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Successful transformational change in revenue management among beneficiary communities of South African renewable energy construction companies

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Abstract

Transformational change is the second of three sub-models that resulted from the splitting of the original model following the data analysis as part of a thesis entitled *A theoretical model for successful management of revenue for beneficiary communities of renewable energy construction companies in South Africa*. The sub-model provides specific guidance for project managers dealing with transformational change in communities to stakeholders, industry experts and community development practitioners in the renewable energy sector. The aim of the research was to promote a localised understanding of education, social interaction, social cohesion, infrastructure improvement and sharing to ensure success in managing the revenue for beneficiary community projects by renewable energy construction companies. A literature review of relevant literature on transformational change factors was conducted and used to develop a structured questionnaire distributed to national and international population of project management practitioners who were conveniently sampled in South Africa. Using an electronic measuring instrument, the empirical findings established four factors that were reliable and valid for transformational change in communities, namely education, infrastructure development, human development, and change management. Using these factors and constructing a path diagram of

the independent variables (education, infrastructure development, human development, change management) and subsequent intervening (good governance) and dependent variables (perceived success of revenue management), appropriate hypotheses were developed to test the model. The hypotheses were analysed and tested empirically using Structural Equation Modelling (SEM). Determinants were identified as elements of transformational change that influence the success of revenue management for beneficiary communities for South African renewable energy companies. These included the use of education, infrastructure development, human development, change management, and good governance.

Keywords: Beneficiary communities, community development, economic development, green energy, renewable energy, revenue management, socio-economic development, project management, transformational change

Abstrak

Transformatoriese verandering is die tweede van drie submodelle wat voortspruit uit die opbreking van die oorspronklike model na die data-analise as deel van 'n proefskrif getiteld *A theoretical model for successful management of revenue for beneficiary communities of renewable energy companies in South Africa*. Die submodel bied spesifieke leiding aan projekbestuurders wat handel oor transformasieverandering binne gemeenskappe aan belanghebbendes, kundiges in die bedryf en gemeenskapsontwikkelingspraktisyns in die hernubare energie sektor. Die doel van die navorsing was om 'n gelokaliseerde begrip van onderwys, sosiale interaksie, sosiale samehorigheid, verbetering van infrastruktuur en deel te bevorder om sukses te behaal in die bestuur van die inkomste vir begunstigde gemeenskapsprojekte deur hernubare energie konstruksie maatskappye. 'n Literatuurstudie van relevante literatuur oor transformasieveranderingsfaktore is gedoen en gebruik om 'n gestruktureerde vraelys te ontwikkel wat aan nasionale en internasionale populasie van projekbestuurspraktisyns in Suid-Afrika versprei is. Met behulp van 'n elektroniese meetinstrument het die empiriese bevindinge vier transformasiefaktore gevind wat betroubaar en geldig was vir transformasieverandering in gemeenskappe, naamlik onderwys, infrastruktuurontwikkeling, menslike ontwikkeling, en veranderingsbestuur. Met behulp van hierdie faktore en die konstruksie van 'n vloeddiagram van die onafhanklike veranderlikes (onderwys, infrastruktuurontwikkeling, menslike ontwikkeling, en veranderingsbestuur) en die daaropvolgende tussenliggende (goeie bestuur) en afhanklike veranderlikes (waargeneme sukses van inkomstebestuur) is toepaslike hipoteses ontwikkel om die model te toets. Die hipoteses is empiries geanaliseer met behulp van strukturele vergelyking modellering (SEM). Determinante is geïdentifiseer as elemente van transformasieverandering wat die sukses van inkomstebestuur vir begunstigde gemeenskappe vir Suid-Afrikaanse hernubare energie maatskappye beïnvloed. Dit sluit in die gebruik van onderwys, infrastruktuurontwikkeling, menslike ontwikkeling, veranderingsbestuur, en goeie bestuur.

Slutelwoorde: Begunstigde gemeenskappe, ekonomiese ontwikkeling, gemeenskapsontwikkeling, groen energie, hernubare energie, inkomstebestuur, projekbestuur en transformasieverandering, sosio-ekonomiese ontwikkeling

1. Introduction

As mentioned in a previous article entitled *The success of multi-sector participation in the management of revenue for beneficiary communities of South African renewable energy companies – sub-model A* (Amansure & Adendorff, 2017: 63-75), one of the main benefits to be derived from the industry is not being achieved, owing to ineffective project management of revenue for beneficiary communities in the renewable energy sector in South Africa.

Beneficiary communities refers to those communities that must receive socio-economic development benefits from the renewable energy companies located in the area surrounding the renewable energy farm. This investigation focuses on the second sub-model of a comprehensive model to explain transformational change in the perceived success of the management of revenue for beneficiary communities. This is of paramount importance to project managers, especially those operating in the renewable energy sector in South Africa as part of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The comprehensive model consists of three sub-models (in effect, three sets of independent variables), namely multi-sector participation, transformational change (addressed in this article), and sustainable initiatives (Amansure, 2016). Owing to the limited sample size, the entire matrix of responses in this study could not be subjected to a single exploratory factor analysis and was consequently split into the three sub-models.

