The factorial validity and reliability of a change agent identification assessment tool[#]

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Abstract

The main aim of the research project reported on here was to validate and test the reliability of the developed change agent identification assessment tool to be used by organisations to identify change agents more effectively in large organisations undergoing change, with a view to providing improved support to employees and ensuring more effective change management in such organisations. An initial change agent identification framework was developed by Van der Linde-de Klerk (2011) and this served as the foundation for the development of an assessment tool. Because minimal research has been conducted on identifying change agents in large organisations, it was deemed important to provide organisations with a tool to help them identify these individuals correctly. A sample group comprising 239 change agents participated in the quantitative research and completed the newly developed change agent identification questionnaire. The proposed questionnaire consists of three dimensions, namely willingness, commitment and personality traits. Participants indicated the ideal attributes in each dimension that they require to operate as change agents. The dimensions are based on the theoretical change agent identification framework that was developed. The results of the validity and reliability analysis indicated that the questionnaire can be used with confidence to select change agents. Change agents can typically be employees, managers, personnel practitioners, organisational development consultants or employee or union representatives. The developed scale showed positive reliability and validity results.

Key words: *organisational change; employee support during change; change management; change agent identification framework; personality traits; change agent network; occupational personality profile; union representatives*

The questionnaire is not provided, as the authors still have to submit it to the Council for Scientific Research (CSR) to be classified as a psychometric test. The authors may be contacted for enquiries about the instrument (see contact details below).

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1   Background to the study

According to Van Tonder (2004), change is taking place much faster than it did in the 1980s and 1990s. Anyone who does not keep up will be left behind and lose his or her competitive advantage in the business world, while those who do keep abreast of change will constantly reap the benefits. Given the continuing resistance to change, the present-day process of change is more complex and challenging than ever before (Karkan & Agarwal 2000). A scientific approach to identifying individuals in organisations who could assist employees during change and facilitate the process of change could be supported by a properly developed and validated change agent identification tool. The aim of the current article is to provide an overview of the process used to develop, validate and test the reliability of the developed change agent identification assessment tool on the basis of the theoretical change agent identification framework. Today, change often takes place so rapidly that people do not have time to adapt before the next change is upon them. Sometimes change is planned and people have sufficient time to prepare themselves in advance, but in other instances, change is unexpected and people have to adjust immediately in response to it (Laycock 2002).

Organisational change occurs mainly in the context of failure or a need to make adjustments of some kind. In organisations, change may involve a difference in the way an organisation functions, who its members and leaders are, what form it takes and how it allocates its resources (Huber & Glick 1993). Nowadays, many organisations use change agents to help transition those affected by change from the current state to the desired end state, allowing the affected employees to adapt accordingly and demonstrate the required new behaviours. To this end, change agents could typically be compared to medical doctors, who diagnose the real problem and then propose clear, directed solutions. From diagnosis to the achievement of the desired end state, the change agent plays the roles of facilitator, designer, educator, marketer, observer and influencer (Tearle 2007). Employees who are passionate about change can serve the organisation as change agents; they will then have to report to and be managed by a change management specialist who coordinates overall change in a particular environment. Change agents are responsible for managing change in terms of its impact on members of the organisation. One of the key goals of change agents is therefore to ensure that the relevant organisational constituents are aware of and understand the need for and the impact of the impending change (Karkan & Agarwal 2000).

One challenge that many organisations are faced with today is how to identify and select individuals with the right profile to act as effective change agents in the organisation (Arrata, Arnaud & Kumra 2007). Currently, organisations use multiple methods, such as nominations by line managers or colleagues, personality assessments and/or change readiness assessment results to identify change agents. In most instances, these methods are not based on a scientific, validated approach (Strebel 1998). To this end, a change agent identification assessment tool has been developed to allow for a more scientific approach to be followed. This article firstly discusses the importance of change agents, which leads to a discussion of how change agents are typically identified, and subsequently, how a theoretical change agent identification framework has been developed. Secondly, the process for validating the proposed assessment tool on the basis of the theoretical change agent framework is explained.

2   Literature review

2.1   *Organisational change agents*

The success of any change effort relies heavily on the quality of the relationship between the change agent and the sponsor of the change or key decision maker (Lunenburg 2010). Nowadays, managers and workers are selected to play the role of change agent, but the reality is that these individuals do not always have the attributes or skills to manage change effectively (Tschirky 2011).

Change agents may be described as those individuals who campaign to promote the changes, act as facilitators of the planned change process and enable and empower employees to adapt to and accept the changes (Lunenburg 2010). In the fast-changing South African work environment, employee representatives or union representatives are often regarded by their colleagues as change agents.

Hutton (1994) states that in organisations, a group of change agents is often referred to as a "change agent network". This author also provides valuable insights into the roles of change agents. The more aware change agents are of any information relating to the changes that could potentially affect them, the better able they are to disseminate this information to employees (Hutton 1994). In this way, everyone is kept informed and made to feel that their contribution is valued. The closer change agents are to new information as it is released, the sooner they can communicate the impact of this information to their colleagues as well as any changes that may result.

