



Identifying Factors to Measure Managerial and Leadership Competence of Business School Educated Managers

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ABSTRACT

The article explores a model to measure managerial and leadership competence of business school educated managers by seeking to identify the latent variables in the model. Here the research uses exploratory factor analysis (EFA) to identify latent variables. The article also renders a verdict on the validity of the model as a higher objective of model development. In total 385 questionnaires using a five-point Likert scale were independently administered to business school educated managers; 94% responded. EFA identified five factors explaining a cumulative variance of 56.5%. These are Leadership skills, Managerial challenges, Emotional intelligence, Personal value system, and Cultural sensitivity. Measuring criteria with low factor loadings or those with high dual-loadings were eliminated in the purification of the measuring criteria. The data have a high reliability coefficient of 0.947 while the constructs also adhered to the validity requirements. The research is of value to managers who aim to improve their managerial and leadership skills after studying advanced management programmes at business schools, employees of such educated managers and also to academia aiming to explore this avenue of managerial and leadership skills development further.

Keywords: Management, Leadership, Competencies, Validity, Measurement, Model, Factors

JEL Classifications: A23, I23, M19

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1. INTRODUCTION

The fourth industrial revolution poses a great challenge to managers and leaders to be competent and effective in this new economy where the fast-changing business environment is dominated by major volatility and disruptions (Schwab, 2016). Consequently, organisations have to be highly adaptive to remain competitive. Smit et al. (2016) capture it succinctly when they state that these disruptions bring with it not only huge benefits but also the complexities of managing organisations that have to deal with diversity and constant change. This transformation is affected by both external and internal factors which relate to management and leadership (Chirimbu, 2011). Constant strategic refocusing and planning require a successful change in the organisation and requires the active participation of competent managers or leaders (Anderson, 2017).

Within this context, the questions of competent management or leadership are now, more than ever, important areas of focus for the survival and growth of any organisation. Managers are also expected to lead using global and even virtual teams in the workplace (Maitland and Anderson-Terry, 2017), and have to adapt to cross-cultural differences and attempt to cope with important differences in interpersonal communication styles, preferred approaches to organizational control and authority relations, and work-related knowledge and problem-solving approaches (Cramton and Hinds, 2014; Fong et al., 2016, Cornellissen, 2017). In the midst of these complex dynamics, vexing management and leadership questions remain, for example, what are the implications of these technological changes for managers or leaders of companies? What are the characteristics of the manager who has to navigate the organisation through the era of mass disruptions? Is the current managerial or leadership

style still appropriate if organisations are changing relentlessly and also profoundly? Here Eulitz (2016) provides candid advice by pointing out that, primarily, a change of thinking is required. Traditional thinking such as the linear organisation structure and current leadership styles are adapted to address new challenges and could even become obsolete. This poses more challenges to managers and leaders, and it is clear that special attention needs to be given to the skills and competencies of managers and leaders to equip them to embrace the disruptive changes of the Fourth Industrial Revolution. This will enable them also to lead, manage and encourage their employees to do the same (Staffen and Schoenwald, 2016).

2. PROBLEM STATEMENT

Reflecting the changes in the current global business environment, new skills and competencies are needed by the future manager or leader. Here Petrie (2014) notes that while the nature of the challenges that managers or leaders face is rapidly changing, the methods that are being used to develop the challenges, however, provides stability because they remain the same. Modern thinking methodology is required to face these challenges (Eulitz, 2016), and new thinking paradigms are eminent to successfully negotiate the challenges posed by the new economy. Here, Smith (2014) reports that the majority of top managers he surveyed, indicated that their organisations are not equipped to cope with this complexity. As a result, organisations are forced to construct changes to survive in the fast-changing global economy with management and leadership that are not equipped to be the change agents. They require more (and new) managerial and leadership competencies to successfully guide the organisation successfully in the disruptive and changing business environment. Also, although these managers and leaders do possess skills and competencies, the application thereof in the new global economy changes. A typical example here is that although a manager might have excellent team-working skills, he or she is now forced to manage such a team as a culturally diverse and virtual team; this requires new team management competencies. However, the problem facing managers, leaders and organisations pertains to what skills and competencies are required to negotiate the new global economy best, and if identified, can these skills be measured among the managers and leaders? This question underpins the primary problem addressed in this article.

3. RESEARCH OBJECTIVES

The primary objective of this article is to develop a model to measure the managerial competence of business school educated managers.

The primary objective is achieved by the following secondary objectives:

- Identify the important measuring criteria postulated in the theoretical model;
- Identify the latent variables to measure competence;
- Ensure reliability of the latent variables identified;

- Empirically validate the model to measure management and leadership competencies; and to
- Present an empirical model to measure management and leadership competencies.

4. LITERATURE REVIEW

The literature review consists of three key elements. Firstly, the use of alumni or university students as the target population for a meaningful research endeavour. Secondly, the appropriate statistics employed to simplify and validate the model, and then thirdly, to confirm the relevance of the latent variables from the literature.

4.1. Measuring Managerial and Leadership Skills among Alumni or Business School Populations

Students or alumni of universities have long been a favourite target population for researchers. There are many reasons for that, but primarily these respondents are selected because they (Fullerton and Bisschoff, 2013):

- Have specific knowledge of an institution; hence are able to provide accurate feedback on the topic that the institution would like feedback on;
- Easy to target and collect information from;
- Provides a homogenous group which suits the study design well.