In order to promote a localised understanding of transformational change to ensure success in managing the revenue for beneficiary community projects by renewable energy construction companies, the factors (variables) that influence the success of revenue management solutions for the renewable energy sector in South Africa were investigated and a theoretical business process model was developed for the perceived success of this revenue management. To test the proposed model, appropriate hypotheses were proposed and tested, and a path diagram of relationships between the independent variables and the dependent variable was constructed and measured. Based on the results of the statistical analysis, the organisational and social variables that will ensure transformational change were identified.

2. Literature review Sub-model – Transformational change (see Figure 1)

Change without transformation is simply window-dressing (Amansure, 2016). Transformation is about changing the way people view themselves – self-potential; how people view others around them — collective potential, and how people view the world around them (including the natural environment) — sustainable potential (Amansure, 2016). Transformation involves education, social interaction, social cohesion, infrastructure improvement, and sharing. Therefore, every kind of participation referred to in Sub-model – Multi-sector participation) must complement Sub-model – Transformational change and have a deliberate component of knowledge (education) and skills transfer so that beneficiary communities can take ownership of, and be responsible for growth and development.

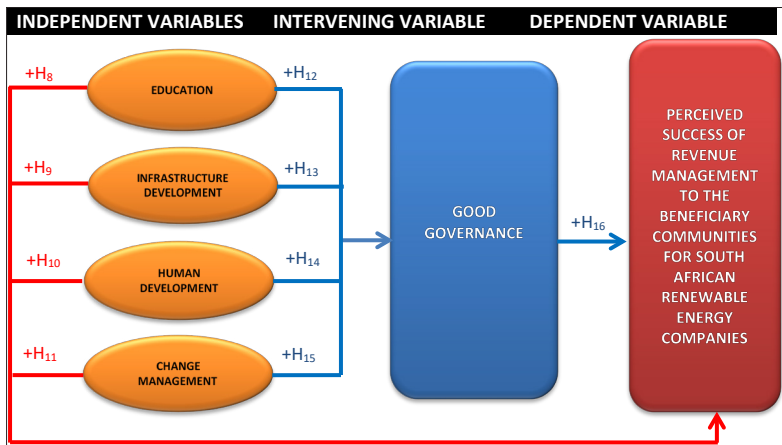


Figure 1: Proposed theoretical Sub-model – Transformational change

To understand the elements in the proposed model, it is important to introduce the factors relating to transformational change that directly influence the perceived success of revenue management for beneficiary communities. These factors form the independent variables used in the measuring instrument. Two of the variables, education and infrastructure development, will be loaded together to form a factor labelled “developmental benefits”. The **independent variables** associated with this sub-model include developmental benefits, human development and the **intervening variable** of good governance, measured against the **dependent variable**: Perceived

success of revenue management for beneficiary communities. This model alludes to a transformational approach to managing revenue for beneficiary communities.

2.1 Independent variables

2.1.1 Independent variable: Education

The development of a model for managing revenue for beneficiary communities must include the benefits of access to quality education for the rural poor, in order to address illiteracy in rural communities (Atchoarena & Gasperini, 2003). The renewable energy sector should be informed about the best methodology to follow when engaging with these communities to ensure that outcomes are positive and meaningful. In this model, "education" refers to formal and informal education and training in the form of learnerships, mentorships, further education and training, educational support, and resourcing to increase the success of revenue management for beneficiary communities. This will improve the socio-economic circumstances of members of beneficiary communities, enabling them to access the mainstream economy and contribute to local and national economic growth.

2.1.2 Independent variable: Infrastructure development

There are still challenges in infrastructure development in South Africa that must be addressed, especially in rural areas, before the country can reach its infrastructure goals. Some of the challenges include funding of infrastructure projects, slow approval processes for projects, and skills shortages in carrying out the actual work. However, there are also opportunities in investing and developing infrastructure, namely job creation, social development, economic efficiency, and skills development (Gauteng Province Provincial Treasury, 2012: 1). The unique relationship between the renewable energy sector, government and the community must be approached with caution. In this model, "infrastructure development" refers to the physical systems of a renewable energy company or beneficiary community, such as buildings, transportation, communication, sewage, water, and electrical systems that can contribute to successful revenue management, thereby contributing to increased economic growth. Infrastructure governance is also an integral part of this variable.

2.1.3 Independent variable: Human development

In 2010, the United Nations Development Programme (UNDP) reported that South Africa's human development index (HDI) rose from 0.587 to 0.601 between 2005 and 2010 (HDR, 2010: 145). South Africa falls into the medium human development category, with a ranking of 110 out of 169 countries (HDR, 2010: 149). United Nations (UN) documents emphasise that "human development" is measured by life expectancy, adult literacy, access to all three levels of education, as well as people's average income that is a necessary condition to their freedom of choice. In a broader sense, the notion of human development incorporates all aspects of individuals' well-being, from their health status and capabilities to their economic and political freedom (Munene, 2012). In this model, "human development" refers to the increase of capabilities and opportunities that will ensure successful revenue management for beneficiary communities; to improvement in the quality of life and life expectancy of community members in beneficiary communities; to improvement of human capabilities such as improved health, knowledge and skills, and the use people make of the acquired capabilities for leisure, productive purposes or being active in cultural, social and political affairs in beneficiary communities.