According to Massey and Williams (2006), a change agent is also viewed as someone who has been chosen to help employees cope with the change that is usually driven by a specific initiative or project. The focus is therefore specific and change agents usually know what is expected of them. The number of change agents selected usually depends on the size of the organisation, the number of employees affected, and the extent of the change.

Employees who are fulfilling the role of change agents and who are also personally affected by a change are more likely to question its value. Thus, through the answers they obtain to their questions, they could easily become change experts who are able to supply all or most of the answers sought by their peers (Senge, Kleiner, Roberts, Roth, Ross & Smith 1999). Ideally, a change agent should be able to find a balance between being a technical expert, having all the answers and acting as a process facilitator, allowing the employees to find their own answers by providing some guidance (Paton & McCalman 2000).

There is a paucity of information in the literature on the profile of such individuals. However, a few authors have provided some insight into the attributes of successful change agents.

Karkan and Agarwal (2000), for example, highlight the following key qualities of change agents:

• Change agents should have the subject knowledge required to implement the change initiative – others should view these individuals as unbiased and caring. They should also have a high level of energy and enthusiasm in order to keep the environment charged and lively.
• They should have sufficient influence to create readiness for change among those affected by the changes.
• They should be feedback oriented – in other words, they should be able to provide and receive both positive and negative feedback and be proficient in the handling of feelings and sentiments.

- They require outstanding analytical abilities to enable them to correctly assess and resolve problems that could potentially occur while change is being implemented. Their approach to solving problems should be proactive instead of reactive, with an innate ability to visualise and examine the implications of the actions initiated in the long term.

Change agents need to be identified carefully and in accordance with the required attributes to drive change successfully in organisations (Tschirky 2011).

Severini (2012) contends that the following attributes are critical for change agents: trustworthiness; resilience; conflict management skills; coaching skills; facilitation skills; communication skills; emotional intelligence; tolerance of ambiguity and the ability to manage polarities; a service mind-set; and a love of learning. Stagl (2009) provides insights into what he believes are the key characteristics to be demonstrated by potential change agents:

- systems thinker – seeing the relationships between moving parts;
- relational – cultivating relationships at multiple levels of an organisation;
- analytical – using data and measurements to assess progress;
- influential – using multiple forms of influence to encourage people to try new things and adopt different behaviours;
- resilience – demonstrating the ability to effectively deal with difficult, changing situations;
- facilitation skills – guiding conversations between key stakeholders in the organisation and being able to manage difficult conversations between organisational members;
- communication – besides conversations, the compilation of key messages is critical in order to ensure that messages are shared continuously in a consistent manner;
- energy and drive – displaying the conviction that the change must happen; and
- observant – being able to detect what employees are thinking and feeling and their level of resistance in order to design appropriate interventions.

It is clear from insights provided by Severini (2012), Stagl (2009) and Karkan and Agarwal (2000) that there are distinct characteristics that need to be evident in change agents in order to increase the probability that they will be able to implement the required change successfully.

2.2 *Identifying change agents*

As indicated above, it is necessary to understand that the approach followed in the identification of individuals for the role of change agent could have a significant impact on the change initiative itself. Hutton (1994) provides insightful information on the recruitment of these individuals. It is usually the task of change management experts and senior management to select the right individuals. Management should be a part of this process, since they are aware of the capabilities, skills and personality traits of people in their areas of responsibility and can help to recommend specific individuals. However, change agents may also be required to identify other potential change agents who could help to implement the desired change. Research has shown that it is unusual to find individuals with all the required quality-related knowledge and skills to serve as change agents. If no suitable internal candidates can be found, external individuals can be recruited, but this is not always ideal. Ideally, individuals from inside the organisation who are familiar with the organisation's people, structures and vision and who will be affected by the change themselves, should be selected and developed to serve as change agents (Luecke 2003).

Some of the benefits of selecting individuals from within the organisation include the fact that the characteristics and abilities of internal candidates are generally known, and the individuals selected know the organisation as well as the type of business, the process, people and politics (Hutton 1994). Often, these individuals are already known and respected by others. It may be too time-consuming to recruit an outsider, allow him or her enough time to familiarise himself or herself with the business and build relationships. This could interfere with approved change initiative timelines. Further, new employees selected as change agents may become involved in the change process too late, when fears, uncertainties and anxieties are almost unmanageable (Randall 2004).

Strebel (1998) makes some valuable suggestions on how to attract a potential change agent's attention. A subtle approach can be used to attract change agents. In organisations where one can solicit the support of change agents publicly, one can approach individuals directly and sell the idea of becoming change agents to them and/or ask managers to nominate and select change agents in their unit/division. In cases where it might be possible to select change agents and use them to act as change agents in the long term, it might be worthwhile for an organisation to invest in them by continuously training and developing them (Luecke 2003).