The literature shows that various studies dating back to 1985 support the use of student and/or alumni populations. In summary, the more relevant studies are:

- Exploring differences between business and non-business students on 30 ethical issues; business students showed more concern on three of the five statistically significant differences (McNichols and Zimmerer, 1985).
- A similar analysis in 1993 among the same student groups using 19 ethical scenarios found only two significant differences; business students were more accepting than the non-business students, of marketing and anti-union activities (Fullerton, 1993).
- In the business ethics studies, Rapule (2009) compared 2009 final year executive Master of Business Administration (MBA) students to their 2007 alumni counterparts, and Craven (2010) compared the executive MBA students to local and international managers at an international agricultural company.
- Brand loyalty and the management thereof successfully used an array of final year business school educated managers to determine brand loyalty in fast-moving consumer goods in 2010 (Bisschoff and Moolla, 2014).
- Naidoo (2011) also used the business school student population successfully in her study to measure employee stress amongst managers.
- In research by Imandin (2015) the study compiled an employee engagement model based on the data collected from the executive MBA students; and
- In a more recent study in South Africa, business school executive MBA students were compared longitudinally by Bisschoff (2017) who documented the acceptability of managerial ethical scenarios.

Although these, and a myriad of other studies, proved that valuable, reliable and valid data could be collected from student populations, the question remains as to why specifically executive MBA students are such a popular choice in empirical research. Here Moolla (2010) offers a plausible explanation by stating that:

- The students are in full-time employment and study part-time. This posed a rationale that, as employed consumers, they would have had high exposure to a wide range of brands that suited his brand loyalty study.
- Additionally, their strong educational background and higher income make them better-informed consumers.
- Most executive MBA students consist mainly of middle and top managers with a minimum of 3 years' work experience.
- This managerial exposure of executive MBA students represents a community that is more likely to analyse their own management and leadership behaviour; this a rich source of business education experience to tap into.
- This target population sets a minimum educational level for entry into the research which is positively connected to understanding research and content validity.
- This means that they can understand the terminology and nomenclature specified in the questionnaire.
- The population represents a segment that is more informed about contemporary business and management practices.

In summary, although the basis of comparison between the studies differs, these studies have all shown that student, alumni and student-alumni combination populations can be successfully employed and targeted. This is even more so in the case with part-time students such as executive MBA students. Based on his research, Peterson (2001) argues that student groups and even students versus non-students' groups can be compared for research purposes. McNichols and Zimmerer (1985), Rapule (2009), Craven (2010), Moolla (2010), Naidoo (2011), Imandin (2015), Bisschoff (2017) all indicated that business-orientated studies are possible and that these studies yield good results. Perhaps the work by Thekiso (2011) and Shaikh (2013) on measuring skills and competencies in management and leadership provides the best proof of the successful use of executive (or part-time) MBA students as valuable sources of information for research purposes.

Based on the above discussion, it is evident that the use of student or alumni samples is appropriate under certain circumstances. This then means that the executive MBA populations are justified as target populations for this study.

4.2. Statistics Employed

This study employs three sets of statistical techniques.

- Firstly, the data is scrutinised to ensure that it can be used for further analyses. This is done by determining if the data collected by the sample is adequate to do so (thus enough data points have been collected); if the data is reliable and if the data symmetry compound is suitable. Here the Kaiser-Meyer-Olkin (KMO), Cronbach's alpha coefficient and Bartlett's sphericity test statistics are used, respectively.
- Secondly, the data is subjected to exploratory factor analysis (EFA) to weed out non-contributory measuring criteria. That is criteria that dual-loads onto more than one factor or criteria

have loadings below the cut-off factor loading set in this study; that is 0.40.

- Then the identifying and labelling of the latent variables of measuring managerial and leadership competence.
- Finally, to validate the results using some validity measures.

These techniques and their decision criteria are discussed next.

4.3. KMO Measure of Sample Adequacy

The KMO measures if the sample is adequate; this means that there has been sufficient data points used to provide an adequate sample. According to Mediaspace (2007) (in Imandin et al., 2016), "the results displayed are an index to compare the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients." Here Naidoo (2011, p. 19) indicates that the KMO measure of sampling adequacy is interpreted according to its returned value between 0 and 1. Preferably the KMO value should be bigger or equal to 0.7 to be satisfactory, although KMO values between 0.60 and 0.70 are deemed acceptable for further analysis. A KMO value below 0.50 is not an acceptable value. In this study where exploratory factors analysis is pursued, various researchers warned that it would be inappropriate to continue should the KMO be <0.50 (Imandin et al., 2016; Du Plessis, 2009, p. 26; Du Plessis, 2010 and Field (2009, p. 645). It is, therefore, important in this study to exercise care and consider the KMO before continuing towards factor analysis.

4.4. Bartlett's Test of Sphericity

Sphericity is a general condition of compound symmetry. However, more understandably, the term sphericity is seminally explained by the example that the sphericity of "the distribution of balls inside a ball bearing determines the quality of the bearing, such as the load it can bear or the speed at which it can turn without failing" (Wadell and Hakon, 1935). Likewise, the sphericity of the data determines how well the data can provide the answers the researcher needs. In multivariate statistical analysis, like EFA, Bartlett's test of sphericity is used as an indicator of the suitability of the data to continue towards this type of analysis (UCLA, 2017a). Bartlett's tests should return a p-value of 0.05 or less to allow the researcher to proceed towards a factor analysis. Bartlett's test is, like the KMO, a test statistic used as a gatekeeper for further analysis.

