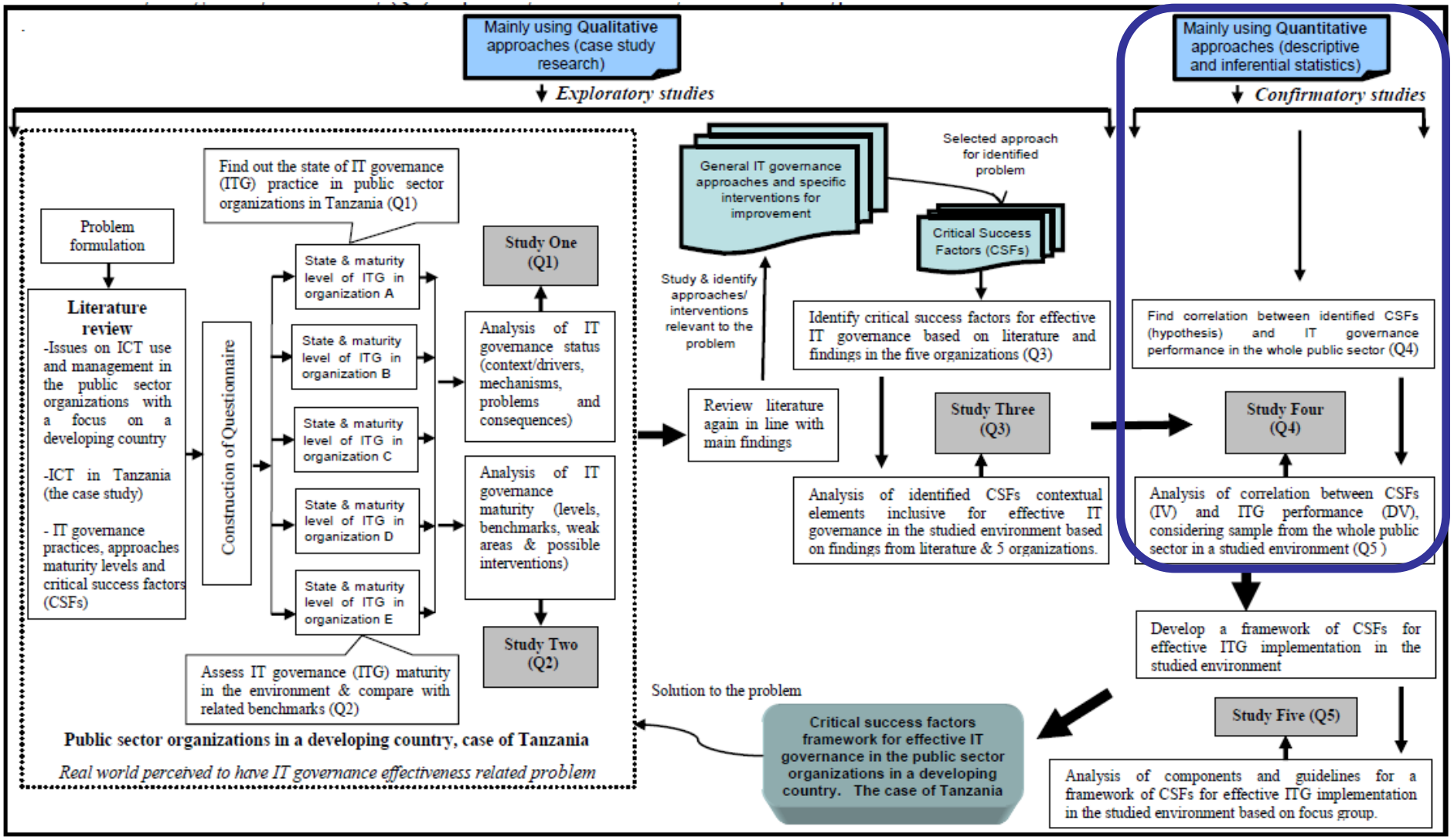
Nfuka & Rusu, 2010b



- Though based on this study it is reasonable to believe the correlated effect between *these CSF & ITG performance (rate of governance effectiveness)*, this has not been statistically confirmed
- In this paper we have addressed such a gap by hypothesizing that such correlated effect exists.