2.1.4 Independent variable: Change management

The Department of Energy (DoE) sets the rules for the disbursement of revenue by renewable energy companies (Eberhard & Naude, 2017). These companies lack the experience and skills to deal with the often complex beneficiary communities that must benefit from funds spent on Socio-Economic Development (SED) and Enterprise Development (ED) (Tait, Wlokas & Garside, 2013). Trying to meet the obligations of the DoE has brought about sudden changes (such as large amounts of revenue inflow) in the beneficiary communities that fall within the geographic radius of the SED and ED obligations of multiple renewable energy facilities. Unless these changes are managed correctly and systematically, it threatens to unbalance and have a negative long-term effect on the socio-economic growth of the beneficiary communities. In this model, "change management" refers to all the participants, methodologies and activities that will contribute to the success of revenue management for beneficiary communities in a transformational and sustainable manner. This will promote human development, socio-economic development, creativity, and innovation with a view to assisting in closing the poverty gap where it exists.

2.2 Intervening variable: Good governance

Corporate governance is a system of procedures and rules laid down by a company for its efficient and ethical functioning to achieve its mission, conforming to both public policy and law of government and the acceptable, ethical standards of society, resulting in equitable and just distribution/delivery of its benefits to all stakeholders and to society at large (Colley, Doyle, Logan & Stettinius, 2004). Good governance has also been covered extensively by the King Commissions Report of the past few years (The Institute of Directors in Southern Africa, 2016). The code views good governance essentially as being effective, ethical leadership (The Institute of Directors in Southern Africa, 2016: 20). The application of sound governance principles to managing revenue for beneficiary communities in the renewable energy sector in South Africa addresses issues of the mismanagement and misappropriation of funding in the short, medium and long term, as well as deterring incidences of fraud and corruption. In this model, "good governance" refers to the influence of good governance practices, the relationship with the identified variables, and the perceived success of revenue management for beneficiary communities in South Africa. This includes good governance infrastructure, processes, policies, systems, and procedures.

2.3 Dependent variable: Perceived success of revenue management for beneficiary communities

In this model, "the perceived success of revenue management for beneficiary communities" is defined as the degree to which the proposed revenue management model results in an increase in the quality and sustainability of benefits to beneficiary communities in the short, medium and long term, thus resulting in transformational socio-economic development that will reduce poverty and increase job creation and overall economic development of the country.

The primary objective of Sub-model – Transformational change was to guide stakeholders, enterprises and consultants in the renewable energy sector towards a pro-active, effective and relevant decision-making process, in order to achieve transformation success in revenue management for the beneficiary communities. Using proposed Sub-model – Transformational change as a guide and constructing a path diagram of the dependent variable and subsequent independent and intervening variables, appropriate hypotheses were developed. Table 1 shows the hypotheses considered to be tested for Sub-model – Transformational change.

Table 1: Hypothesis for Sub-model – Transformational change

<i>Hypothesis</i>	<i>Definition</i>
H ⁸	There is a positive relationship between education and the perceived success of revenue management for beneficiary communities of South African renewable energy companies.
H ⁹	There is a positive relationship between infrastructure development and the perceived success of revenue management for beneficiary communities of South African renewable energy companies.
H ¹⁰	There is a positive relationship between human development and the perceived success of revenue management for beneficiary communities of South African renewable energy companies.
H ¹¹	There is a positive relationship between change management and the perceived success of revenue management for beneficiary communities of South African renewable energy companies.
H ¹²	There is a positive relationship between education and good governance.
H ¹³	There is a positive relationship between infrastructure development and good governance.
H ¹⁴	There is a positive relationship between human development and good governance.
H ¹⁵	There is a positive relationship between change management and good governance.
H ¹⁶	There is a positive relationship between good governance structures and the perceived success of revenue management.

3. Research methodology

For this research study, a positivistic research paradigm was adopted within which to identify the organisational and social variables that will ensure transformational change of revenue management among beneficiary communities of South African renewable energy construction companies. The positivist paradigm asserts that real events can be observed empirically and explained with logical analysis (Aliyu, Bello, Kasim & Martin, 2014: 83). The positivistic paradigm is also known as the quantitative, objectivist, scientific, experimentalist or traditionalist research paradigm (Collis & Hussey, 2003). This paradigm allows for quantitative research design which allows for the use of structured questionnaire surveys, enabling researchers to generalise their findings from a sample of a population (Creswell, 1994). In the questionnaire, transformational change, items expected to measure the factors of education, infrastructure development, human development, and good governance were extracted and set as the variables that will ensure transformational change (Creswell, 2005). Exploratory factor analysis (EFA) was used