4.5. Reliability

The most popular reliability statistic used is Cronbach's coefficient alpha (Fink, 1995). Published by the mathematician Cronbach in 1951, the coefficient determines the internal consistency (or mean correlation of items in the questionnaire) which renders a verdict on the reliability (Wuensch, 2009, p. 9). However, an Alpha coefficient is an important indicator that deals with "consistency" or "repeatability" of analysis (UCLA, 2017b). Here Field (2009, p. 677-681) states that when a questionnaire produces similar scores every time it is used under the same conditions, it shows the ability to collect data with a high reliability coefficient. Reliability coefficients are regarded to be satisfactory if they are equal or higher than 0.70 (Field, 2009, p. 666), although Cortina (1993, p. 102) has proved in his research that coefficients of 0.57 and higher are

also acceptable. Based on the successful application of Cortina's research by Naidoo (2011), Muthambara (2013), Bisschoff et al. (2017) and others, the lower limit for a reliability coefficient is thus set at 0.57 while the desired reliability coefficients are 0.70 and above.

4.6. EFA

Costello and Osborne (2005, p. 5) state that factor analysis is used for the identification of groups and to cluster variables. These groups are factors (or latent variables) embedded in the data (UCLA, 2017a). Here Imandin et al. (2016) point out that EFA is used mainly for:

- Understanding the structure of a set of variables
- To identify an underlying or latent variable group; and to
- Reduce a dataset to a more manageable size while retaining as much of the original meaning thereof as possible.

Factor analysis also allows for specialised application settings. One such important setting is the selection of the method of rotation. In desired repeatable studies, the rotational principle leans towards an orthogonal rotation where the angle between the axes is kept constant. If there is no desire to compare the results in the future to similar studies, an oblique rotation may be used as it could explain a higher variance if the angle between the axes is not fixed. This could yield a better variance explained (Bisschoff, 2017). However, Field (2009, p. 796) suggests that in exploratory research settings (such as this study) a varimax rotation may be more desirable as it tends to maximise the dispersion of factor loadings within the factors and also the variance explained by the data (Field, 2009, p. 796). This study, therefore, used an orthogonal varimax rotation. Additionally, the analysis also employed, as suggested by Costello and Osborne (2005, p. 3), the maximum likelihood factor extraction method was used because the data was normally distributed. This supports the explanation of a high cumulative variance. In setting the cut-off factor loadings, the objective of developing a model weighed heavily; here, based on the success of similar research, only criteria with factor loadings of 0.40 and higher were retained (Bisschoff and Moolla, 2014; Fields and Bisschoff, 2013a). Regarding the cumulative variance explained, this study aims for 60% to indicate a good fit to the data (Schunn and Wallach, 2012; Field, 2009, p. 672) although 50% is also deemed satisfactory in an exploratory research setting (Costello and Osborne, 2005, p. 7). The number of factors to extract was based on the eigenvalues to be equal or higher than one.

4.7. Validity

Imandin et al. (2016) define validity as "the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure". In agreement, researchers at the California State University (Los Angeles) states that "while reliability is concerned with the accuracy of the actual measuring instrument or procedure, validity is concerned with the study's success at measuring what the researchers set out to measure" (CSU, 2014). In practice, this means that the "degree of validity" determines how truly the study measures what it intended to measure, and thus reports on the truthfulness of the research results (Golafshani, 2003, p. 601).

Table 1 shows the types of validity applicable to this study and provides the requirements to achieve each one. Table 1 was adopted and then adapted from a similar study by Imandin et al. (2016).

5. RESEARCH METHODOLOGY

5.1. Design and Questionnaire Structure

A literature study identified the 11 management and leadership competencies while in-depth theoretical research guided the way towards formulating the 42 specific measuring criteria that were included in the questionnaire. The skills, item code, criteria and origins on which the questionnaire was based, appear in Table 2. The self-generated criteria that appear in the table are based on either multiple authors' (sometimes vague) views on a specific concept or have been formulated based on a similar (but not directly attributable) line of thought some author(s) had.

The questionnaire contained two sections: Section A: Demographics and Section B: Measuring criteria. Section A consists of eight questions to compile the demographic profile of the respondents. Section B consists of the 11 management and leadership skills, each with its measuring criteria, in statement format to which the respondents had to indicate their level of agreement or disagreement on a five-point Likert scale. In total, Section B consisted of 42 measuring criteria (Table 2).

5.2. Data Collection

The population was all executive MBA students at two private business schools. These schools have a wide geographic service area which covers the whole of South Africa. Annually these students attend study schools in the major centres, Durban and Johannesburg. During such a study school in June 2017, the data was collected. The attendees were requested to complete the questionnaires in a classroom context. It was clearly indicated that participation is voluntary and also anonymous. Trained research assistants, of which most were lecturers well acquainted with academic research, distributed, assisted and collected the questionnaires. A total of 385 questionnaires were distributed and 362 completed, and usable questionnaires were collected. Some 21 were incomplete and could not be used while two questionnaires were not returned. This resulted in an effective 94.0% response rate. The data was captured by the statistical consultation services of the North-West University and analysed with the IBM social package for social sciences version 24 (SPSS, 2017).