Study Purpose

Purpose: To analyze ***effect*** of ***CSFs for effective IT governance*** on ***IT governance performance*** *in public sector organizations in a developing country like Tanzania.*



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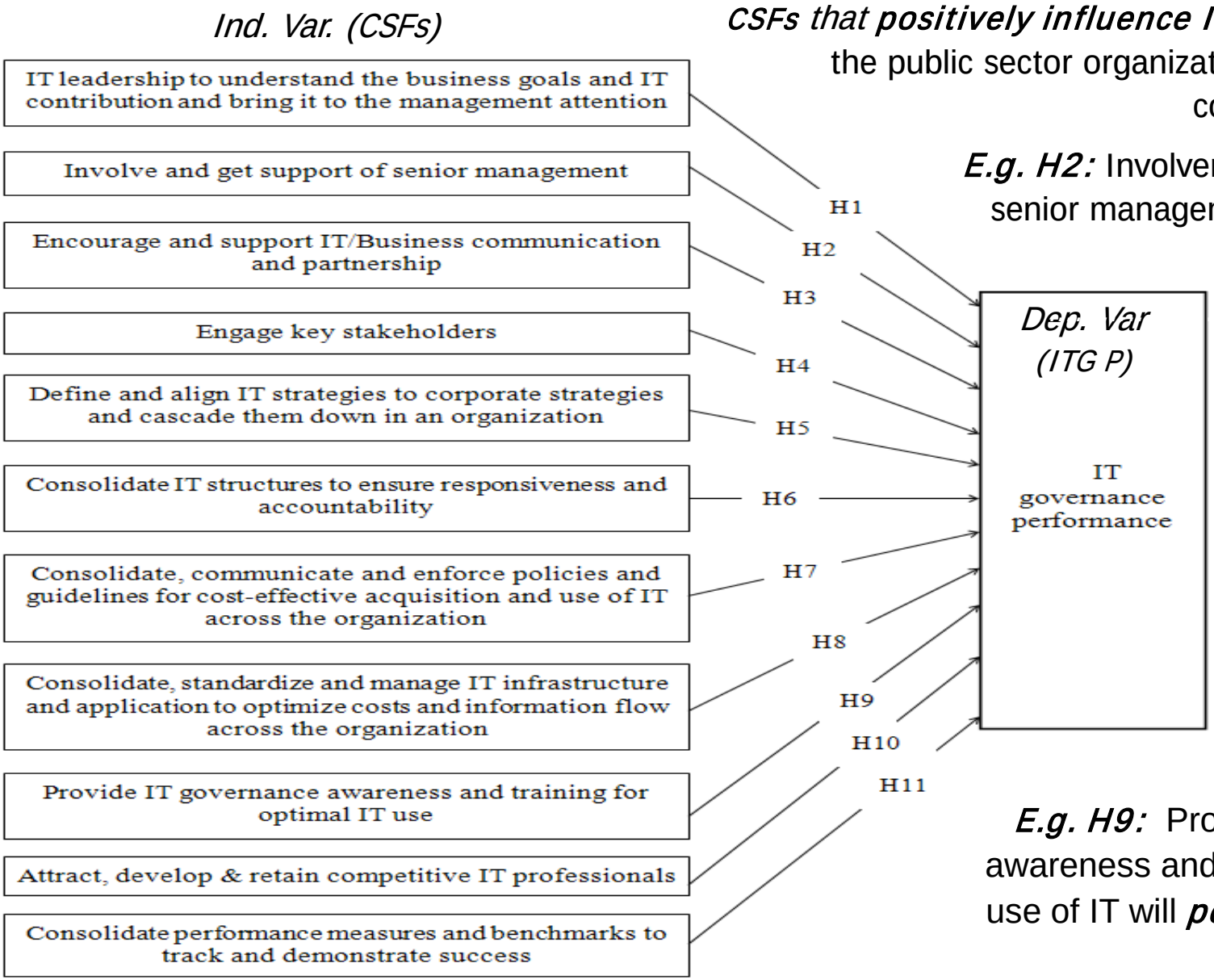
Research Model / Hypotheses

The ***model*** generally ***hypothesizes*** that there are ***11 CSFs that positively influence ITG performance*** in the public sector organizations in a developing country like Tanzania.

