Original Research Article

Healthcare service quality measurement towards successful implementation of intervention strategies in three Namibian public healthcares facilities: a deterministic framework

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ABSTRACT

Background: Implementation science has advanced towards improved use of theoretical tactics to provide better understanding and explanation of how and why implementation succeeds or fails. The aim of the study is to develop a deterministic framework for the successful measurement of healthcare service quality in public healthcare organisations, focusing on the staff member's satisfaction level with 2009 - 2013 strategic decisions implementation in the three Namibian Public healthcares.

Methods: The research utilized quantitative approach, a survey design and questionnaire was employed to collect data. The study used Gaskin's CFA/SEM procedure and applies the SPSS 23 AMOS plugins, Pattern Matrix Model Builder"(PMMB), "Master Validity"(MV), "Model fit measures"(MFM) to validate and determine the interrelationships between variables. A quantitative interpretive structural modelling (ISM) approach was used within an action implementation framework (AIF). This study employed three models that complied with the action implementation framework's dual roles. The EIS model provided the hands on support to implementing strategy role by retrospectively focusing on the 2009-2013 MoHSS Strategic plan implementations. While, the ISF model and IFF models were used to identify the determinants for its evaluation.

Results: The study found no direct link between PHOs and the public sector institutions in implementing strategic plans. However, there is 1:2 mediation effect facilitated by the MoHSS and the PHOs are responsible for implementing 33% of the mandates of the Ministry of Health and Social Services in Namibia.

Conclusions: This study had demonstrated why strategic plans failed in the public sectors in Namibia in that the objectives in the plans were formulated without determining whether they had an effect or not on the implementation outcome.

Keywords: Implementation science, Implementation strategy, Service quality measurement, Public healthcare, Deterministic framework

INTRODUCTION

The study is located within the emerging discipline of implementation science. The broad field of this study is implementation strategies. Implementation strategies have incomparable reputation in implementation science, as they establish the 'how to' factor of altering healthcare setting.[1] The study context is the public health reform in developing countries, in particular public healthcare in low resource settings. Generally, there is a growing concern that in Namibia it has become a norm for public institutions including public healthcare to launch their road maps in the name of strategic planning, and celebrate their new visions with the public but they never

revealed back to the public whether their visions were successes or what were the impediments for effective implementation of such visions then. Despite Public institutions having Strategic plan in place in Namibia there is still public outcry of poor service delivery. The famous usually questions are: how public institutions determine the measurement outcome contributed by each objective in the strategic plan? How effective strategic plan implementation in the service industries such Public healthcare can be measured? It would appear that Namibia does not have a comprehensive development strategy into which effective implementation of strategic plan of Public institutions shall be measured. This leave Public healthcare Organizations in Namibia with no option but to tune the line in adopting a generic strategic plan of public institutions as preferred by political authority. This approach seems to be a headache to public healthcare managers in implementing strategic plan successful. Factors that can determine the success implementation of the strategic plan in one public service department does not always be the same that ascertain the success implementation of strategic plan of public healthcare.

Therefore, public healthcare managers must seize countless hindrances, limitations and meaningfully pay attention to assessing, testing, and successfully engage accomplishment strategies that work in healthcare practice.

It seems that the ever-expanding role players and stakeholders with divergent interests and conflicting agendas had fragmented the global health community.[2] The fragmentation along the divergent views is bringing in new paradigms, theories and ways of thinking focused on reforming healthcare. There are clarion calls for effective governance and innovative solutions necessary to achieve the health-related sustainable development goals (SDGs), global health security, and other priorities of the international community. Hoffman further reports of new ideas on better ways to make global health decisions and allocate limited global health resources. He contrasts the calls for total transformation with those calling for the incremental approach of small changes; some rely on existing institutions while others propose new organizations. In seeking solutions, that simplifies and ensures implementation success of intervention strategies in public healthcare organisations, the study draws upon emerging perspectives in strategic management, implementation science, and healthcare reform to come up with a conceptual model for measuring healthcare service quality in public healthcare organisations, using a deterministic framework.