5.3. Ethical Clearance

The study was classified as an ethically low-risk category study and ethically cleared by the Ethics Committee of the Faculty of Economic and Management Sciences at the North-West University. The low-risk category requires only approval, and no formal ethics number was issued.

6. RESULTS

6.1. Reduction of the Measuring Criteria

Studies by Fields and Bisschoff (2013a; 2013b) and Bisschoff and Moolla (2014) successfully simplified and purified their measuring

Table 1: Measures to validate a factor model

Validity measure	Evidence required for validity claims
External validity	
Population validity	1.KMO measure of sampling adequacy exceeds 0.70 (Shadish et al., 2002; Field, 2009, p. 658) 2.Significant factor loadings realised (>0.40) (Farrel, 2007, p. 4)
Ecological validity	1.Expert opinion and consultation on methods and appropriateness (Shuttleworth, 2013) 2.Pre-testing of questionnaire (CSU, 2014; Gaskin, 2014, p. 3)
Internal validity	1.Rigour of study: Supervised and stepwise checked by experts 2.Alternative explanations assessed via consultation with topic specialists and focus group discussion with selected researchers
Criterion validity	
Content validity	Testing against benchmark tests performed only in literature sources (CSU, 2014; College Board, 2012)
Predictive validity	
Content validity	Alignment of criteria to subject area achieved by in-depth theoretical study on previous measurement models in a similar field (Huitt, 1998; Shuttleworth, 2013)
Construct validity	
Convergent validity	1.High factor loadings (>0.40) per factor (Gaskin, 2014, p. 5; Farrell and Rudd, 2009, p. 4) 2.Satisfactory variance explained (>50%); desired (>60%) (Costello and Osborne, 2005, p. 7; Field, 2009, p. 637) 3.High average reliability ($\alpha=0.7$) (Gaskin, 2014, p. 7; Knowledgebase, 2014)
Discriminant validity	1.Elimination all dual-loading criteria (Farrell and Rudd, 2009, p. 5; Gaskin, 2014, p. 4) 2.Inter-correlations of factors below 0.70 (Mathbits, 2014; Knowledgebase, 2014)
Face value validity	The factors identified by the analysis make good sense and are partially confirmatory of the theory. No unexpected factors surfaced. The results make good sense (Gaskin, 2014, p. 4)

*The sources in the table as used by Imandin et al. (2016) have been retained. Source: Imandin et al. (2016). KMO: Kaiser-Meyer-Olkin

instruments using EFA. The EFA employed a Varimax rotation because of its ability to maximise variance explained (Field, 2007, p. 642). As indicated the following statistical decision criteria, as applied by Bisschoff and Moolla (2014, p. 1116), were implemented:

- Factor loadings of 0.40 and higher (Fields and Bisschoff, 2014, p. 48-49);
- A cumulative variance that exceeds 50% (Schunn and Wallach, 2012; Costello and Osborne, 2005, p. 7); preferably 60% (Field, 2009, p. 662);
- A KMO measure of sampling adequacy higher than 0.70 (Field, 2007, p. 660);
- Bartlett's test of sphericity needs to be lower than 0.05 (Field, 2009, p. 660 and 648); and
- Reliability, as measured by Cronbach's alpha, to exceed 0.70 (ideally) (Field, 2009, p. 675); also sets a secondary lower limit of 0.57 (Cortina, 1993, p. 102).

The data required four rounds to purify to eliminate all non-loading criteria (<0.40) and dual-loading criteria (criteria that load high on more than one factor). This purification helps to improve the validity of the analysis (Gaskin, 2014) and to simplify the results into an operational model that can be used to measure managerial and leadership competencies in practice. The results of the four successive rounds of the EFA appear in Table 3. The table shows which criteria were eliminated after each round of analysis and also how that elimination affected the statistical indicators (see the criteria in Appendix A as per item codes).

Table 3 shows that the cumulative variance explained decreased from 62.3% to 56.5% as the 42 criteria decreased to 25 when the low-loading and dual-loading criteria were omitted. Additionally, the number of factors also reduced to five clear factors. This significantly simplified the model by eliminating 17 non-contributory criteria and five factors which explained low variance

for the loss of only 5.8% of the total variance. The other statistical measures remained excellent with marginal differences in the sample adequacy (KMO), sphericity (Bartlett tests) and reliability (alpha coefficients) that all remained very favourable with both the alpha coefficient and the KMO exceeding 0.90 in all four cases, while Bartlett's test of sphericity also remained below the required 0.05 level. The real value of purification, however, resides with the reduction of the number of factors (from ten to five) and thereby creating a much more measurable and manageable model of leadership and managerial competence. The loss of 5.8% of the total variance explained is but a small price to pay for the additional validity gained by the reduction in the number of factors and measuring criteria (Hill and Hughes, 2007, p. 8).

6.2. Factor Analysis

The results of the final round (and simplified factor model) are shown in Table 4 where the sample adequacy by KMO and sphericity of Bartlett's test are shown, respectively.

Table 5 shows the five factors that were extracted after the varimax rotation. These factors explain a cumulative variance of 56.5%. The rotated factor loadings are shown in Table 5.