E.g. H2: Involvement and support of senior management will ***positively influence*** ITG.



a. Cost effective use of IT

b. Effective use of IT for growth

c. Effective use of IT for asset utilization

d. Effective use of IT for business flexibility

Items (Weill & Ross, 2004)

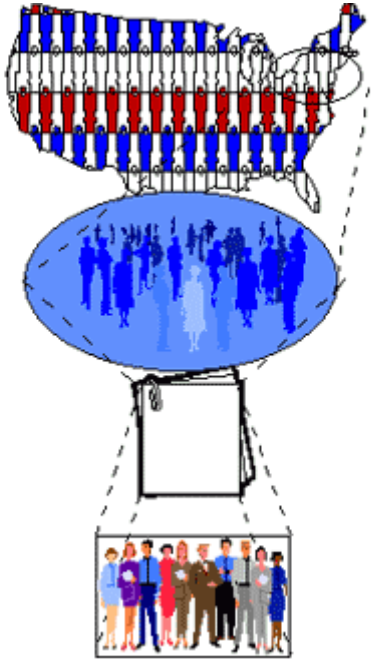
E.g. H9: Provide IT governance awareness and training for optimal use of IT will ***positively influence*** ITG.

Research Method, Population and Sample

- **Research Method:** Quantitative research design with positivist underlying philosophical assumptions - based on *survey research method* & *statistical analysis.*

- **Population/Sample:** paramount in obtaining a more accurate & less biased results

Who do you want to generalize to?



The Theoretical Population

Public Sector Organizations

What population can you get access to?

The Study Population

Ministries, Department & Agency (MDAs)

How can you get access to them?

The Sampling Frame

Tanzania Government directory/CEMIPS mail list

Who is in your study?

The Sample

IT/Business management
- Quest. sent to 198/Expected 100+

- **Sample Size:** Using formula below – Based in the nature of our data (Likert scale) and Monte Carlo simulations on Confirmatory Factor Analysis

$$n \geq 50r^2 - 450r + 1100$$

$$\text{Therefore } n \geq 100$$

Where **n** is the minimum sample size;

r is the ratio of indicators to latent variable which in this case the maximum ratio is 5. (Marsh *et al.*, 1998)

Operationalization of the Study

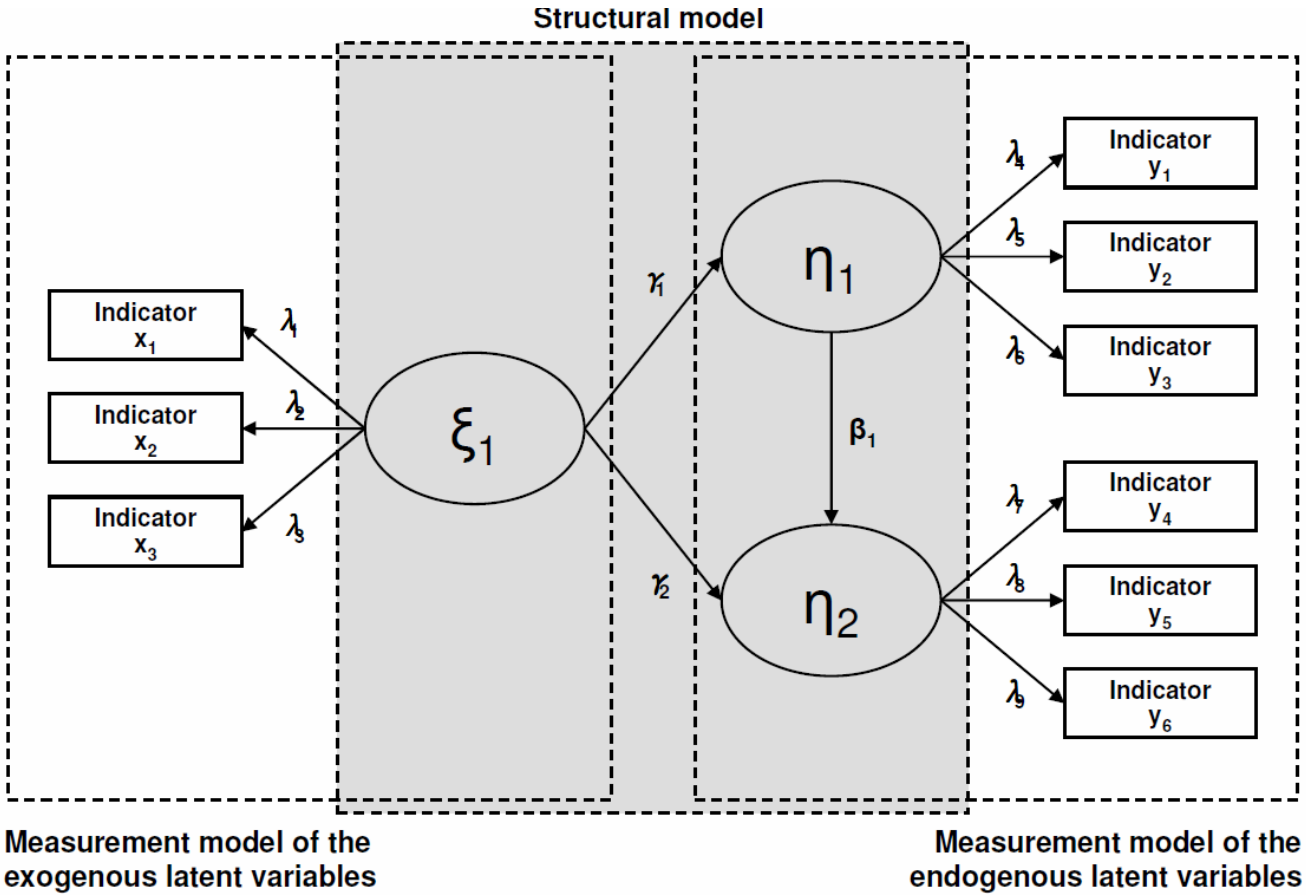
- Measurement for Independent variables (CSFs for effective IT governance)
  - 3-5 measurement items for each hypothesis (11 hypotheses).
  - 5-point Likert scale i.e. *'1' Strongly disagree, '2' Disagree, '3' Undecided, '4' Agree and '5' Strongly agree.*
- Measurement for Dependent variable (IT governance performance)
  - Operationalized through 4 items of Weill & Ross (2004)
  - These items assessed on how important is IT governance in their organizations.
  - Also as measures of success on influence of IT governance in these organizations.
  - Calculated using below formula (Weill & Ross, 2004)