Strebel (1998) distinguishes between two types of change agent, namely task-oriented and people-oriented change agents. Task-oriented change agents tend to be skilled at analysing formal economic dimensions, but may have poor interpersonal relationship skills. These individuals are effective in driving processes and technology and highlighting trends in the marketplace. People-oriented change agents, however, focus more on aligning the change initiative to the needs of their fellow employees. These individuals usually have excellent interpersonal skills and find it easy to communicate and drive change among their co-workers. This research project focused on the people-oriented change agents, since these individuals need to work closely with others affected by change to ensure that they are well able to cope with and adjust to the changes involved. People-oriented change agents may typically be human resource practitioners, line managers, employee relations practitioners or union representatives who are constantly involved in change.

Arrata et al (2007) hold that there are a number of distinct factors an organisation should consider in order to identify credible change agents. They stress that when considering identifying change agents, it is necessary to anticipate other staff members' reactions when the change agents' names are announced.

The selection of individuals who are known as high performers and are already well respected and well known is an indication that management is taking the programme seriously by placing these credible individuals in the role of change agents. Arrata et al (2007) argue that, by forming a credible team of change agents, management are able to implement and drive change more effectively. Recruiters should focus on identifying people with sound interpersonal skills – in other words, people who find it easy to communicate with others in their area.

The procedure or tools used in the selection of change agents can be customised specifically for each division in the organisation, depending on where the change agent is located in the organisation, as well as considering the planned nature of the work he or she will be asked to perform (Strebel 1998). According to Strebel (1998), the two methods most favoured and frequently used by organisations to select change agents are:
• change readiness questionnaires; and
• nominations by respective line managers.

In instances where questionnaires are used, the organisation selects an appropriate questionnaire that will help to identify potential change agents according to the organisation's needs. The literature findings state that many organisations request the employees affected by change to complete a change readiness questionnaire in order to determine the level of readiness, and in so doing to identify as potential change agents those individuals with high change readiness scores (Strebel 1998).

When questionnaires are not used, potential change agents are identified through nominations by direct managers or supervisors. These managers usually nominate individuals in their area whom they believe have the ability to influence other people, communicate well with others and have strong relationships with their colleagues. No individual nominated to act as a change agent should ever be forced to accept the role. It should be completely voluntary, and the individual should have a clear understanding of what would be expected of him or her. Only in cases where an individual and his or her line manager are satisfied with their roles and responsibilities, as well as with the time the individual will spend in the role of change agent, should the individual be appointed and introduced as such (Strebel 1998).

Wertheimer (2001) developed a number of criteria for identifying individuals for the role of change agent. He indicates that the identification process will differ in accordance with the location in the system where change agents will be placed and the nature of the work they will be asked to accomplish. However, the following are some generic characteristics the recruiter should consider when identifying suitable change agents:

• the level of experience in rendering a service to both internal and external stakeholders;
• the level of experience in supervising or assisting others to solve multiple problems;
• the communication skills of the individuals, which should include reading and writing skills; and
• the facilitation skills, which should be tested in practice by requesting the individual to facilitate a specific workgroup session.

The recruiter should have a checklist handy to indicate which skills are or are not demonstrated, to enable him or her to draw up a short list from the pool of candidates evaluated.

The recruiter should also consider the proven track record of trust in the organisation and capabilities developed by the potential change agent so far. Strebel (1998) and Wertheimer (2001), like Hutton (1994), indicate that candidates with the right interpersonal skills and personality traits should be considered for this role, instead of focusing on the qualifications of a preferred change agent. Wertheimer (2001) argues that the skills and traits that potential change agents possess are far more important than any qualification or specialised training.

Following a qualitative triangulation approach, the following instruments and strategies were used by Van der Linde-de Klerk (2011) to develop a theoretical change agent identification framework:

• *Explorative qualitative perception questionnaire.* Following the analysis of available literature and empirical research, a qualitative perception questionnaire was developed. This questionnaire was used to guide an exploratory process because no existing standardised questionnaire was available – hence the use of open-ended questions to determine the perceptions of experts in the field. These experts were individuals who had specialised in change management and had been working for some time as external consultants to the organisation at which the research project was conducted.

- *Concept mapping.* This is a method used to clarify and describe people's ideas by means of graphical representation. Mapping concepts in graphic form makes it easier to understand the relationships between them, and this technique is especially useful in the development of a conceptual framework (Trochim 2002). Fifteen internal change management specialists participated in the process to verify which elements should form part of a change agent identification framework and which elements should be eliminated. This was done by considering and discussing those elements that had emerged from the qualitative perception questionnaire in the concept-mapping focus groups.
- Change agent identification framework. The results of the qualitative perception questionnaire and concept-mapping process were analysed and integrated to develop a change agent identification framework.