The fear of making the wrong decision is what drives us to utilize a scientific approach.[3] The emerging perspectives that use the scientific approach include management science (MS), strategic decision making and implementation science (IS). However,the implementation science comes out of the need to address challenges associated with the use of research to achieve more evidence-based practice (EBP) in health care and other areas of professional practice.[4] Similarly, due to the growing importance of global health governance, all proposals are worthy of consideration, but none deserve implementation without such consideration. As such, the best available research evidence should inform any health future reforms and implementation of strategic decisions.

However, implementation strategies have often not paid attention to the theoretical underpinnings risk becoming expensive trial and error exercises. More recently, Nilsen 2015 developed a taxonomy that outlines and distinguishes the different categories of theories, models and frameworks within implementation science. This taxonomy is important to this study, as it locates the appropriate theoretical framework for the research. He notes that implementation science has progressed towards increased use of theoretical approaches to provide better understanding and explanation of how and why implementation succeeds or fails. The proposed taxonomy, therefore distinguishes between different categories of theories, models and frameworks in implementation science. In order, to facilitate appropriate selection and application of relevant approaches in implementation research and practice. As such, this study is located under the determinant frameworks, which provide generic support for carrying out implementation endeavours.

Determinant frameworks refer to broad-spectrum of determinants that are hypothesised or have been found to influence implementation outcomes. Furthermore, each type of determinant typically comprises a number of individual barriers, hinders or impediments and/or enablers (facilitators), which are seen as independent variables. These determinants will have an impact on implementation outcomes, which will be the dependent variable.

Thus this study makes the following propositions within an active implementation framework,

Proposition 1

Effective strategy implementation in Public healthcare organisations (PHOs) is directly affected by the public sector institutions it interacts with in providing healthcare services. In this study, the PHOs are the Intermediate Public Hospitals that implement the National strategies and mandates of the Ministry of Health and Social Services (MoHSS). As well as, other public sector institutions such as the Ministry of Finance (MoF), Ministry of Works and Transport (MWT) and the Public Service Commission (PSC).

Proposition 2

Several determinants exist, which mediates the implementation relationships between PHOs and the

ministry or department of health. The study determinants refer to the different factors affecting implementation outcomes. These include the content of the strategy, contextual, structural, and operational factors.

Proposition 3

The study uses the staff perceptions to measure and validate the implementation relationships that affecting public healthcare organisation's (PHO) service quality and intervention strategies.

Objective

To develop a deterministic framework for the successful measurement of healthcare service quality in public healthcare organisations, focusing on the staff member's satisfaction level with 2009 - 2013 strategic decisions implementation in the three Namibian Public healthcares.

METHODS

LibQual rating model questionnaire was used to assess Ministry of Health and Social Services(MoHSS) operational staff and regional management from three intermediate public hospitals with corresponding regions to assess the Satisfaction level with the MoHSS strategic plan objectives for 2009- 2013 Implementation (Expected implementation satisfaction-EIS). The hospitals are Katutura Intermediate State Hospital (KISH) in Khomas region, the Rundu Intermediate State Hospital (RISH) in Kavango region and the Oshakati Intermediate State Hospital (OISH) in Oshana region. The study only covered those who have been continuously in the employment of MoHSS for the period February 2009 - February 2013. The population was 453 operational staff and regional management members. Representatives of 290 staff were involve in this research. The study was carried out from May 2016- July 2016.