$$\text{Governance Performance} = \frac{(\sum_{n=1 \text{ to } 4} (\text{importance of outcome } \{Q\} * \text{influence of IT governance } \{Q2\})) * 100}{\sum_{n=1 \text{ to } 4} (5\ (\text{importance of outcome}))}$$

- Survey Questionnaire
  - Part I: Introduction ***(Rational/Purpose)***
  - Part II: General Information ***(Demographic)***
  - Part III: Critical Success Factors (CSFs) for effective IT governance ***(Independent variables)***
  - Part IV: Perceived Overall IT Governance Performance ***(Dependent variable)***

Data Analysis Approach

- Mainly based on a developed research model and use of Partial Least Squares (PLS)
- PLS is a variance based structural equation modeling and second generation data analysis techniques *(Wold, 1985; Fornell & Larcker, 1981).*
- It is used to test for statistical conclusion validity and answer a set of interrelated research questions in a single, systematic and comprehensive analysis by modeling the relationships among multiple independent and dependent constructs simultaneously *(Gefen et al., 2000).*



(adapted from Urbach & Ahlemann, 2010; Backhaus et al. 2000)

Data Analysis Approach …

- It was adopted due to the nature of the study construct i.e. the number of independent variables and Likert scale non-parametric nature and has been used widely in information systems research (Urbach & Ahlemann, 2010).
- Specifically we used SmartPLS which is a comprehensive PLS with favorable requirements, methodological options, readily available support and ease of use (Ringle et al., 2005).

Type of Ass.	Criteria	Guideline	Source
Measurement Model	*Convergent validity*		
	Item loading	>=0.4	Hair *et al.*, 2006
	Composite reliability	> 0.5	Fornell & Larcker, 1981
	Average variance extracted(AVE)	>=0.5	Fornell & Larcker, 1981
	Cronbach alpha coefficient	>=0.7	Gefen & Straub, 2005
	t-value of outer loading	>=1.96	Gefen & Straub, 2005
	Discriminant validity		
	Item cross loadings to construct correlations	Item loads on its own construct >= to other constructs	Gefen & Straub, 2005
	Square root of AVE of each construct correlations to others	Sqrt. of AVE between construct & its measures > = to other constructs	Gefen & Straub, 2005
Structural Model	*Variance (R^2)*		
	Variance in dependent variables	>=0.5	Hair *et al.*, 1995
	Path coefficients significance		
	Path coefficients	>= 0.1 small, >= 0.3 moderate, >= 0.5 strong	Cohen, 1988
	Significance of path coefficients (t-value)	>=1.96 (0.05), >=2.58 (0.001)	Hair *et al.*, 1995