In Table 5 the factor loadings of the criteria and the variance explained by the factors appear. The variance explained shows that factor 1 is the most important factor explaining 18.2% of the variance, followed by factor 2 which explains 11.4%, down to the least important Factor 5 which explains 7.5% thereof. Cumulatively the factors explain 56.5% which is higher than the initially required 50%, but slightly lower than the desired good fit at 60% of the variance explained.

Regarding the reliability of the factors, all of them except Factor 4 have excellent reliability coefficients more than the required 0.70. Inexplicably, factor 4 has a Cronbach alpha coefficient

Table 2: Additional constructs supported by the literature

Global leadership competence	Measuring criteria	Origin
Leading change	<p>1.As a leader, I need to be prepared to help my organisation to keep pace with change</p> <p>2.I believe that there is a relatively high level of failure in strategic change efforts in organisation</p> <p>3.As a leader, I need to drive the topic of change, be a change agent myself and promote diversity</p> <p>4.MBA programmes must include a course on managing strategic change in the core curriculum</p> <p>5.I believe that most managers do not embrace the reality of regular change in their organisations</p>	Hoffman (2016); Truxillo et al. (2016); Eulitz (2016); Sinh (2016); Anderson (2017)
Cultural intelligence	<p>6.I believe that cultural intelligence is a critical success factor of the leadership process and organisational transformation</p> <p>7.Leaders with cultural understanding and sensitivity are better placed to leverage culture and use it to help accomplish organisational goals</p> <p>8.Increased advances in ICT, the degree of cultural diversity is bound to increase pressure on organisational leaders</p>	Sulaiman and Mohezar (2006); Walker et al. (2003); Hitt et al. (2005); Hitt et al. (2012); Fong et al. (2016); Alon et al. (2016)
Team building	<p>9.Team performance is a major determinant of the overall organisational performance</p> <p>10.Business leaders of the 21st century is going to spend a greater portion of their time working in teams</p> <p>11.I believe that leaders who are collaborative are most successful in their leadership efforts</p> <p>12.Collaborative leaders generate goodwill in the team, which in turn enhances team performance</p>	MacMillan (2001); Campbell (2006); Hatting (2016); Reese (2016); Maitland and Anderson-Terry (2017)
Strategic leadership	<p>13.Strategic leadership focuses less on day-to-day events and more on underlying trends and patterns</p> <p>14.Strategic leadership has the potential to create a competitive advantage for an organisation which is hard for competitors to imitate</p> <p>15.Strategic leaders envision the future and inspire others to work towards creating a viable future for the organisation</p> <p>16.Strategic leadership is directly connected to organisational renewal and strategic innovation</p>	Day (2000); Oritz (2004); Hitt et al. (2012); Anderson (2017); Hatting (2016)
Conflict management	<p>17.I must manage the gaps and tensions that emerge due to the diversity of my team members</p> <p>18.A leader's conflict management ability is key to the current business environment of diversity, complexity and continuous change</p>	Campbell (2006); Kamal (2015); Reese (2016); Anonymous (2017)
Communication skills	<p>19.If I manage conflict poorly, business performance will suffer</p> <p>20.A leader's performance is closely tied to his/her communication competence</p> <p>21.MBA degrees and business education programmes must include communication skills to improve graduates' impact in the workplace</p> <p>22.Leaders spend a substantial part of their time communicating with their constituents.</p> <p>23.Influencing others is central to leadership, and this is achieved through effective communication</p> <p>24.Communication will increasingly become networked and matrix-based across multidisciplinary teams</p>	Wiemann (1997); Lanier et al. (1997); Tanyel et al. (1999); Frederickson (2006); Du-Babcock (2006); Simpson (2006); Conrad and Newbury (2011); Giles (2016); Reese (2016); Anonymous (2017), Cornellissen (2017)
Global leadership mindset	<p>25.I understand the global mindset is the ability to see beyond national culture, organisational boundaries, and local business opportunities</p> <p>26.The global leadership mindset is essential for success in the 21st century because it enables leaders to embrace paradox and complexity</p>	Rogers and Blonski (2010); Cohen (2010); IGI Global (2017)

(Contd...)

Table 2: (Continued)

Global leadership competence	Measuring criteria	Origin
Emotional Intelligence	27.I understand self-awareness to be a key part of emotional intelligence	Cherniss et al. (1998); Ovans (2015); Boyatzis et al. (2000); Abbatiello et al. (2017); Stein (2017)
	28.Emotional intelligence can result in an outstanding performance at work. An emotionally intelligent leader is aware of relationship management as well as task orientation	
	29.An emotionally intelligent leader is aware of relationship management as well as task orientation	
	30.If I am emotionally intelligent, I understand the impact that my emotions and behaviour would have on others around me	
Ethical and External influences	31.The public has higher expectations these days for the ethical behaviour of companies	Sulaiman and Mohezar (2006; 2009); Whetten and Cameron (2015, p. 37); Bisschoff (2017)
	32.MBA graduates are required to reflect greater ethical awareness – especially since the 2008 crisis	
	33.Leaders in business are regularly faced with ethical issues such as bribery, corruption, kickbacks for contracts among others	
	34.Leaders must have a basic knowledge of ethical language and behaviours in their daily interactions	
Career awareness	35.I am aware that employees are required to have technical skills in the digital economy	Carr (2008); Hogan and Hogan (2001); Nanterme (2016); Accenture (2016)
	36.Lifelong learning is an essential feature of career development in the knowledge economy	
	37.Career planning is part of my self-development – rather than my employer’s responsibility	
	38.I am aware that even technical jobs require soft skills such as creativity, collaboration and business savvy	
Personal value system	39.I apply my own beliefs, values, ethics, knowledge and skills in my leadership style	Hernez-Broome and Hughes (2004); Tubbs and Schulz (2006); Satija (2009); Berger et al. (2012); Katulwa (2015); Katulwa (2016); Dillon and Bourke (2016)
	40.Leadership behaviours are to be built on character as a foundation	
	41.Ethical lapses in business are partly a result of character flaws of leaders	
	42.The demonstration of solid character is going to be an indispensable quality of 21 st century leaders	