The results of this process were summarised and consolidated in a change agent identification framework (Figure 1). The above process is discussed in detail by the authors in a preceding article, namely "The development of a change agent identification framework for South African change agents" (Van der Linde-de Klerk, Martins & De Beer 2014). The four dimensions were indicated as follows by Van der Linde-de Klerk et al (2014):

- The concept-mapping workshop participants identified the first dimension, namely *willingness*, as a key consideration, because the role of the change agent should be voluntary. They indicated that it should remain the choice of the individual whether or not to assume this role for a specific period of time, and agreed that this was a vital dimension to consider when identifying individuals to act as change agents.
- The participants in the concept-mapping workshop also noted the importance of the second dimension, namely *availability*, in the identification of change agents. They stated that it would not be feasible to identify change agents to perform certain tasks if their day-to-day responsibilities did not allow them to fulfil this role. A specific percentage of their time would therefore have to be allocated to the performance of their duties as change agents. An agreement should be reached between the potential change agent and his or her manager in terms of which he or she would be able to fulfil this role as per the agreed key performance indicators. All participants agreed that this was a vital dimension to consider when identifying individuals as change agents.
- The findings of the literature study highlighted the fact that the third dimension, namely *commitment*, could not be measured without change agents having a comprehensive understanding of the vision, mission and objectives of the transformation programme. In the research into high-performing teams conducted by Rice, Eggleton, Eggleton and Rice (1996), one of the focal areas was the measurement of commitment. During the concept-mapping workshop, participants indicated that, if an individual is not committed to the proposed change initiative, he or she will not fulfil the responsibilities of a change agent. They agreed that this was a vital dimension to consider when identifying individuals as change agents.
- The fourth dimension of the framework, namely *personality traits*, also had its foundation in the review of the relevant literature. For the purposes of the empirical research conducted, it was of crucial importance to understand the ideal personality traits of change agents to ensure that individuals can be identified as potential change agents on the basis of suitable personality characteristics. For the purposes of this research, the ideal profile refers to the ideal personality traits that are required for an individual to be identified as a change agent with the ability to drive and manage change in the change agent's own business area.

Figure 1
Change agent identification framework

| DIMENSION | DEFINITION/SUPPORTIVE ELEMENTS |

WILLINGNESS

Willingness to act as a change agent. Whether or not a person is willing to act as a change agent can be determined only once he or she fully understands his or her roles and responsibilities in that regard. The individual chooses whether or not to act as a change agent.

AVAILABILITY

Availability to add an extra role to the day-to-day job of the selected change agent. Key performance indicators must be evaluated to determine the individual's capacity. An agreement should be reached between the employee and his or her manager.

COMMITMENT

The pledge that an individual makes to himself or herself to fulfil a certain purpose or behave in a certain way. The individual practises what he or she believes in. The strong belief that the change agent has in the transformation project will reinforce commitment to ensuring its success.

PERSONALITY TRAITS

- Willingness
- Self-awareness
- Assertiveness
- Flexibility
- Approachability
- Perseverance
- Persuasiveness
- Open mindedness
- Good listening skills
- Integrity and honesty
- Optimism
- Sociability

Source: Van der Linde-de Klerk (2011)

3   Aim of the study

The aim of this study was to validate and test the reliability of the developed change agent identification assessment tool to be used to identify change agents more effectively in large organisations in the process of undergoing change. If such a measure could be used to identify suitable individuals, the change processes and support for affected employees would be improved. The study followed the theoretical project which focused on the development of a change agent identification framework for South African change agents (Van der Linde-de Klerk et al 2014).

4   Research design

4.1   *Research participants*

The sample consisted of identified change agents in a utility organisation as well as full-time employees who were enrolled for a development programme for organisational development consultants who had identified themselves as change agents.

Three hundred and forty-five identified change agents were invited to participate in the research study. A final sample of 239 (n = 239) participated in the survey. The final sample consisted of 68,6% females, 69,9% Africans (blacks, coloureds and Indians), 79,5% with an average of more than seven years' work experience and 64,4% with a bachelor's or higher degree (Table 1).

Table 1
Biographical groups

Biographical group	Frequency	Percentage
Gender		
Male	71	29,7%
Female	164	68,6%
No response	4	1,7%
Race		
Black	139	58,2%
White	70	29,3%
Coloured	21	8,8%
Indian	7	2,9%
Not stated	2	0,8%
Working experience		
0 to 3 years	10	4,2%
4 to 6 years	37	15,5%
7 to 10 years	54	22,6%
11 to 13 years	27	11,3%
14 years and more	109	45,6%
No response	2	0,8%
Highest qualification		
Diploma or certificate	82	34,3%
Bachelor's degree	73	30,5%
Honours degree	55	23,0%
Master's degree	25	10,5%
Doctorate	1	0,4%
Not stated	3	1,3%
Employee/student		
Eskom employee	124	51,9%
Students	105	43,9%
Not stated	10	4,2%

4.2 *Developing the measuring instrument*

Based on the review of available literature and the results of the explorative qualitative perception questionnaire, the resulting concept mapping and the change agent identification framework, 29 statements were formulated in line with the developed change agent profile. The researchers followed generally accepted guidelines for the development of measuring instruments (DeVellis 2003; Fischer 2006; Foxcroft 2004) by including statements that:

• reflected the purpose of the questionnaire and the constructs of interest;
• were seemingly redundant to ensure that the content, which is common to the items of each dimension, would summate across items;

- included in the item pool, a larger number than they intended using in the final questionnaire (to reduce possible poor internal consistency);
- were not exceptionally lengthy;
- had appropriate reading difficulty levels to ensure that participants from all language groups and education levels would understand them;
- were clear and concise with no problematic wording; and
- had appropriate grammatical structures and word choices.