to assess these measured variables in terms of their validity and reliability. *It is a type of technique that analyses the unidimensionality (characteristics) of each of the defined transformational change items (original variables), in order to reduce it to a common score (smaller number of factors) by examining relationships among these quantitative factors* (Pallant, 2013: 192; Rossoni, Engelbert & Bellegard, 2016: 200). Several *factor analysis* methods are available, but Principal Axis Factoring (PAF) was used, because it analyses not only correlations, but also covariances, and the Eigenvalues could be extracted which explains whether the factors tested had or had not a noticeable effect on people's responses to the variables in the original test (analysed construct) (Rossoni *et al.*, 2016: 201; Pallant, 2013:192; Youngblut, 1993: 123). Structural Equation Modelling (SEM) was used to test the significance of the causal relationships hypothesized between the variables that influence good governance. SEM is a technique that uses path analysis to test factor analysis and hypotheses in the same analysis (Gefen, Straub & Boudreau, 2000: 5).

3.1 Sampling method and size

It is very difficult to ascertain the overall research population size, but the composition of the population that was targeted for this research study included practitioners from various renewable energy sectors, governmental institutions, non-governmental institutions, renewable energy researchers, community development specialists, and academics. Snowball sampling was used, because this method is appropriate when the members of a special population are difficult to locate (Babbie & Mouton, 2001). As the snowball sampling progressed, databases were received from interested parties within the renewable energy community and economic development sector, resulting ultimately in 219 participating respondents.

3.2 Data collection

A self-administered questionnaire was developed and distributed to 219 respondents using electronic email from 1 July to 30 September 2016. The questionnaires were collated online, using an Excel-based spreadsheet, and then downloaded by the researcher for analysis.

Topics on transformational change of revenue management used in the questionnaire were extracted from reviews of the literature, resulting in the formulation of a questionnaire divided into two sections. Section one on respondent's profile obtained personal information on age, gender, level of education, experience in

community development, and connection with the renewable energy sector. Section two sets 60 questions on factors influencing revenue management for beneficiary communities in the renewable energy sector in South Africa. The respondents were required to indicate their level of agreement with these statements. The data from these measurements forms the variables used in the exploratory factor analysis, which tested the validity and reliability of the factors. To reduce the respondent's bias, closed-ended questions were preferred for section two (Akintoye & Main, 2007: 601).

3.3 Data analysis and interpretation of findings

Prior to the implementation of SEM, IBM Statistical Product and Service Solutions 23 (SPSS 23) for Windows was used to determine the factor analysability of the measured constructs incorporated in the theoretical model (Pallant, 2013).

To rank which of the transformational change items were expected to measure the factors of education, infrastructure development, human development, and good governance, the measures were rated on a seven-point Likert scale. Likert-type or frequency scales use fixed choice response formats and are designed to measure attitudes or opinions (Simon & Goes, 2013: online). The following scale measurement was used regarding mean scores, where 1 = strongly disagree (≥ 1.00 and < 1.80); 2 = disagree (≥ 1.81 and ≤ 2.60); 3 = somewhat/slightly disagree (≥ 2.61 and ≤ 3.40); 4 = neither agree nor disagree (neutral) (≥ 2.61 and ≤ 3.40); 5 = somewhat/slightly agree (≥ 3.41 and ≤ 4.20); 6 = agree (≥ 2.61 and ≤ 3.40), and 7 = strongly agree (≥ 4.21 and ≤ 5.00).

For the analysis of the internal reliability of the factors in the questions on transformational change, Cronbach's *alpha* values were tested during the exploratory factor analysis (Kolbehdori & Sobhiyah, 2014: 347; Nunnally & Bernstein 1994; Wahab, Ayodele & Moody, 2010: 67). Tavakol and Dennick (2011: 54-55) and Yount (2006) suggested that the acceptable values of Cronbach's *alpha* would range from 0.70 to 0.95. In the current study, a Cronbach's *alpha* co-efficient of greater than 0.70 is used to indicate that a factor is reliable. Furthermore, the optimal inter-item correlations mean (factor loadings) should range from 0.2 to 0.4, in order for the factor to be reliable (Pallant, 2013: 134). However, in this study, a value of 0.3 and above was adopted.

To confirm whether the data from the measurements was sufficient for factor analysis (test the validity and factor analysability of the data), the Kaiser-Meyer-Olkin (KMO) test (Lorenzo-Seva, Timmerman

& Kiers, 2011: 343) and the Bartlett's sphericity (Hair, Black, Babin, Andersen & Taham, 2006: 110) tests were performed. In the KMO test, as the values of the test vary from 0 to 1, values above 0.7 are recommended as being desirable for applying EFA (Hair *et al.*, 2006). A statistically significant Bartlett test ($p < 0.05$) indicates that sufficient correlations exist between the variables to continue with the analysis (Hair *et al.*, 2006: 110; Pallant, 2013: 190). Eigenvalues are used to explain the variance captured by the factor. Eigenvalues greater than 1 are considered significant, whereas factors with Eigenvalues less than 1 are considered insignificant and are discarded (Hair *et al.*, 2010). In this study, in exceptional cases, factors with Eigenvalues lower than 1 were considered for retention provided that the factors (and items) could be interpreted.