Criteria for assessment of measurement and structural models

Realibilty/Validity of the Measure

- Pilot test to verify internal consistency of construct was done based on 25 individuals from 25 MDAs.
- The test indicated that the reliability and validity of construct measurement i.e. Average variance extracted (AVE), Cronbach"s alpha and Composite reliability were acceptable above 0.5, 0.7 and 0.5 respectively *(Fornell & Larcker, 1981; Nunnally & Bernstein, 1994).*

Construct	AVE	Cronbach's Alpha	Composite Reliability
ITLeadp (H1)	0.6382	0.7987	0.8976
SenMag (H2)	0.7604	0.8177	0.9406
ComPart (H3)	0.8003	0.8471	0.9231
KeyStak (H4)	0.6463	0.7877	0.8449
ITCorStr (H5)	0.8345	0.8731	0.9380
ITStruc (H6)	0.7714	0.8493	0.9099
PolGuid (H7)	0.5715	0.8547	0.9259
ITInfr (H8)	0.6901	0.7952	0.8693
ITGAwTr (H9)	0.7462	0.8088	0.9216
ITProf (H10)	0.5641	0.8650	0.8988
PerfMeas (H11)	0.6824	0.8907	0.8952

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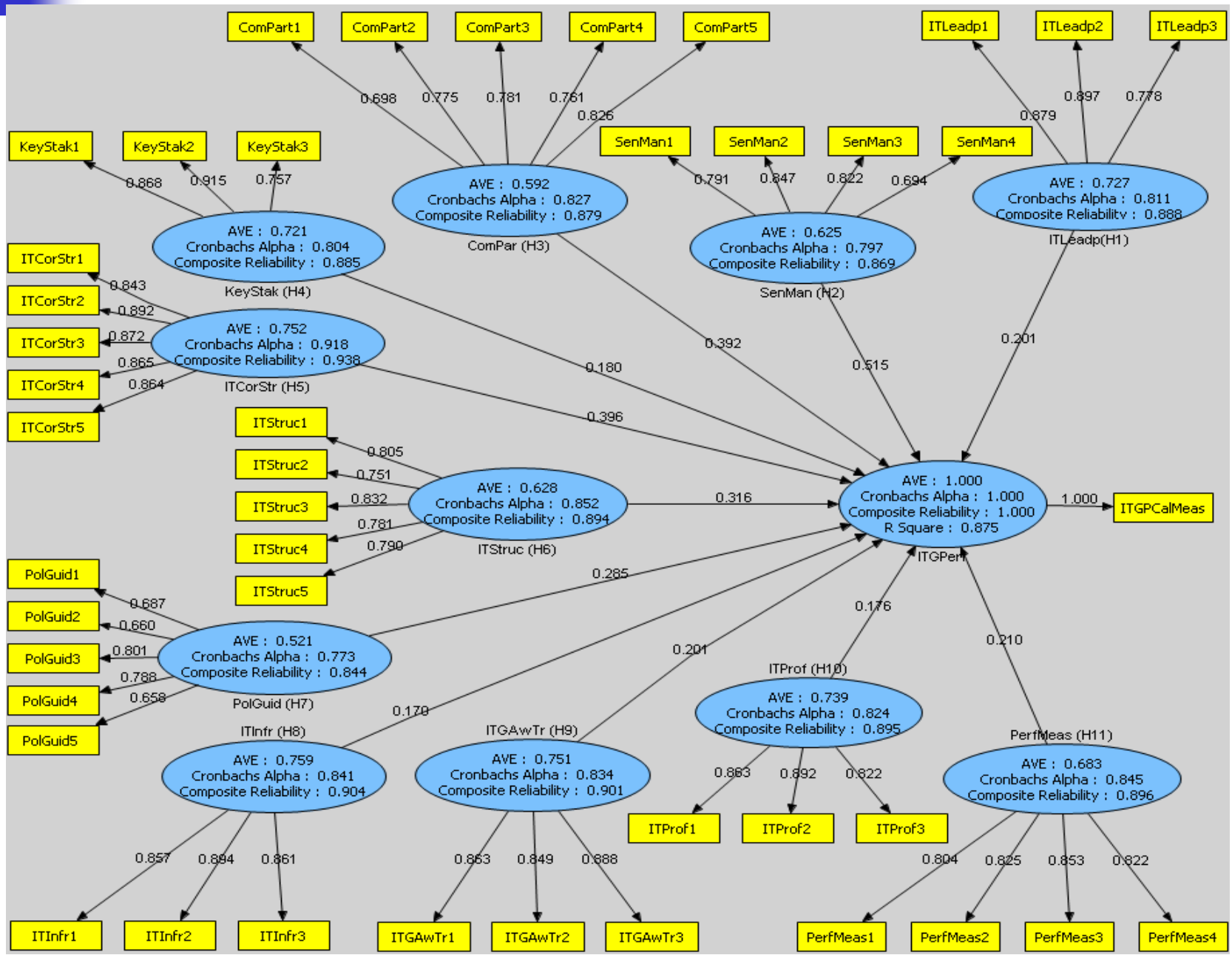
Test of the Measurement Model (Convergent and discriminant validity)