Dimensions measurements

The study develops constructs with 27 items from the 2009-2013 Strategic plan objectives and five dimensions (themes): service provision, human resource management, a quantitative interpretive structural modelling (ISM) approach was used within an action implementation framework (AIF).[5]

Analysis

The strength of the relationship among the variables (or items) was tested using the Kaiser-Meyer-Olkin (KMO) test, which must produce a value larger than 0.5. Pallant et al argued that the items within the scales should adequately correlate with a Bartlett's test of sphericity that should be significant (p <0.05).[6] The study results showed that all the necessary conditions were met and that it was appropriate to conduct an Exploratory Factor Analysis and only items that contained factor loadings

greater than 0.30 were considered to be significant and were thus retained.[7] The study further follows Gaskin's CFA/SEM procedure and applies the SPSS AMOS plugins, "Pattern Matrix Model Builder" (PMMB), "Master Validity" (MV), "Model fit measures" (MFM) in an iterative process.[8] Using the Pattern Matrix Model builder (PMMB) plugin involves copying the SPSS dimension reduction output's EFA pattern matrix and pasting in into PMMB and running. This results in a CFA/SEM model whose validity and model fit measures are tested using the MV and MFM plugins.

RESULTS

Expected implementation satisfaction

The Expected Implementation Satisfaction (EIS) scale includes 27 items of MoHSS, 2009-2013 strategic plan that consist of 11 items on service provision, 5 items on governance, 3 items on infrastructure development; 5 items on human resource management and 3 items on financial management. EFA is used to group the 27 items into three factors of institutions that have control in ensuring effectiveness of the implementation. The factors include the public healthcare organisation (the state intermediate hospitals), the responsible government ministry (MoHSS) and the public sector effect (MWT, MoF & PSC). Human Resource Management (5 items). Table 1 presents the results.

Table 1, presents the results from the EFA that used Principal Axis Factoring with Direct Oblimin rotation. The 27-item EIS scale is reduced to the three factors of public healthcare organisation (PHO), Ministry of Health and Social Services (MoHSS) and Public Sector Effect (PSE). The results are consistent with previous assessment of the Namibian hospital governance structure, autonomy and management.

This result highlights the organisation structure and bureaucratic processes of healthcare service provision in Namibia in that service provision by both MOHSS and PHO is affected by PSE as their buildings are managed by Ministry of Works and Transport whereas their human resources is managed by the Public Sector Commmission and financial management is effected through the Ministry of Finance [9]. This makes it challenging for hospital management teams to effectively implement any strategic interventions. Additionally, health facilities require specialised construction and major renovations to improve patient safety, poor sanitation services and unpredictable water supply that increase risk of hospital acquired infections.

Furthermore, the study used SPSS AMOS version 23 software to determine construct validity the three EIS measures. The analysis also involved the determination of the EIS model fit for further analysis. Figure 1, present the result.

Figure 1, shows that PHO is dependent on PSE and MoHSS for effective implementation of strategic interventions. It also show that PSE is dependent on MoHSS. Table 2, presents the modelfit measures.

Table 2, presents the model fit measures of the final EIS model from numerous iterations guided by the cut off criteria and validity concerns. The EIS model fit was excellent, without any validity concerns.

Table 1: EFA analysis of EIS scale.