Scaling format

A semantic differential scale was used to describe the identified dimensions and constructs. The scale had its origin in the work of Charles Osgood in the 1950s, which proposed a technique for scaling people on their responses to pairs of bipolar adjectives in relation to specific concepts (Gable & Wolf 1993).

According to Osgood, Suci and Tannenbaum (1957), the semantic differential scale is a technique for measuring meaning that evolved from research on synaesthesia conducted at Dartmouth College in the late 1930s. Typically, a single word (or short phrase) represents the construct of interest, and individuals help the researcher differentiate the meaning of that construct by responding to several pairs of bipolar adjectives which are scored on a continuum ranging from -X to +X or from X to X + Y (Likert style). In theory, each bipolar pair ("scale") can be represented by a straight line ("semantic space"); several such pairs or scales form a multidimensional geometric space (Gable & Wolf 1993). An example of the statements and scale is provided in Table 2:

Table 2
Example of questionnaire statements

Limited compassion and concern for the company	0	0	0	0	0	Sincere caring about the company
Sceptical about the change	0	0	0	0	0	Committed to the change
Aloof	0	0	0	0	0	Active encouragement among peers
Resistant towards change	0	0	0	0	0	Enthusiasm for change
I don't see myself as a role model for others	0	0	0	0	0	I can act as a role model for others
Low levels of satisfaction with my employer	0	0	0	0	0	High level of satisfaction with my employer
What's in it for me?	0	0	0	0	0	Loyalty towards the company
Minimal alignment between my own and the company's values	0	0	0	0	0	Alignment between my own and the company's values
Ashamed to be part of the company	0	0	0	0	0	Proud to be part of the company
Disagree with company policies	0	0	0	0	0	Agree with company policies

4.3 Results

The Kaiser-Meyer Olkin (KMO) measure of sampling and Bartlett's test of sphericity were first applied to determine whether the researchers could continue with the factor analysis. The results in Table 3 indicate that the KMO is above the proposed cut-off value of 0.5 for factorability and that the Bartlett's test is not above a p of 0.05. According to Hair, Anderson, Tatham and Black (1995), a measure of 0.90 for sample adequacy or above is interpreted as excellent, while the Bartlett test of sphericity indicates significant correlations between the variables. The researchers therefore proceeded with the factor analysis.

Table 3
KMO and Bartlett's test

KMO measure of sampling adequacy		.884
Bartlett's test of sphericity	Approx chi-square	2395.021
	Df	406
	Sig	.000

The construct validity of the questionnaire was tested by means of factor analysis. Initially, the principal components analysis was run on the semantic differential in order to investigate correlations between subsets of responses to bipolar pairs. This analysis reduced the semantic differential to a smaller number of components representing subsets of bipolar pairs measuring similar aspects of identification. Principal components analysis (PCA) provided an initial number of possible factors (based on components with eigenvalues greater than 1) derived from patterns of correlation and intercorrelation of variables (pairs). The varimax rotation – a form of orthogonal rotation that forces items to correlate or load with one and only one factor – was used in conjunction with PCA (Tabachnik & Fidell 2001). The results of the means, standard deviations and communalities for the 29 statements are presented in Table 4.

Table 4
Descriptive statistics and communalities

Statements	Mean	Std deviation	N	Communality extraction 1	Final communality extraction 2
Q8	3.89	.915	180	.596	.560
Q9	4.28	.805	180	.672	.476
Q10	4.44	.662	180	.614	.414
Q11	4.41	.649	180	.511	.463
Q12	3.85	1.070	180	.690	.583
Q13	4.32	.706	180	.594	.519
Q14	4.21	.803	180	.503	.473
Q15	4.09	.944	180	.445	.416
Q16	4.24	.745	180	.652	.586
Q17	4.23	.790	180	.644	.613
Q18	4.14	.667	180	.528	.522
Q19	4.22	.727	180	.673	.568
Q20	4.30	.668	180	.636	.503
Q21	3.79	1.050	180	.662	.619
Q22	4.11	.871	180	.608	.599
Q23	3.91	.901	180	.658	.602
Q24	4.29	.857	180	.644	.623
Q25	3.93	.925	180	.679	.625
Q26	4.52	.620	180	.606	.544
Q27	4.13	.743	180	.708	.659
Q28	4.16	.726	180	.784	.682
Q29	4.24	.835	180	.666	.381
Q30	4.24	.779	180	.686	.686
Q31	4.38	.654	180	.686	.684
Q32	4.20	.848	180	.673	.657
Q33	4.43	.755	180	.623	.422
Q34	4.34	.694	180	.528	.498
Q35	4.29	.775	180	.727	.690
Q36	3.98	1.078	180	.762	.671

The PCA revealed seven components (plausible factors) with eigenvalues greater than 1 that explained 64% of the variance among the responses to bipolar pairs. The scree plot used to gain insight into the number of possible components (ultimately, in this case, factors) lacks a clear "elbow" but confirms seven components. Based on the results of the PCA, factor analysis (FA) was conducted using principal axis factoring with seven factors and varimax rotation to determine whether similar results would be obtained.