Test of the Measurement Model (Convergent and discriminant validity) …

Construct	H3	H5	H9	H8	H1	H10	H6	H4	H11	H7	H2
ComPar (H3)	**0.77**	0	0	0	0	0	0	0	0	0	0
ITCorStr (H5)	0.6994	**0.87**	0	0	0	0	0	0	0	0	0
ITGAwTr(H9)	0.6647	0.6808	**0.86**	0	0	0	0	0	0	0	0
ITInfr (H8)	0.4751	0.4744	0.4404	**0.87**	0	0	0	0	0	0	0
ITLeadp (H1)	0.6409	0.6506	0.5946	0.5332	**0.85**	0	0	0	0	0	0
ITProf (H10)	0.6677	0.666	0.6394	0.4421	0.644	**0.86**	0	0	0	0	0
ITStruc (H6)	0.6129	0.6639	0.6269	0.5144	0.6795	0.5927	**0.79**	0	0	0	0
KeyStak (H4)	0.6246	0.6675	0.5985	0.3856	0.6549	0.5947	0.5957	**0.85**	0	0	0
PerfMeas(H11)	0.6764	0.6481	0.6517	0.465	0.6451	0.6278	0.6172	0.618	**0.83**	0	0
PolGuid (H7)	0.6028	0.5056	0.5242	0.3624	0.5311	0.5518	0.5068	0.4347	0.4671	**0.72**	0
SenMan (H2)	0.6691	0.6241	0.613	0.5381	0.6203	0.6272	0.6392	0.6245	0.643	0.5105	**0.79**

Test of Structural Model / hypotheses

- The result indicated that 87% of the variance in IT governance performance (ITGPerf) was explained by the eleven hypothesized constructs.
- It also indicated the positive path coefficients ranging from 0.170 to 0.515 that according to Cohen (1988) are between small and strong relationship.
- The result also indicates associated t-values generated by SmartPLS bootstrapping that were above 1.96 thus 11 hypothesized constructs were significant though at different levels: 0.05 (1.96) & 0.001 (2.58).

Construct	Path Coeff.(γ)	t-values(t)
SenMan (H2)	0.515	4.645**
ITCorStr (H5)	0.396	2.973**
ITStruc (H6)	0.316	2.654**
ITLeadp(H1)	0.201	2.925**
ComPar (H3)	0.392	2.290*
PolGuid (H7)	0.285	2.460*
PerfMeas (H11)	0.210	2.351*
ITGAwTr (H9)	0.201	2.149*
KeyStak (H4)	0.180	2.463*
ITProf (H10)	0.176	2.037*
ITInfr (H8)	0.170	2.338*