Variable	Description	Factor		
		MoHSS	PSE	PHO
Service_Prov_ES_Focus	Improve focus on core function	0.934		
Service_Prov_ES_Fleet	Improve fleet management	0.922		
Service_Prov_ES_Stream	Streamline and harmonize services	0.920		
Service_Prov_ES_Dec_Mort	Decrease mortality rates	0.918		
Service_Prov_ES_Dec_Morb	Decrease morbidity rates	0.918		
Service_Prov_ES_Waste	Improve waste management system	0.917		
Service_Prov_ES_Adeq_Form	Provide adequate, formalized and structured community based health	0.917		
Service_Prov_ES_Stake	Improve stakeholder relations and coordination	0.915		
Service_Prov_ES_Red_Mal	Reduce malnutrition	0.906		
Service_Prov_ES_PMS	Adopt and implement management system	0.906		
HRM_Devolve_Decision	Devolve decision making to appropriate levels		0.773	
HRM_Skilled_Force	Create a skilled work force		0.729	
HRM_Staff_Morale	Improve staff morale		0.703	
Infrastructure_MDSP	provide a minimum district service package (MDSP)		0.659	
HRM_Adeq_Staff_comp	Ensure adequate and appropriate staff complement and strength		0.604	
Governance_Contract	Implement efficient and effective contract management system		0.579	0.343
Governance_Leg_Policies	Ensure responsive legislation and policies		0.550	0.444
Infrastructure_Faci_emerging	Improve health facilities to be responsive to emerging needs		0.526	0.349
Infrastructure_mgt_equip	Ensure proper management of infrastructure and equipment		0.520	0.418
HRM_Condition_workers	Improve conditions of service for staff		0.513	
Service_Prov_ES_Disasters	Ensure prompt and effective response to disasters	0.333	0.413	0.313
Governance_MIS	Improve information management system			0.827
Governance_Stewardship	Strengthen the stewardship role of MoHSS			0.804
Financial_mgt_Improve	Improve financial management	0.314		0.691
Governance_Proc_Pay	Improve the procurement and payment system		0.303	0.667
Financial_mgt_Capt	Ensure capital formation make up at least 10 percent MOHSS total budget	0.317		0.654
Financial_mgt_Equit	Ensure equitable and efficient allocation of resources	0.349	0.311	0.579
Eigenvalue		14.305	3.747	1.675
% of Variance		52.982	13.878	6.203
Cumulative %		52.982	66.860	73.063

Structural equation modelling (SEM)

SEM is used to test the conceptual model. For this research, three implementation constructs were first validated by conducting CFA. Secondly, the model adequacy was evaluated by means of goodness-of-fit measures for the overall structural model. Maximum likelihood estimation with residual moments and

modification indices was used for the model estimation and structural path coefficient. The SEM estimates using PHO staff perceptions the structural relationships between the implementation satisfactions constructs of EIS (represented by PHO, MoHSS, and PSE), Implementation Success Factors (ISF) (represented by ISF1, ISF2, ISF3, ISF4) and Implementation Failure

Factors (IFF) (represented by IFF1, IFF2, IFF3, IFF4). Figure 2, the results.

Table 3, shows that most of the fit indices indicate acceptable to excellent fit, the Comparative Fit Index (CFI), is marginally at the acceptable cut off of 0.9 (0.896). The final model fit was affected by covariance and modification indices were used to improve the model

fit without removing any variables. The logic used in improving the model was that of keeping all the original items for interpretation. The factors and path relationships that do not align with any plausible theory will be omitted.
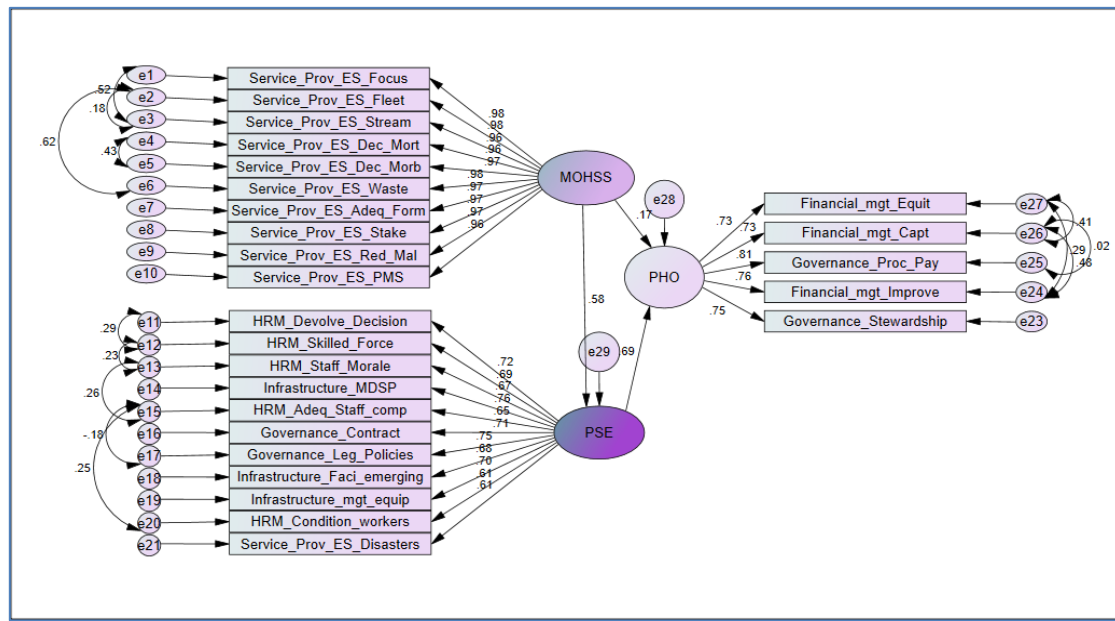