MBA: Master of Business Administration

Table 3: Purification of the measuring criteria

Round	Var. Expl. (%)	KMO	Bart-Lett	Number of factors	Alpha	Criteria eliminated*
1	62.3	0.937	0.000	10	0.947	COS5, EEI3, EEI4, GLM1, PVS3, PVS4, TEB1
2	58.1	0.935	0.000	7	0.938	CAW1, COM1, EMI1, GLM2, STL3
3	57.2	0.933	0.000	7	0.935	LEC3, STL2, TEB4
4	56.5	0.920	0.000	5	0.933	***

*Appendix A for criteria codes. KMO: Kaiser-Meyer-Olkin

Table 4: KMO and Bartlett’s tests

Measure of sampling adequacy	0.920	
Bartlett’s test of sphericity	Approx. Chi-square	2997.081
Df		276
Significant		0.000

KMO: Kaiser-Meyer-Olkin

should be taken in the absolute interpretation of coefficient alpha. Coefficients of 0.50 and higher are also deemed usable when researchers operationalise their research (Morgan, 2017). The table also shows the measuring criteria about each factor. After consideration of the criteria within the factors, the five factors were labelled and explained.

6.2.1. Factor 1: Leadership skills

Factor 1 is the most important factor, explaining 18.2% of the variance, and deals with a range of issues that broadly relate to leadership skills. More specifically, Factor 1 consists of leadership skills such as conflict management, soft managerial skills, career planning, change management and communication.

of 0.556. This is marginally below Cortina’s 0.57 margin and indicates that the factor cannot be deemed reliable. However, a low reliability coefficient does not mean that a factor is of lower importance for the current study, it merely renders a verdict on the likelihood that this factor will present itself in a repetitive study of similar nature. Although this factor shows a lower likelihood to do so, Morgan (2017) warns that care

Table 5: Rotated factor analysis

Criteria	F1	F2	F3	F4	F5
com3	0.715				
lec1	0.705				
lec2a	0.659				
cos1	0.627				
caw3	0.623				
caw4	0.620				
cos2	0.619				
com2	0.549				
caw2	0.549				
ee11		0.623			
cos3		0.620			
teb2		0.619			
stl1		0.579			
cus3		0.541			
ee12		0.491			
emi3			0.805		
emi4			0.721		
emi2			0.715		
lec2			0.501		
pvs1				0.710	
pvs2				0.700	
lec4				0.469	
cus2					0.837
cus1					0.798
Variance (%)	18.2	11.4	10.8	8.6	7.5
Cum. variance (%)	18.2	29.6	40.4	49.0	56.5
Cronbach alpha	0.886	0.715	0.780	0.556	0.783

6.2.2. Factor 2: Managerial challenges

Factor 2 deals with issues about managerial challenges and also diversity management issues. Hence, initially, the line of thought was to label it as such. However, closer scrutiny revealed that diversity management issues actually do pose specific challenges to management. Factor 2 is regarded as a realistic subset of managerial challenges faced by South African managers and explains 11.4% of the variance.

6.2.3. Factor 3: Emotional intelligence

Factor 3 is related to emotional intelligence. In the context of the modern digital economy, Abbatiello et al. (2017) argue that emotional transformation is regarded as critical in the transformation of both the leadership process and the organisation. This means that leaders need to react differently to management and leadership in an organisation. The factor explains 10.8% of the variance.

6.2.4. Factor 4: Personal value system

Factor 4 deals with personal value systems of a leader and explains 8.6% of the variance. Interestingly, this factor has been found in a number of studies seeking to determine managerial and leadership competencies (Tubbs and Schulz, 2006; Kanter, 2010; Katulwa, 2015; 2016; Barrett Values System, 2017). These studies note that, in the context of volatility and uncertainty, leaders can remain effective in their roles “by applying their leadership attributes such as beliefs, values, ethics, character, knowledge and skills”. The results of these studies confirm that managers and leaders will need to continue to depend on their portfolio of personal experiences and value systems. Here, Berger et al. (2012) confirm that a personal value system is a skill required by managers and leaders to create and facilitate career-defining experiences.

6.2.5. Factor 5: Cultural sensitivity

Factor 5 is the least important factor and explains 7.5% of the variance. This factor deals with the competence of cultural intelligence; a widely recognised critical factor for leadership success and organizational transformation (Maznevski et al., 2013). Increased globalization has amplified cultural diversity in the workplace and made the ability to lead across cultures a critical managerial competence for effective managers (Stevens et al., 2014).