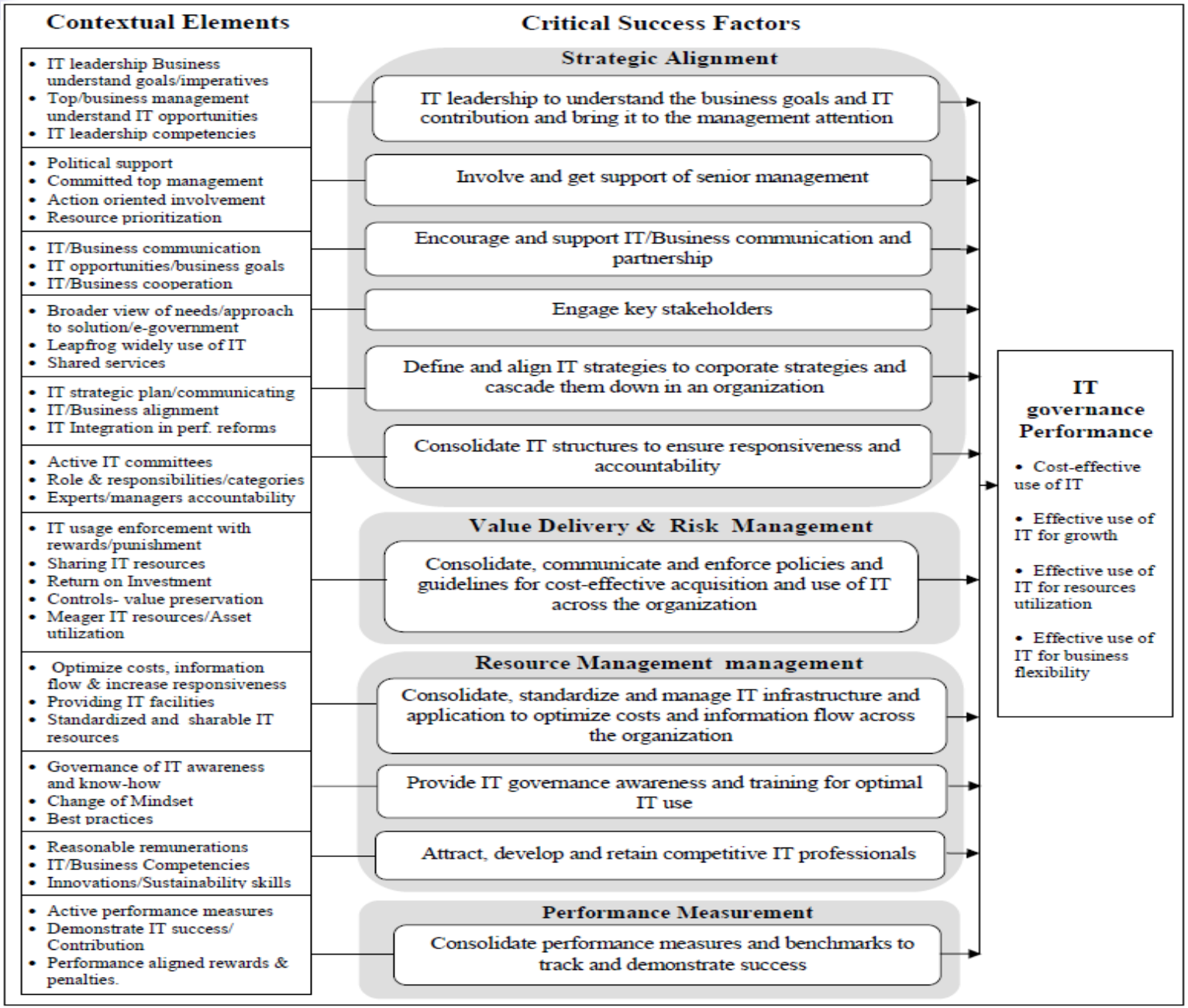
Path coefficient significance (Hair et al., 1995):

** Significant at 0.05(t>1.96);*

*** Significant at 0.001(t>2.58).*

Path coefficient strength (Cohen, 1988):
(< 0.1 small, <0.3 moderate, <0.5 strong)

CSFs Model for Effective IT Governance in the Studied Environment



Study Implication/Contribution

- Main findings
  - Correlated effect between CSFs and IT governancee performance
  - CSFs Model for Effective IT Governance in the Studied Environment
- Implication from practitioners' point of view
  - They can optimize scarce resources and improve public service delivery by concentrating on CSFs that influence most IT governance performance.
  - E.g. by improving contextual elements (measures) of *'Involve and get support of senior management', 'Define and align IT strategies to corporate strategies and cascade them down in an organization'* and *'Consolidate IT structures to ensure responsiveness and accountability'* could relatively pay-off highly in terms of ensuring IT resources, alignment, sustainability & responsiveness functions.
- Implication from academicians' point of view
  - Findings can be used to widen the CSFs scope for effective IT governance. For instance along five IT governance focus areas and developing country perspectives.
  - Also it can be used to improve existing IT governance frameworks like COBIT e.g. effect to ITG focus areas in each COBITs IT processes could be improved based on insights from the confirmed correlated effect.