Figure 1: EIS model fit.

Table 2: EIS model fit measures.

Measure	Estimate	Threshold	Cut-off Criteria*			Interpretation
			Terrible	Acceptable	Excellent	
CMIN	440.734	--				--
DF	283	--				--
CMIN/DF	1.557	Between 1 and 3	>5	>3	>1	Excellent
CFI	0.977	>0.95	<0.90	<0.95	>0.95	Excellent
SRMR	0.054	<0.08	>0.10	>0.08	<0.08	Excellent
RMSEA	0.052	<0.06	>0.08	>0.06	<0.06	Excellent
PClose	0.0346	>0.05	<0.01	<0.05	>0.05	Excellent

Table 3: Final SEM model fit measures.

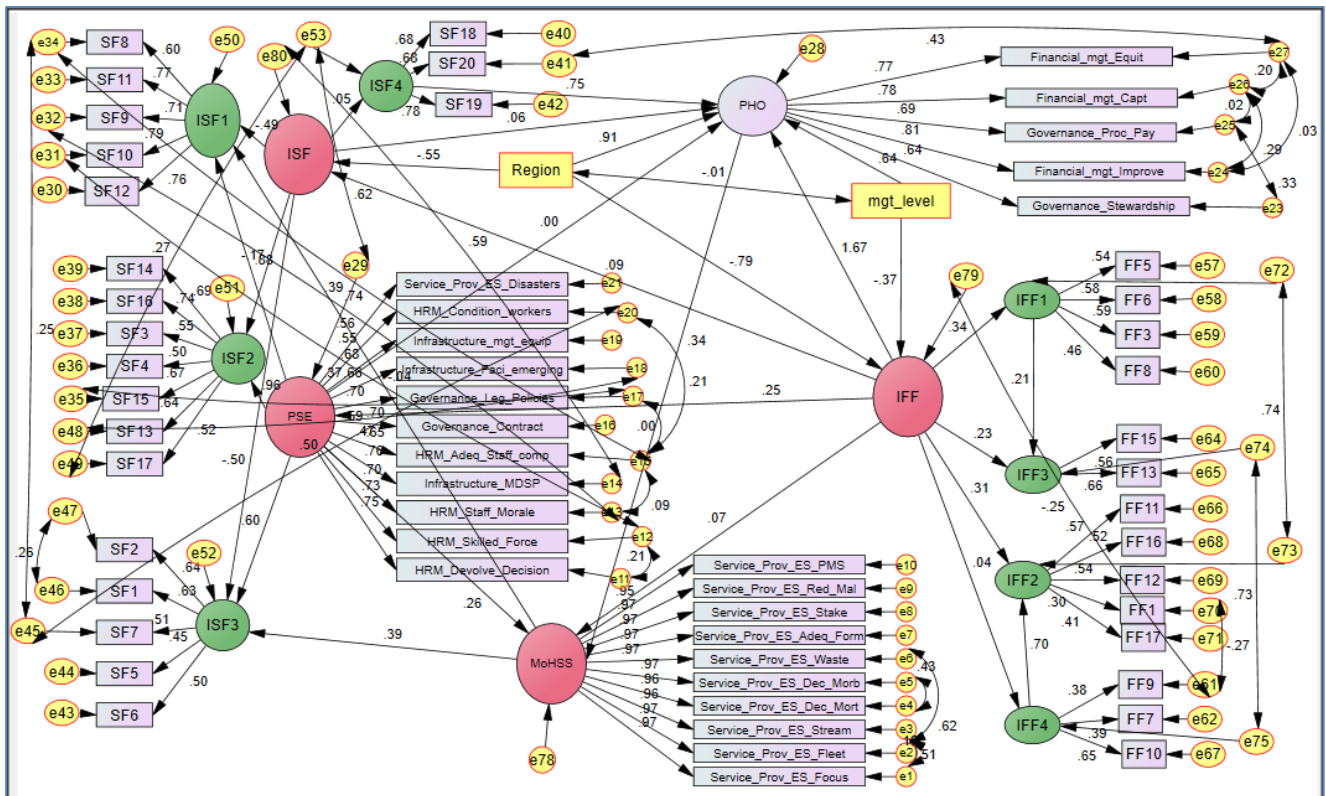| Measure	Estimate	Threshold	Cut-off Criteria*			Interpretation
			Terrible	Acceptable	Excellent	
CMIN	2877.016	--				--
DF	1776	--				--
CMIN/DF	1.62	Between 1 and 3	>5	>3	>1	Excellent
CFI	0896	>0.95	<0.90	<0.95	>0.95	Need More DF
SRMR	0.087	<0.08	>0.10	>0.08	<0.08	Acceptable
RMSEA	0.055	<0.06	>0.08	>0.06	<0.06	Excellent
PClose	0.014	>0.05	<0.01	<0.05	>0.05	Acceptable