The researchers decided to follow up PCA with principal axis factoring (PAF) because of a notion related to item response theory. An individual's actual score on any instrument comprises the true score plus some measure of error. This is not unlike variance as explained by PCA. Total variance comprises true variance (unique plus shared) as well as variance due to error. PCA does not distinguish the error variance from the true variance (Tabachnik & Fidell 2001).

Whereas total variance is analysed in PCA, in PAF only common or shared variance is analysed. PAF, set for seven factors, was run using varimax rotation. The correlation matrix, the determinant, KMO and the results of the Bartlett's test for sphericity were the same as for PCA (see the PCA section for these values). Communalities were somewhat lower in PAF than in PCA (see Table 4). However, all the items were retained. The eigenvalues again revealed a variance of 64% with seven factors (Table 5). The rotated factor analysis was therefore converted into seven factors.

Table 5
Total variance explained

Factor	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	9.644	33.255	33.255	9.177	31.645	31.645	3.200	11.035	11.035
2	2.529	8.721	41.976	2.097	7.230	38.875	2.918	10.064	21.098
3	1.596	5.505	47.481	1.144	3.947	42.822	2.459	8.479	29.577
4	1.329	4.584	52.064	.882	3.041	45.863	1.878	6.477	36.054
5	1.240	4.277	56.341	.853	2.940	48.803	1.776	6.126	42.180
6	1.106	3.814	60.155	.635	2.188	50.991	1.699	5.857	48.036
7	1.015	3.500	63.655	.551	1.899	52.890	1.408	4.854	52.890
8	.936	3.228	66.883						
9	.881	3.037	69.919						
10	.793	2.733	72.653						
11	.700	2.415	75.068						
12	.682	2.352	77.420						
13	.627	2.163	79.583						
14	.575	1.984	81.567						
15	.539	1.860	83.427						
16	.519	1.790	85.217						
17	.499	1.719	86.935						
18	.474	1.634	88.569						
19	.442	1.524	90.093						
20	.402	1.386	91.479						
21	.388	1.340	92.819						
22	.342	1.178	93.997						
23	.309	1.066	95.063						
24	.299	1.031	96.094						
25	.267	.920	97.014						
26	.240	.827	97.842						
27	.230	.795	98.636						
28	.212	.731	99.367						
29	.184	.633	100.000						

The PCA and the PAF therefore yielded similar results. After investigating both factor structure results, the researchers decided to use the PAF factor analysis (Table 6). A cut-off point of 0.4 for the factor loadings was used which, according to Hair et al (1995), is deemed to be more important (adequate), while a cut-off point of 0.3 is regarded as meeting the minimal level. The Kaiser criterion specifies that factors with values of 1.00 or more should be retained and the scree test should be used to determine the number of factors to extract. It emerged from the use of the Kaiser criterion that seven factors could be extracted, explaining 63.65% of the total variance. After investigating the factor structure, the researchers decided to conduct a confirmatory factor analysis with six and five factors to determine which number of factors yielded the best results. The results of the five-factor analysis yielded the best results and are indicated in Table 6. The communalities of the items are provided in Table 4. Although some items display communalities lower than 0.50 they were retained in the final factor analysis because their factor loadings were above the cut-off of 0.4, as discussed above.

Table 6
Rotated component matrix for five factors

	Component				
	1	**2**	**3**	**4**	**5**
Q17	.665				
Q14	.595				
Q11	.576				
Q9	.544				
Q26	.533				
Q18	.519				
Q19	.510				
Q10	.496				
Q20	.470				
Q15	.458				
Q21		.777			
Q24		.763			
Q23		.725			
Q25		.719			
Q22		.716			
Q16		.562			
Q30			.761		
IQ31			.724		
Q32			.722		
Q29			.518		
Q34			.512		
Q33			.420		
Q12				.749	
Q36				.682	
Q27				.640	
Q35					.737
Q28					.573
Q8					.522
Q13					.413

Extraction method: principal component analysis

Rotation method: varimax with Kaiser normalisation

a. Rotation converged in 15 iterations

The alpha coefficients of these identified dimensions range from 0.711 to 0.860 (see Table 7). The alpha coefficients of all five dimensions were considered to have adequate internal consistency reliabilities because they were above the recommended cut-off of 0.70 (Nunnally 1978). Kline (1999) notes that although the generally accepted value for reliability is 0.8, when dealing with psychological constructs, values below 0.7 can be expected because of the diversity of the constructs being measured. Overall, the researchers were able to conclude that the internal consistency (reliability) of the change agent questionnaire and the factors were consistent with what the questionnaire intended to measure.