In determining the number of factors to extract, Principal Axis Factoring (PAF) was used to find the underlying factors related to the 60 questionnaire items based on correlations and on covariances, where the first factor accounts for as much common variance as possible (Burton & Mazerolle, 2011: 28; Fabrigar, Wegener, MacCallum & Strahan, 1999: 277). In PAF, when the number of variables (items) is between 20 and 60, it is more reliable to use Eigenvalues to extract factors, as it makes interpretation simpler (Johnson & Wichern, 2007). To clarify and simplify the results of the factor analysis, Oblique Rotation (direct quartimin) was used to examine factor/item loadings and to reveal any correlation between these factors (Costello & Osborne, 2005: 3).

Structural Equation Modelling (SEM) was used to test the significance of the causal relationships hypothesized between the variables that influence good governance. The LISREL software application (v 8.8) was used to test the relationships among the factors that influence the perceived success of the management of revenue.

3.4 Limitations

The research was limited to the field of global and regional generation of electrical power by renewable energy.

4. Findings

The significant relationships identified in the study and the recommendations about how these determinants can be addressed are presented and discussed in Tables 1-5.

4.1 Empirical results of Sub-model – Transformational change

For Sub-model – Transformational change, labelled “Transformational change”, PAF with an Oblique Rotation (Oblimin with Kaiser Normalisation) was used as the extraction and rotation method. Bartlett’s Test of Sphericity returned a KMO value of 0.93 ($p < 0.00$), indicating that the data were suitable for factor analysis.

In Sub-model – Transformational change, items expected to measure the factors of education, infrastructure development, human development, and good governance were assessed for discriminant validity by means of an exploratory factor analysis. Initially, the number of factors to be extracted was not specified, but the Eigenvalues suggested a total of three factors to be used as the independent variables. The final solution was reached through an iterative process of deleting items that did not demonstrate sufficient discriminant validity, and re-running the exploratory factor analysis until all the remaining items loaded to a significant extent ($p > 0.4$), with no cross-loadings (*i.e.*, loaded on only one factor). All items with loadings < 0.4 were deleted. The independent variables were analysed first and the following results were obtained:

Table 1: Rotated factor loadings: Sub-model – Transformational change

Variable	Factor 1 <i>Developmental benefits</i>	Factor 2 <i>Human development</i>	Factor 3 <i>Good governance</i>
ED5	0.822*	-0.032	-0.009
ID5	0.813*	0.020	-0.212
ED3	0.768*	0.051	0.054
ID4	0.746*	0.025	0.106
ED4	0.709*	0.041	0.136
ID2	0.673*	0.024	0.184
ED2	0.602*	-0.038	0.194
ID3	0.551*	0.009	0.276
ID1	0.533*	0.011	0.233
ED1	0.462*	0.011	0.289
HD4	-0.097	0.895*	0.004
HD3	0.025	0.853*	-0.084
HD2	-0.041	0.744*	0.033
HD1	0.168	0.678*	-0.131

Variable	Factor 1 Developmental benefits	Factor 2 Human development	Factor 3 Good governance
HD5	-0.038	0.528*	0.143
GG3	0.162	-0.009	0.732*
GG1	-0.009	0.012	0.702*
GG4	0.205	0.05	0.658*

* = significant loadings ($p \geq 0.4$); ED = Education; HD = Human development; ID = Infrastructure development; GG = Good governance

Table 1 indicates that a total of 20 items, including three independent variables and one intervening variable, were grouped into three factors, which explained 65.24% of the variance in the data. The intervening variables were then analysed using the same procedure of factor analysis.

4.1.1 Factor 1: Dependent variable – developmental benefits

All five items expected to measure the construct of education and infrastructure development loaded together on the same factor. Consequently, based on the results of the factor analysis, this construct was redefined and renamed “developmental benefits”.

In this study, “developmental benefits” are operationally defined as the benefits that the beneficiary community can derive from formal and informal education, training in the form of learnerships, mentorships, further education and training, educational support, and resourcing. Benefits also include the development of physical systems such as buildings, transportation, communication, sewage, water, and electricity pertinent to the construction phase that will improve the socio-economic circumstances of the beneficiary communities.

Developmental benefits explained 45.01% of the variance in the data, with an Eigenvalue of 9.00, as reported in Table 1. All factor loadings exceeded 0.4 and were thus regarded as significant, providing sufficient evidence of discriminant validity of the construct. The Cronbach's *alpha* co-efficient of 0.93 for developmental benefits suggests that the instrument used to measure this construct was reliable.

4.1.2 Factor 2: Independent variable – human development

All five of the items that were expected to measure the construct of human development loaded together on one factor. Human development explained 14.60% of the variance in the data, with an Eigenvalue of 2.92, as reported in Table 1. All factor loadings exceeded 0.4 and were thus regarded as significant, providing sufficient evidence of discriminant validity of the construct. The Cronbach's *alpha* co-efficient of 0.856 for human development suggests that the instrument used to measure this construct was reliable.