Figure 2: Final SEM model.

Table 4: Interpretation of EIS model.

Dependent	Independent	Standardized	PHO	MoHSS	PSE
Govemance.Stewardship	HospitaI_Mgt (PHO)	0.64	0.64	0.22	0.00
Financial_mgt_lmprove	Hospital_Mgt	0.81	0.81	0.28	0.00
Financial_mgt_Capt	Hospital_Mgt	0.78	0.78	0.27	0.00
Financial_mgt_Equrt	Hospital_Mgt	0.77	0.77	0.26	0.00
Governance_Proc_Pay	Hospital_Mgt	0.69	0.69	0.23	0.00
Ministry_H ealth_SS	PHO or PSE	0.34	0.34	1.00	0.26
Service_Prov_ES_Focus	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Fleet	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Dec_Morb	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Waste	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Adeq_Form	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Stake	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Red_Ma!	Ministry_Health_SS (MoHSS)	0.97	0.33	0.97	0.25
Service_Prov_ES_Stream	Ministry_Health_SS (MoHSS)	0.96	0.33	0.96	0.25
Service_Prov_ES_Dec_Mort	Ministry_Health_SS (MoHSS)	0.96	0.33	0.96	0.25
Service_Prov_ES_PMS	Ministry_Health_SS (MoHSS)	0.95	0.32	0.95	0.25
lnfrastructure_mgt_equip	Pub!ic_Sector_Effect (PSE)	0.68	0.00	0.18	0.68
Infrastructure_M DS P	Pub!ic_Sector_Effect (PSE)	0.76	0.00	0.20	0.76
HRM_Devolve_Decision	Pub!ic_Sector_Effect (PSE)	0.75	0.00	0.20	0.75
HRM_Skilled_Force	Pub!ic_Sector_Effect (PSE)	0.73	0.00	0.19	0.73
HRM_Staff_Mora!e	Pub!ic_Sector_Effect (PSE)	0.70	0.00	0.18	0.70
Governance_Contract	Pub!ic_Sector_Effect (PSE)	0.70	0.00	0.18	0.70
Governance_Leg_Policies	Pub!ic_Sector_Effect (PSE)	0.70	0.00	0.18	0.70