The results of the factor analysis and the item analysis converged into five dimensions. This largely reflects the summarised theoretical dimensions as outlined in Figure 1, the change agent identification framework.

Table 7
Reliability analysis

Dimensions and statements	Mean	No of items	Cronbach's alpha
Willingness: Q9, Q10, Q11, Q14, Q15, Q17, Q18,Q19, Q20 and Q 26	4.25	10	0.860
Commitment: Q16,Q21, Q22,Q23, Q24 and Q25	4.08	6	0.847
Personality traits: Q29,Q30, Q31, Q32,Q33 and Q34	4.32	6	0.831
Availability: VQ8, Q13,Q28 and Q35	4.19	4	0.724
Facilitator: Q12,Q27 and Q36	4.02	3	0.711

The additional dimension which the authors labelled "facilitator" was also in line with the researched theory because it is an indication of the vital role played by the change agent as facilitator.

5   Discussion

The domain of the identification of change agents was explored in order to validate a change agent identification tool. The results of the analysis yielded a measurement scale consisting of seven dimensions. Three aspects of validity were considered in developing the change agent identification assessment tool, namely face validity, content validity and construct validity. Face validity was established through a process of expert scrutiny that eliminated any unsuitable items. Content validity was established by clearly defining the domain of the change agent and then using the discussed triangular approach to develop a change agent identification framework as discussed by Van der Linde-de Klerk et al (2014). The framework was subsequently used to systematically develop items to cover each of the dimensions of the framework.

Factor analysis was then applied to determine the factor structure of the assessment tool. This was followed by an analysis of the reliability of the factors. Based on the results, researchers could conclude that the domain of the change agent identification framework was reliably and validly measured through the use of the change agent identification assessment tool.

The objective of the research was therefore achieved, namely to develop a change agent identification assessment tool to be used by organisational change management

specialists to identify change agents more effectively in large organisations undergoing change. With the developed change agent identification framework and the change agent identification assessment tool, organisations will now be in a much better position to select and appoint suitable individuals as change agents.

By administering the change agent identification framework and assessment tool in organisations, the following can be accomplished:

- A more valid and reliable selection of change agents can be achieved.
- The results of the assessment can assist organisations in designing training and development plans for active and/or prospective change agents.
- A more scientific process can now be followed in the selection of change agents.
- Employees and unions can rest assured that the appropriate characteristics are being evaluated when selecting change agents based on the results of a scientific process.
- Organisations can use the change agent framework and the developed assessment tool to select employee representatives or union representatives as well.

According to available sources, this is the first scale developed in the South African context that aims to identify change agents. The research findings contribute towards a comprehensive understanding of the selection criteria for change agents. Managers and employee relations practitioners are constantly involved in change and its management. In many instances, they are primarily involved in the coordination and management of change and have to rely on change agents to facilitate the change initiatives. They can now apply the proposed framework and change agent assessment tool to guide them in selecting such change agents to assist with change initiatives. The comprehensive change agent identification framework and tool will give company leaders the reassurance that the appropriate characteristics are being evaluated when selecting these individuals. The framework and tool will furthermore not only promote better selection of change agents and therefore help them manage change with greater ease and efficiency, but also ensure that that the selection is perceived as fair and scientific by colleagues and union representatives.

This study did not focus on the profile of union leaders and representatives per se; its emphasis was on change agents in general. However, given the unique role of union leaders and union representatives in organisations and their role in change, the discussed change agent identification framework and the change agent identification assessment tool could also contribute to their recruitment and selection. In his research, Anstey (2013) discussed the impact of the Marikana confrontation, and the following question could be asked: If a scientific process had been used to select and recruit these trade union leaders and change agents, would the confrontation not have been better handled? The framework and assessment tool could thus assist management and organised labour to select and train a new generation of union leaders and representatives, and in the long run this could be beneficial to management and organised labour in South Africa (also see Van der Linde-de Klerk et al 2014).

6   Recommendations for future research

It would be advantageous for the change agent identification assessment tool to be tested again on an even larger and more representative example. In addition, the results of selection based on the framework and the change agent questionnaire could be monitored in terms of change outcomes in various contexts.

7 Limitations of the study

Firstly, as mentioned by the researchers, at the time of the study there was a paucity of comparable valid change agent identification tools in the market. A second limitation was the availability of change agents for inclusion in such a study. The third limitation was that the tool was applied to a convenience sample owing to the fact that participation in the survey was voluntary.

8 Conclusion

The research findings should contribute towards a comprehensive understanding of the role of change agents and the current methods used in selecting change agents in organisations. Managers and employee relations practitioners are constantly involved in change and its management. These individuals often either coordinate change or act as change agents themselves in the change process. The selection tool developed should assist employee relations practitioners to effectively select those individuals with characteristics that make them suitable to serve as change agents in their organisations. Such individuals could help promote implementation of the change processes and improve support to affected employees. Furthermore, this should contribute to the perception by colleagues and union representatives that the selection is fair. Lastly, the time spent on the selection process itself would be reduced because one tool would be used instead of a number of methods in ensuring that the most appropriate individuals are appointed to take up the role of change agent.