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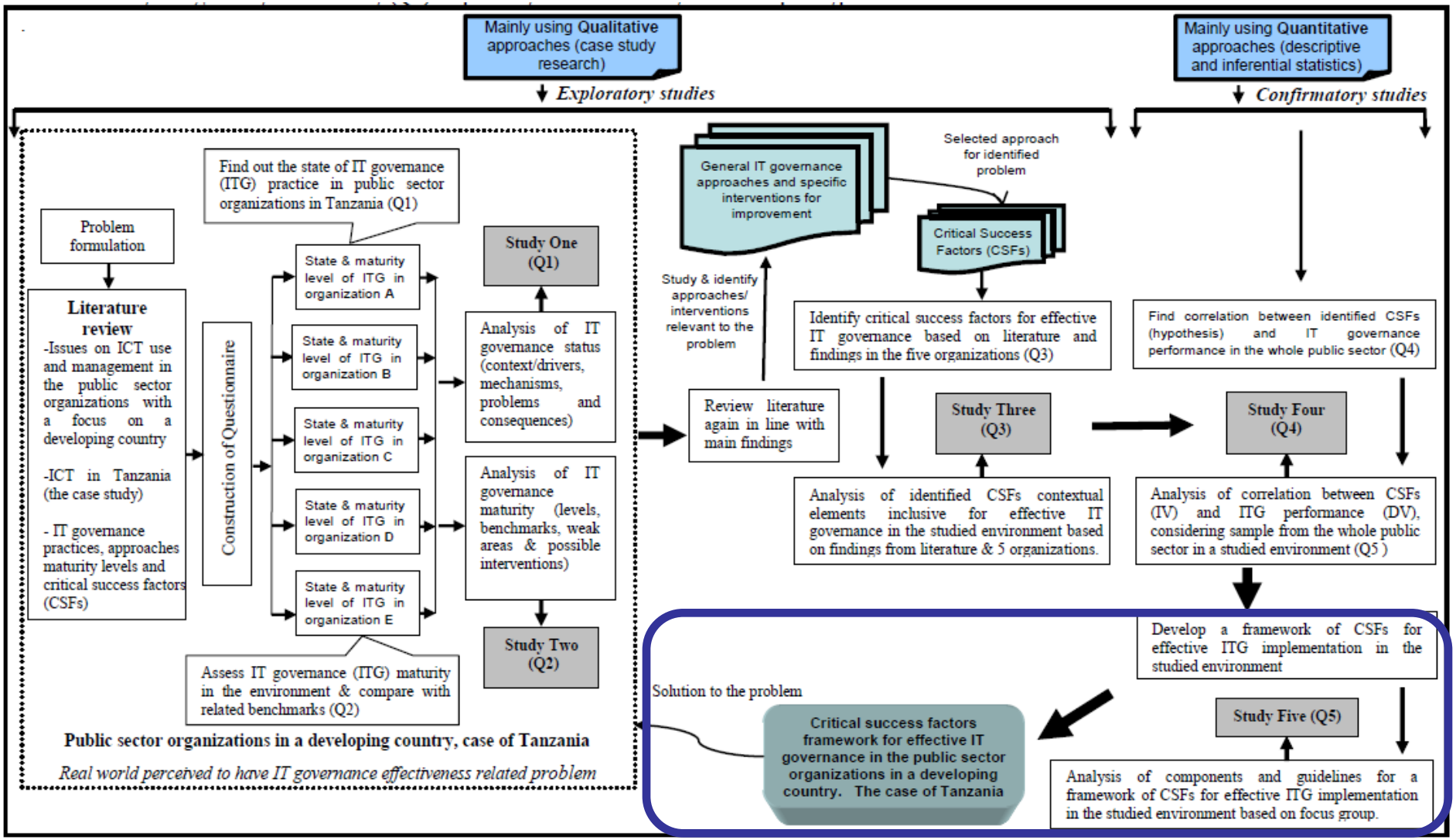
Future Research Directions

- One way could be on using these findings to develop guidelines for improving IT governance performance e.g. in a form of CSFs framework for effective IT governance in this environment.
- Involve *more than one developing country* in a single study to compare and broaden insights for effective IT governance in these environments.



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Thank you!

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