6.3. Factor Correlations and Multiple Regression Analysis

Pearson correlation coefficients were calculated to determine the relationships between the factors. All the factors showed high inter-factor correlations ($p \leq 0.05$). These high correlations require a more in-depth analysis into how these factors influence one another, for example, to use a regression function (Galkins and Andrews, 2014). Factor 1: Leadership skills are the most important factor because it explains the highest variance. Consequently, multiple regression was used to determine how Factors 2, 3, 4 and 5 (as independent variables) contribute towards Factor 1 as the dependent variable). The results appear in Table 6.

The table shows that all four independent variables (Factors 1–4) are significant ($P \leq 0.05$) contributors to Factor 1, with Factor 2 contributing the most (0.336) down to Factor 5 (0.119) which contributes the least. In practice, this means that Leadership skills (Factor 1) can be improved by Managerial skills (Factor 2) with a regression weight of 0.336, and also by Emotional intelligence (Factor 3) with a regression weight of 0.288, by Personal value system (Factor 4) with a regression weight of 0.197 and by Cultural sensitivity (Factor 5) with a regression weight of 0.119. This then means that to improve Leadership skills, it is worth the while to develop Managerial skills first as this will yield the highest positive return on the leadership skills. This is also true in their declining order of importance for the other factors. The calculated $R^2 = 0.533$ (Adjusted $R^2 = 0.528$) for the function means that the variance declared is 53.3%. This is satisfactory.

The regression function then constitutes:

$$Y = 1.146 + 0.336X_1 + 0.288X_2 + 0.197X_3 + 0.119X_4$$

Substitution with the factor labels, the function reads:

$$\text{Leadership skills (Y)} = 1.146 + (0.336 \times \text{managerial skills}) + (0.288 \times \text{emotional intelligence}) + (0.197 \times \text{personal value system}) + (0.119 \times \text{cultural sensitivity})$$

Interpretation of the regression function means that managerial skills are the biggest predictor of leadership skills, followed by emotional intelligence. Cultural sensitivity has the lowest predictable influence on leadership skills. In practice, this means that an improvement in managerial skills will benefit and improve leadership skills more than the other factors and should be attended to first. Leadership development programmes should then firstly include teaching managerial skills, secondly attempt to improve

Table 6: Multiple regression on factors

Model		Unstandardised coefficients		Standardised coefficients	t	Significant
		B	Standard error	Beta		
1	(Constant)	1.149	0.170		6.776	0.000
	Factor 5	0.083	0.030	0.119	2.797	0.005
	Factor 4	0.157	0.033	0.197	4.784	0.000
	Factor 3	0.235	0.037	0.288	6.425	0.000
	Factor 2	0.320	0.045	0.336	7.150	0.000

^aDependent variable: Factor 1

emotional intelligence, then aim to instill a personal value system, and finally, try to increase cultural awareness.

6.4. Validity Measures

Finally, the simplified model requires judgement on the relevant validity measures required (refer back to Table 1). The validity measures applied to the model that measures management and leadership competencies were adopted from Imandin et al. (2016) who successfully applied it in their research. These measures are the external validity (using both population and ecological validity), internal validity, criterion validity (using both concurrent and predictive validity), content validity, construct validity, and criterion-related validity (using both construct and discriminant validity). After comparing the results of the analyses to the perspective validity measures in Table 1, it was concluded that the simplified model achieved validity of all the requirements except for one validity category, namely criterion validity. Criterion validity consists of both content and predictive validity. These two sub-requirements and the reasons for failure to meet them are explained below:

- Content validity is where the results of the model are required to be tested against benchmark tests performed only in literature sources (College Board, 2012; CSU, 2014, both as cited by Imandin et al., 2016). This study is an exploratory study. This means that at present there are no directly comparable benchmarks to test the model against. Hence the model could not be tested, and validity cannot be determined. Once such benchmarks become available, research can confirm or determine if the model achieved validity or failed to do so.
- Predictive validity requires that the model is operationalised and that these predictions than be scrutinised to ascertain that they are correct, thus validating the operational side of the model (Shuttleworth, 2013). Surely, this is a very important step in the final validity of the model, but at present, this is future music. The exploratory model did not yet predict outcomes and as such also here the verdict is out on this validity category until such predictions could be made and then evaluated for accuracy.

In conclusion, the model passed all but one futuristic validity measure. The model is thus deemed to be valid until future research either confirms or deny its content and predictive validity.

7. A MODEL TO MEASURE MANAGERIAL AND LEADERSHIP COMPETENCIES

The analyses enabled the development of a model to measure management and leadership competencies. In total 17 criteria

were omitted from the theoretical model. The model has five factors that explain a cumulative variance of 56.5%. Four factors have excellent reliability while the fifth factor shows moderate reliability. The model is shown in Figure 1.

Figure 1 shows that the five factors identified do not consist of sub-factors or further underlying variables. This is important because it indicates that the factors identified are pure and do represent the management and leadership competencies as they were labelled. Factor 1: Leadership skills, is the most important factor in the model explaining 18.2% variance, followed by Factor 2: Managerial challenges at 11.4% variance. Likewise, Factor 5: Cultural sensitivity is then the least important factors with an explained variance of 7.5%.

8. CONCLUSIONS

From the analysis, the following conclusions can be drawn.