The operationalization of human development, as described in Section 2, remained unchanged.

4.1.3 Factor 3: Intervening variable – good governance

All five of the items that were expected to measure the construct of good governance loaded together on one factor, as expected. Good governance explained 5.64% of the variance in the data, with an Eigenvalue of 1.13, as reported in Table 1. All factor loadings exceeded 0.4 and were thus regarded as significant, providing sufficient evidence of discriminant validity of the construct. The Cronbach's *alpha* co-efficient of 0.88 for good governance suggests that the instrument used to measure this construct was reliable.

The operationalization of good governance, as described in Section 2, remained unchanged.

4.2 Reformulation of the hypotheses and the revised theoretical model

Sub-model – Transformational change (Transformational change) was constructed using a separate path diagram depicting the causal relationships between the antecedent variable of developmental benefits and human development and the intervening variable of good governance and the dependent variable of perceived success of revenue management (Figure 2).

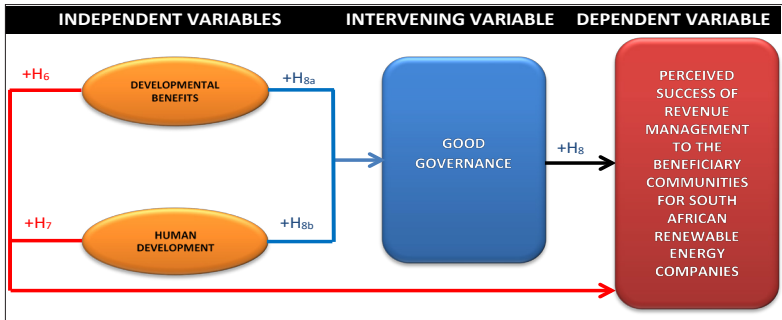


Figure 2: Path diagram of causal relationships: Revised theoretical model (Sub-model – Transformational change)

Two variables, namely education and infrastructure development, loaded together to form a factor labelled “developmental benefits” (DEVB). The independent variable of change management was removed from the proposed theoretical model because its discriminant validity could not be confirmed by the exploratory factor analysis.

After the reliability and discriminant validity of all the variables remaining in the empirical model had been confirmed, the statistical technique of SEM was used to test the series of relationships of the revised model in Figure 2.

Table 2: Reformulated hypotheses for Sub-model – Transformational change

Reformulated hypotheses	
Sub-model - Transformational change – Transformational change	
H ⁶	There is a positive relationship between developmental benefits and the perceived success of revenue management.
H ⁷	There is a positive relationship between human development and the perceived success of revenue management.
H ⁸	There is a positive relationship between good governance and the perceived success of revenue management.
H ^{8a}	There is a positive relationship between developmental benefits and good governance.
H ^{8b}	There is a positive relationship between human development and good governance.

4.3 Assessment of fit

Before the SEM analysis was carried out, an assessment of the multivariate normality of the data was conducted. The following hypotheses were formulated for this purpose:

H_0 : The data are normally distributed.

H_a : The data are not normally distributed.

The null hypothesis and the alternative hypothesis, as formulated above, were evaluated by assessing the skewness and the kurtosis of the data, while the *Chi*-square (χ^2) value was used to determine the relevant *p*-value. The results of the test of multivariate normality of the relationship between the independent and intervening variables are presented as follows.

4.3.1 The measurement and structural models for Sub-model – Transformational change (intervening variable of good governance)

Table 3 shows the fit indices for Sub-model – Transformational change, which assess the relationship between the independent variables of developmental benefits and human development and good governance.

Table 3: Fit indices for the measurement and structural models for Sub-model – Transformational change – intervening variable

<i>Fit indices for the measurement and structural models for Sub-model – Transformational change Relationship between the independent and intervening variables (good governance)</i>		
<i>Item</i>	<i>Measurement model</i>	<i>Structural model</i>
Sample size	219	219
Degrees of freedom	269	271
Satorra-Bentler scaled Chi-square	466.463 (<i>p</i> = 0.00)	471.228 (<i>p</i> = 0.00)
SBχ^2 / Degrees of freedom	1.73	1.74
Root Mean Square Error of Approximation (RMSEA)	0.0580	0.0582
90% confidence interval for RMSEA	(0.0491; 0.0668)	(0.0493; 0.0669)
Expected Cross-validation Index (ECVI)	2.654	2.657

4.3.1.i Measurement model

The goodness-of-fit indices for the measurement model illustrated in Figure 3 are reported in Table 3. The Satorra-Bentler χ^2 divided by the degrees of freedom is 1.73, which is lower than the acceptable value of 2 and indicates a good fit. The RMSEA (0.0580) is less than 0.06 and indicates a close fit (Hu & Bentler, 1999, while the 90% confidence interval for RMSEA (0.0668) is less than 0.08 and is considered to be in the upper limit of the confidence level (MacCullum, Browne & Sugawara, 1996). These fit indices all provide evidence of a model with a reasonable fit. Consequently, the null hypothesis, that the data fit the model perfectly, must be rejected. However, although the data do not fit the model perfectly, the data can be described as having a close fit.