Dependent	Independent	Standardized	PHO	MoHSS	PSE
lnfrastructure_Faci_emerging	Pub!ic_Sector_Effect (PSE)	0.66	0.00	0.17	0.66
Service_Prov_ES_Disasters	Pub!ic_Sector_Effect (PSE)	0.56	0.00	0.15	0.56
HRM_Condition_workers	Pub!ic_Sector_Effect (PSE)	0.55	0.00	0.14	0.55
Hospital_Mgt	Management level	0.64	0.64	0.22	0.00
Hospital_Mgt	Region	0.91	0.91	0.31	0.00
Ministry_Health_SS	IFF	0.07	-0.12	0.07	0.02
Public_Sector_Effect	IFF	0.25	-0.42	0.02	0.07
IFF	Management level	-0.37	0.62	-0.03	-0.10
ISF	Region	-0.55	-0.50	-0.17	0.00
IFF	Region	-0.79	-0.72	-0.24	0.00
IFF	Hospital_Mgt	-1.67	-1.67	-0.12	0.00
ISF	IFF	0.09	-0.15	0.01	0.02

Table 4, shows that the PSE does not have a direct effect on the PHOs. Therefore, the MoHSS acts as mediator in the relationship. This implies that the PSE institutions like MWT who own the hospital infrastructure do not have any direct interactions with the hospitals. This could explain the poor state of Hospital infrastructure in the country. The human resources and financial management functions are also affected by the no effect relations with PSE institution like PSC and MoF. There is need for shared accountability with respect to hospital service quality, as the underlying factor affecting effective implementation involves a number of public sector players. The results also show a 1:2 mediation effect from the MoHSS. This implies that PHOs carry out a third (33%) of the MoHSS mandates such as reduce malnutrition, decrease mortality and morbidity.

The results also show that region or organisational name (0.91) had a very strong effect on the satisfaction perceptions of the staff. Management level (0.64) had moderate positive effects on the staff satisfaction with implementation.

DISCUSSION

The research sought to interpret the CFA and SEM model in the context of the research, as well as highlight some contributions and discoveries made in the study. The standardized regression weights of the fitted models were arranged to reflect the overall regression weight values of the model fit paths. The revised regression weights were then sorted in descending order. The factors were then categorised to strategy formulation success factors and strategy implementation success factors.

The active implementation frameworks play the dual role of providing hands-on support to implement strategy and identifying determinants for its evaluation.[10] As such, this study employed three models that complied with the action implementation framework's dual roles. The EIS model provided the hands on support to implementing strategy role by retrospectively focusing on the 2009-2013 MoHSS strategic plan implementations. While, the ISF model and IFF models were used to identify the determinants for its evaluation.

Proposition 1

The research proposed that effective strategy implementation in Public healthcare organisations (PHOs) is directly affected by the public sector institutions it interacts with in providing healthcare services. In this study, the PHOs are the Intermediate Hospitals that implement the National strategies and mandates of the Ministry of Health and Social Services (MoHSS). As well as, other public sector institutions such as the Ministry of Finance (MoF), Ministry of Works and Transport (MWT) and the Public Service Commission (PSC).

The study found no direct link between PHOs and the public sector institutions such as the Ministry of Finance (MoF), Ministry of Works and Transport (MWT) and the Public Service Commission (PSC). However, there is 1:2 mediation effect facilitated by the MoHSS and the PHOs are responsible for implementing 33% of the mandates of the Ministry of Health and Social Services (MoHSS).

Proposition 2

The study proposed that several determinants exist, which mediates the implementation relationships between PHOs and the ministry or department of health. The study determinants refer to the different factors affecting implementation outcomes. These include the content of the strategy, contextual, structural, and operational factors.