8.1. Conclusions 1 and 2

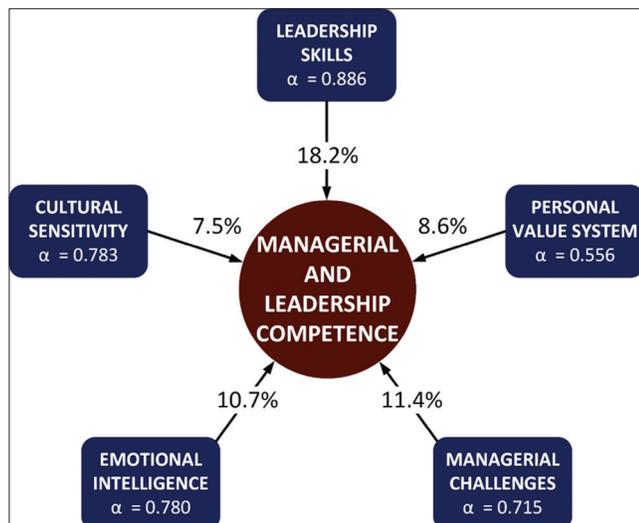
This article identified management and leadership competencies and its respective measuring criteria. Strongly literature orientated, the study identified eleven management and leadership competencies, measured in total by 42 criteria. The study scientifically reduced the eleven competencies to a more manageable five factors, measured by 25 criteria (thereby reducing the measuring criteria by 17).

- It is concluded that the study succeeded to significantly simplifying the model to measure management and leadership competencies.
- Based on the conclusion above, it is also concluded that the simplification of the model now enables an easier operationalisation of the model in the industry, thus putting academic research to use in practice.

8.2. Conclusion 3 and 4

The success of simplifying the model and achieving satisfactory reliability and validity can be attributed to a high sample adequacy as measured by KMO. (This study had a KMO value of 0.933.). Additionally, sphericity (as measured by Bartlett) measures if the data is suitable for factor analysis. Here the Chi-square for this study was 2997.081, the degree of freedom was 276, and the significance was below 0.05. The cumulative variance, as explained by the five factors, is also satisfactory at 56.5%. It is thus concluded that to develop or simplify a model successfully:

- An adequate sample is required; and
- Sphericity is tested to ensure the data's suitability to be subjected to further analysis. Without these gatekeeper statistics, the attempts to develop a model are risky.

Figure 1: A model to measure management and leadership competence

8.3. Conclusion 5

- The validity measures showed good content, internal and external and discriminant validity (in support of other validity criteria). Resultantly, it is concluded that the model to measure management and leadership competencies is a valid model to do so.

8.4. Conclusion 6

- Leadership skills and managerial challenges are the most important factors in the model showing that modern leaders should hone their leadership skills in the fast-changing business environment of the Fourth Industrial Revolution, while managers are required to apply their skills to conquer the challenges the business environment throws at them to maintain competitiveness and efficiency.

8.5. Conclusion 7

- Also, leaders and managers should also apply their competence in the areas of cultural sensitivity, emotional intelligence and develop a personal value system to successfully negotiate the 21st century challenges to manage their diverse cultural workforce wisely, leading by example based on high personal values.

9. SUMMARY

In this article, the latent variables or factors to measure management and leadership competencies have been identified and modelled. In addition to simplifying the original set of measuring criteria, the model was also subjected to reliability and validity confirmation. The model is reliable and returned satisfactory reliability coefficients. Regarding the validity, the model proved to be valid in all except the future validity requirements. This cannot yet be determined, and future research should be employed to ensure the model can predict management and leadership competencies accurately. As a result, the article presents a usable validated model to measure management and leadership competencies of managers and leaders. The model is also a managerial tool for managers to employ if they want to measure the competencies their managerial

or leadership staff have while it provides a solid theoretical basis for future academia in their managerial competency-related research projects.

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APPENDIX

Appendix A: List of deleted criteria

Code	Criteria	Elimination round
COS05	Communication will increasingly become networked and matrix based across multidisciplinary teams	1
EEl03	Leaders in business are regularly faced with ethical issues such as bribery, corruption, kickbacks for contracts among others	1
eei04	leaders must have a basic knowledge of ethical language and behaviours in their daily interactions	1
GLM01	I understand the global mindset is the ability to see beyond national culture, organizational boundaries, and local business opportunities	1
PVS03	Ethical lapses in business are partly a result of character flaws of leaders	1
PVS04	The demonstration of solid character is going to be an indispensable quality of 21 st century leaders	1
TEB01	Team performance is a major determinant of the overall organizational performance	1
CAW01	I am aware that employees are required to have technical skills in the digital economy	2
COM01	I must manage the gaps and tensions that emerge due to the diversity of my team members	2
EMI01	I understand self-awareness to be a key part of emotional intelligence	2
GLM02	The global leadership mindset is essential for success in the 21 st century because it enables leaders to embrace paradox and complexity	2
STL03	Strategic leaders envision the future and inspire others to work towards creating a viable future for the organization	2
TEB04	Collaborative leaders generate goodwill in the team, which in turn enhances team performance	3
STL01	Strategic leadership focuses less on day-to-day events and more on underlying trends and patterns	3
STL02	Strategic leadership has the potential to create a competitive advantage for an organization which is hard for competitors to imitate	3