4.3.1.ii Structural model

The Satorra-Bentler χ^2 to degrees of freedom ratio is 1.74, which is lower than 2. Values lower than 2 indicate a good fit (Politis, 2003). The RMSEA (0.0582) is less than 0.06 and indicates a very close fit (Hu & Bentler, 1991), while the upper limit of the 90% confidence interval for RMSEA (0.0669) is less than 0.08 (Roberts, Stephen & Ilardi, 2003). These fit indices all provide evidence of a model with a good fit. Consequently, the null hypothesis, that the data fit the model perfectly, must be rejected. However, although the data do not fit the model perfectly, the data can be described as having a good fit.

4.3.2 The measurement and structural models for Sub-model – Transformational change (dependent variable of perceived success of revenue management)

Table 4 shows the fit indices for Sub-model – Transformational change, which assess the relationship between the independent variables of developmental benefits and human development, and dependent variable of perceived success of revenue management.

Table 4: Fit indices for the measurement and structural models for Sub-model – Transformational change – dependent variable

<i>Fit indices for the measurement and structural models for Sub-model – Transformational change</i> <i>Relationship between the independent and dependent variables (perceived success)</i>		
<i>Item</i>	<i>Measurement model</i>	<i>Structural model</i>
Sample size	219	219
Degrees of freedom	167	167
Satorra-Bentler scaled Chi-square χ^2	279.470 ($p = 0.00$)	279.470 ($p = 0.00$)
SBχ^2 / Degrees of freedom	1.67	1.67
Root Mean Square Error of Approximation (RMSEA)	0.0556	0.0556
90% confidence interval for (RMSEA)	(0.0439; 0.0668)	(0.0439; 0.0668)
Expected Cross-Validation Index (ECVI)	1.676	1.676

4.3.2.i Measurement model

The ratio χ^2 to degrees of freedom is 1.67, which is significantly lower than 2. A value of lower than 2 is an indication of a good fit. The RMSEA (0.0556) is within the reasonable fit range of 0.05-0.08, while the upper limit of the 90% confidence interval for RMSEA (0.0668) is less than 0.08. These indices all provide evidence of a model with a reasonable fit. Consequently, the null hypothesis, that the data fit the model perfectly, must be rejected. However, although the data do not fit the model perfectly, the data can be described as having a reasonable or acceptable fit.

4.3.2.ii Structural model

The Satorra-Bentler χ^2 divided by the degrees of freedom is 1.67, which is lower than 2 and indicates a good fit (Politis, 2003). The RMSEA (0.0556) is less than 0.06 and indicates a good fit (Hu & Bentler, 1991), while the upper limit of the 90% confidence interval for RMSEA (0.0668) is less than 0.08, which is in the upper limit of the confidence level and indicates a good fit (Roberts *et al.*, 2003). These fit indices all provide evidence of a model with a good fit. Consequently, the null hypothesis, that the data fit the model perfectly, must be rejected. However, although the data does not fit the model perfectly, the data can be described as having a good fit.

4.4 Structural and measurement model

Figure 3 illustrates the structural estimation for Sub-model – Transformational change.

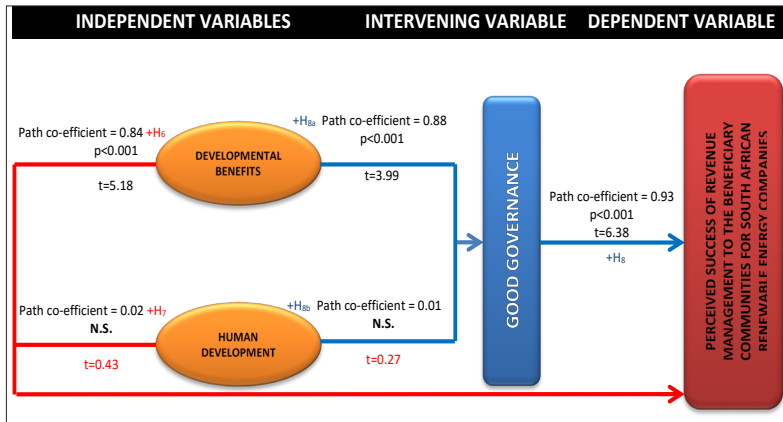


Figure 3: Structural estimation for Sub-model – Transformational change (including t-values) where N.S. = non-significant

4.5 Empirical results: hypotheses testing

In the ensuing sections, the various steps of SEM are applied to Sub-model – Transformational change (Figure 3) to evaluate whether the various hypotheses associated with this sub-model should be accepted or rejected.

4.5.1 Developmental benefits and the perceived success of revenue management

H_6 : There is a positive relationship between developmental benefits and the perceived success of revenue management.