List of references

Anstey, M. 2013. Marikana and the push for a new South African pact. *South African Journal of Labour Relations* 37(2):133-145.

Arrata, P, Arnaud, D & Kumra, G. 2007. *Building an effective change agent team.* Available at: http://web.ebscohost.com/ehost/detail (accessed on 9 January 2008).

DeVellis, RF. 2003. *Scale development: theory and application.* 2nd edition. Thousand Oaks, CA: Sage. PMid: 14558062.

Fischer, WP. 2006. Survey design recommendations. *Rasch Measurement Transactions* 20(3):1072-1074.

Foxcroft, CD. 2004. Planning a psychological test in the multicultural South African context. *South African Journal of Industrial Psychology* 30(4):8-15.

Gable, RK & Wolf, ME. 1993. *Instrument development in the affective domain.* 2nd edition. Boston: Kluwer Academic.

Hair Jr, JF, Anderson, RE, Tatham, RL & Black, WC. 1995. *Multivariate data analysis with readings.* 4th edition. London: Prentice Hall.

Huber, GP & Glick, WH. 1993. *Organisational change and redesign.* New York: Oxford University Press.

Hutton, DW. 1994. *The change agents' handbook.* New York: American Society for Quality.

Karkan, S & Agarwal, N. 2000. Selection of change agents. SKA & NA Paper, NCB Seminar. Available at: http://holtecnet.com/web/content/references/Technical Papers/p_2000.1.pdf (accessed on 20 March 2013).

Kline, P. 1999. *Handbook of psychological testing.* 2nd edition. New York: Routledge.

Laycock, M. 2002. *Module 1: Dealing with change.* Available at: www.oznet.ksu.edu/ LEADS/FACT %20 sheets/EP91.pdf (accessed on 27 August 2007).

Lunenburg, FC. 2010. Managing change: The role of the change agent. *International Journal of Management, Business and Administration* 13(1).

Luecke, R. 2003. *Managing change and transition.* Boston: Harvard Business Essentials/Harvard Business School Press.

Massey, L & Williams, S. 2006. Implementing change: The perspective of NHS change agents. *Leadership and Organisational Development Journal* 27(8):667-681.

Nunnally, JC. 1978. *Psychometric theory.* 2nd edition. New York: McGraw-Hill.

Osgood, CE, Suci, GJ & Tannenbaum, PH. 1957. *The measurement of meaning.* Chicago: University of Illinois Press.

Paton, RA & McCalman, J. 2000. *Change management: A guide to effective implementation.* 2nd edition. London: Sage.

Randall, J. 2004. *Managing change and change managers.* London: Routledge.

Rice, J, Eggleton, C, Eggleton, CH & Rice, JC. 1996. *The fieldbook of team interventions: Step-by-step guide to high performance teams.* Amherst, MA: Human Resources Development Press.

Senge, P, Kleiner, A, Roberts, C, Ross, R, Roth, G & Smith, B. 1999. The dance of change: The challenges to sustaining momentum in learning organisations. *Performance Improvement* 38(5):55-58.

Severini, G. 2012. *Top 10 competencies for change agents.* Available at: http://www.gailseverini.com/2012/09/12top-10-competencies-for-change-agents/ (accessed on 30 March 2013).

Stagl, H. 2009. *Traits and skills of effective change agents.* Available at: http://www. Enclaria.com/2009/10/01traits-and-skills-of-effective-change-agents/ (accessed on 30 March 2013).

Strebel, P. 1998. *The change pact.* San Francisco: Biddle.

Tabachnik, BG & Fidell, LS. 2001. *Using multivariate statistics.* 4th edition. Needham Heights, MA: Allyn & Bacon.

Tearle, R. 2007. *The role of a change master: From change agent to change master.* Available at: http://www.changedesigns.co.za/The_role_of_a_change%20 master.htm (accessed on 16 October 2007).

Trochim, W. 2002. *Non-probability sampling.* London: Routledge.

Tschirky, H. 2011. *Managing innovation-driven companies: Approaches in practice.* New York: Palgrave Macmillan.

Van der Linde-de Klerk, M. 2011. The development and validation of a change agent identification framework. Unpublished DCom thesis. University of South Africa, Pretoria.

Van der Linde-de Klerk, M, Martins, N & De Beer, M. 2014. The development of a change agent identification framework for South African change agents. *South African Journal of Labour Relations* 38(1):93-115

Van Tonder, CL. 2004. *Organisational change: Theory and practice.* Hatfield: Van Schaik.

Wertheimer, MSW. 2001. *The change agent's tool box: Core qualities of change agents.* Available at: www.nasmhpd.org/general_files/publications/ntac_pubs/ toolbox/agent8.html (accessed on 16 October 2007).