The study contrasted two determinant models using Kalali et al failure factor model and Farzin et al critical success factor model.[11,12] The study found that the two models (ISF & IFF) agree on the effects of operational

factors on implementation effectiveness, as well as the effect of structural factors on strategy formulation. However, they could not agree on the effects of context and content factors on either strategy formulation or strategy implementation.

Proposition 3

The study used the staff perceptions to measure and validate the implementation relationships that affecting public healthcare organisation's (PHO) service quality and intervention strategies. Using interpretive structural modelling (ISM) approach, the study was to develop a map of the complex relationships between many elements involved in complex decision situation such as in PHOs.[13] ISM is often used to provide fundamental understanding of complex situations, as well as to put together a course of action for solving a problem. The ISM process transforms unclear, poorly articulated mental models of systems into visible, well-defined models useful for many purposes.

The study used an integrated structural modelling (ISM) to simplify the three CFA/SEM models and interpret the Final SEM model. As such, Figure 3, presents the simplified version of the Final SEM model.
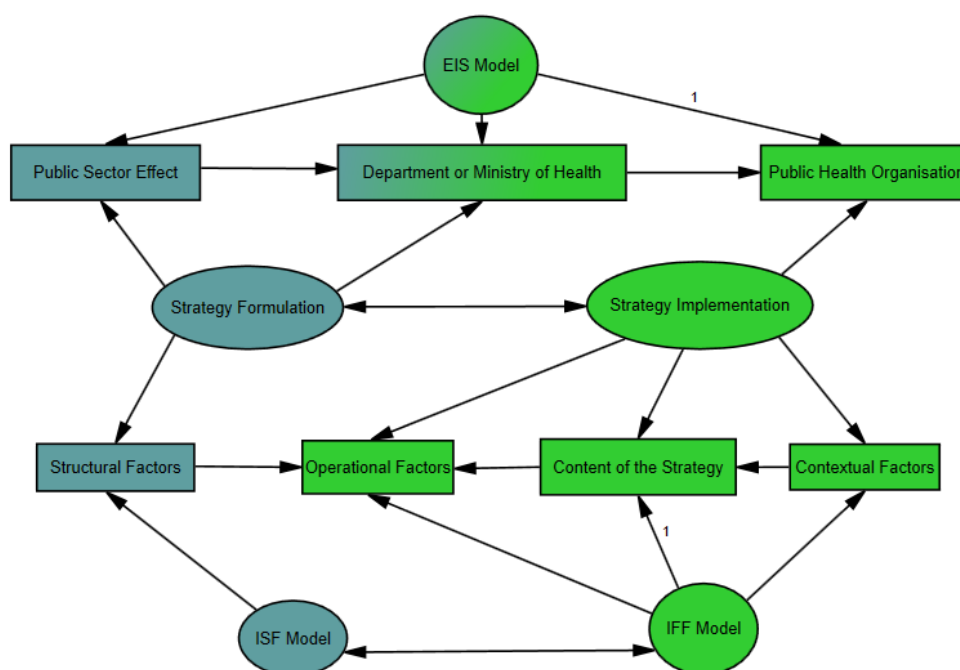
Figure 3: Research model.

The research presents the above formulated research model for the successful measurement of healthcare service quality in public healthcare organisation based the perceptions of healthcare staff.

CONCLUSION

The study concludes that content and context factors are interdependent such that the content of the strategy depends on the strategic context. At the same time, effective implementation depends on the operational factors which are also influenced by structural factors during strategy formulation stage. The study determined that overall objectives of MoHSS strategic plan 2009-2013, the PHOs were only responsible for implementing 33% of the mandates of the Ministry of Health and Social Services (MoHSS) while the intention of the strategic plan was for PHOs to implement such mandates 100%. This further explain why strategic plans failed in the public sectors in Namibia in that the objectives in the

plans were formulated without determining whether they had an effect or not on the implementation outcome.

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