Since various academics and practitioners suggested that the use of developmental benefits would improve the perceived success of revenue management, Hypothesis 6 was assessed. Figure 3 shows that developmental benefits are positively related to the perceived success of revenue management for beneficiary communities (point estimate = 0.84, $p < 0.001$, $t = 5.18$), with 0.01% level of significance. Hypothesis 6 was thus accepted. Hypothesis 6 confirms that, when renewable energy companies incorporate developmental benefit projects such as education and infrastructure development into the socio-economic development approach, they will have a

positive impact on the revenue management for the company's beneficiaries. This empirical result concurs with previous research recorded in literature by Halina, Wilson & Zarsky (2007), Dutton (2004), and Nyahuye (2012).

4.5.2 Human development and the perceived success of revenue management

H⁷: There is a positive relationship between human development and the perceived success of revenue management.

The empirical results of this study revealed that human development does not have a significant influence on the perceived success of revenue management for beneficiary communities of South African renewable energy companies (point estimate = -0.02, $p > 0.00$, $t = 0.43$). Therefore, Hypothesis 7 was rejected.

4.5.3 Good governance and perceived success of revenue management

H⁸: There is a positive relationship between good governance and the perceived success of revenue management.

Various sources, both academically and practically oriented, have suggested that the use of good governance practices can improve the perceived success of the revenue management of renewable energy companies. It was against this background that Hypothesis 8 was assessed. The results recorded in Figure 3 confirm that the use of good governance practices is positively related to the perceived success of revenue management for beneficiary communities (point estimate = 0.93, $p < 0.001$, $t = 6.38$), with a 0.1% level of significance. Hypothesis 8 was thus accepted. Hypothesis 8 proposes that, when good governance measures are implemented, this will result in an improvement in the integrity of revenue management for beneficiary communities. This empirical result is supported by previous research recorded in literature by Jonker & De Witte (2006); Walker & Mokoena (2011); Engelbrecht (2009); Erasmus (2014); Johnston (2009); Boyce, Griffith & King (2007), and Rossouw (2012).

4.5.4 Developmental benefits and good governance

H^{8a}: There is a positive relationship between developmental benefits and good governance.

Various sources, both academically and practically oriented, have suggested that developmental benefits can improve the perceived success of the revenue management of renewable energy companies. Hypothesis 8a was assessed against this background.

Figure 3 shows that developmental benefits are positively related to the intervening variable of good governance (point estimate = 0.88, $p < 0.001$, $t = 3.99$), with 0.1% level of significance. Hypothesis 8a was thus accepted. This hypothesis suggests that, when renewable energy companies consider the implementation of developmentally beneficial projects (education and infrastructure development), this will improve the company's approach of good governance towards beneficiary revenue management. This empirical result confirms previous research recorded in literature by Agenor (2013); Dorel, Rasa & Olga (2015); Boateng (2012); Fourie (2006), and the Economic Commission for Africa (2013).

4.5.5 Human development and good governance

H^{8b}: There is a positive relationship between human development and good governance.

The empirical results of this study revealed that human development does not have a significant influence on good governance (point estimate = -0.01, $p > 0.00$, $t = -0.27$), which is contrary to what was proposed in hypothesis 8b. Therefore, Hypothesis 8b was rejected.

Table 5: Summary of all the Sub-model – Transformational change hypotheses

<i>Summary of all the Sub-model – Transformational change hypotheses</i>		
H⁶	There is a positive relationship between developmental benefits and the perceived success of revenue management.	Supported
H⁷	There is a positive relationship between human development and the perceived success of revenue management.	Not supported
H⁸	There is a positive relationship between good governance and the perceived success of revenue management.	Supported
H^{8a}	There is a positive relationship between developmental benefits and good governance.	Supported
H^{8b}	There is a positive relationship between human development and good governance.	Not supported

5. Conclusion

The independent variables associated with this sub-model include developmental benefits and human development, and the intervening variable was good governance, which alludes to a transformational approach to revenue management for beneficiary

communities. Therefore, every kind of participation referred to in sub-model A (multi-sector participation) must complement Sub-model – Transformational change and have a deliberate component of knowledge (education) and skills transfer so that beneficiary communities can take ownership of, and be responsible for growth and development.

There must be greater participation on the part of government and the IPPs during the implementation of community projects to ensure that outcomes for the beneficiary communities are transformational in nature. The role of the intervening variable, good governance, must also form an integral part of project management to ensure that transformational change benefits the beneficiary community at all times and in every possible way. Project management, especially during the construction phase, must include activities such as:

- Addressing human development needs as a priority.
- Prior to construction of the renewable energy facility, gain baseline knowledge and insight regarding the educational and infrastructural needs of the beneficiary communities (including engagement with the community at grassroots level).
- Scenario forecasting.
- Appointing internal and external service providers.
- Forming possible PPPs or collaborating with other IPPs.
- Managing finances and financial transactions.
- Monitoring, evaluating and reporting all activities.
- Include policies and procedures in all project management processes.

It is now known from the most recent literature available (DoE, 2015) that the quantum of the socio-economic development, enterprise development and community trust to be spent over the next 20 to 25 years in South Africa in the renewable energy sector as part of the REIPPP Program is over R50 billion. The renewable energy sector has the opportunity to use these funds to make a transformational change in the beneficiary communities and, ultimately, in the overall economy of South Africa.

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