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QUALITY PAPER

Validation of employees' self-leadership using exploratory and confirmatory factor analysis

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Abstract

Purpose – Self-leadership (SL) involves the strategic management of people's perceptions and behaviours to enable them to set directions, identify their needs and work effectively. Here, an instrument was developed to measure SL of employees, organisations and managers in Thailand context.

Design/methodology/approach – Questions were developed for a questionnaire based on concepts and theories and validated using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) along four performance dimensions. Research samples were employees in the accommodation industry in Thailand. Factor analysis results confirmed the questionnaire as a reliable SL instrument with acceptable composite reliability (CR), average variance extracted (AVE) and convergent and discriminant validity.

Findings – Four factors of SL were identified as self-visualising and goal setting, self-reward and positive thinking, self-observation and cueing and self-talking and evaluating beliefs comprising 21 items. Factor analysis confirmed the validity of the questionnaire as a reliable SL tool as evidenced by a CR of 0.811 and AVE of 0.526 with acceptable convergent and discriminant validity criteria.

Research limitations/implications – Results were limited to a single group sample of accommodation and cross-sectional design and should be carefully considered for application in different situations.

Practical implications – Findings regarding the four performance dimensions suggest that this SL scale questionnaire can be applied to different businesses and settings either as is or with slight modifications.

Originality/value – Our SL scale is novel and serves as an excellent instrument to measure the behavioural perception of employees.

Keywords Self-leadership, Self-leadership questionnaire, Self-leadership validation, Self-leadership scale

Paper type Research paper

Introduction

Leadership is an aspect which is widely studied to determine organisational behaviours, industrial psychology, human resource development and administrative management (Hellriegel, 2017). Leadership relates to changes in complicated business and organisational environments (Higgs, 2003). Many academics have defined and developed concepts, theories and leadership models. By definition, leadership is an individual's influence on other people and perceived as a role performed by a particular person. In addition, leadership is defined by the actions of an individual to gain influence and power. A '*leader*' is superior to others and those with less influence or power are called '*followers*' (Pearce and Manz, 2014). However, to achieve global economic success, knowledge is essential for leaders to express their different potentials to effectively lead their followers and satisfy organisational operations. Creative dimensions of knowledge are also essential for appropriate operation (Khurana and Nohria, 2010). Furthermore, dimensions focusing on the continuous improvement of leadership are extremely important (Avolio *et al.*, 2009) to manage and steer companies in the most profitable direction. According to Pearce and Manz (2014), focus on strategies to develop the leadership potential of suitable people is helpful and allows staff to effectively deal with challenging changes in various situations.

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Currently, organisations are aware that effective operation does not only rely on competent management but also on employees who are knowledgeable, thoughtful and capable, with good attitudes towards their work responsibility to achieve the expected results. Achieving optimal potentials requires managers with strong leadership qualities who are respected by employees. Both managers and staff need to develop their own leadership, known as '*self-leadership*'. They should be aware that capable application to enhance motivation of both themselves and others will lead to mutual acceptance and improve teamwork (Yun *et al.*, 2006). Leadership theory posits that people's attitudes, beliefs, habits and motivation cause significant differences in motivation to work and achieve their own tasks (Van Wart, 2014). Effectiveness of self-leadership occurs from the strategy of self-influence to create ideas and perform effectively (Bendell *et al.*, 2019; Manz, 1986; Neck *et al.*, 2013). SL focuses on individual self-acceptance and the ability to work with others to operate or perform as expected and achieve company goals. SL is an influential factor that promotes acceptable and desirable behaviour when facing increased work pressure from both internal and external environments. SL allows an individual to perform well and control various incidents or behaviours resulting from changing situations (Manz, 1986; Stewart *et al.*, 2011).

In Thailand, the concept of SL has attracted little attention from academics, researchers and organisational behaviourists. A search of '*self-leadership*' as a keyword in the *Thai Library Integrated System* (*ThaiLIS*) database found only seven research papers with the first published in 2000. Another Thai database, *Thai Journal Online* (*ThaiJo*), funded by The Thailand Research Fund, comprises a collection of academic journals published in Thailand covering all fields of study. An exploration of the interest in SL and when it was first studied discovered only 11 academic papers.

Research concerning educational self-leadership in Thailand was presented by Pongsriwat (2007). He stated that instructive administrators have to show self-leadership to perform their responsibilities most effectively. Superleadership is based on individual self-leadership where the leader promotes and encourages employees to develop their own self-confidence and actively participate in operations or company goals (Jomhongbhibhat *et al.*, 2013; Upathum, 2015; Bumrungjit and Na Wichian, 2015; Paisitsakulkad and Thaijaidee, 2017; Yuenyaw, 2017; Keawsen *et al.*, 2018). In 2016, Kumsiri *et al.* (2016) examined self-leadership factors to test and develop training programmes. They found that self-leadership correlated with the performance of charge nurses at Phramongkutklao Hospital at a level < 0.05, while Phumiphan *et al.* (2016) developed a training programme for self-leadership of students and tested it using the Houghton and Neck (2002) scale. Their findings indicated that after completing the training programme, students showed significantly improved behaviour as self-starters with self-direction and motivation, rewarding personal accomplishment and the inclination to follow-up and determine reasons for personal failure. Later, Nantharojphong and Siriwong (2017) conducted qualitative research on Gen Y regarding the self-leadership topic. Results identified four types of self-leadership as self-awareness, self-efficacy, self-management and self-confidence. Accordingly, knowledge of SL in the Thai context is scant and has only recently been studied. An accurate understanding and explanation of self-leadership is lacking. Here, this important concept is addressed to fill the knowledge gap between principle and practice.

Increasing the body of knowledge concerning SL is important and urgently required to generate knowledge in the Thai context. Study of SL is also necessary to collect accurate, precise and reliable data as a measuring instrument. Because of the importance of SL as described above, researchers are interested in studying SL of employees in organisations to develop accurate, precise and reliable measurements. Our measuring instrument will be useful for researchers, academics, students and others who are interested in the study of SL.

Related theories of SL

Bracht *et al.* (2018), Manz (1986) and Neck and Manz (2013) stated that SL can be described as a process in which people control their behaviour and create influence through strategy and perception. SL is a self-influencing process that enhances an individual's self-direction and self-motivation ability. SL specifies a collection of intra-individual strategies that provide explicit behavioural and cognitive prescription and these can also be used to achieve greater individual effectiveness (Bendell *et al.*, 2019). SL theory focuses on the values of both employees and managers as dependent entities who cooperate with others to fulfil their goals (Van Wart, 2014). Manz (1986) and Marques-Quinteiro *et al.* (2019) mentioned that human behaviours are performed according to the effects of external factors, although performance is usually controlled by internal individual factors (Napiersky and Woods, 2018). SL directs and regulates personal performance and behaviour to set oneself goals followed by self-observation of performance towards those goals, regulation of behaviour and provision of self-reward (Karp, 2012; Flores *et al.*, 2018).

Leadership is a normative model since various strategies are established and designed with goals to satisfy efficiency and effectiveness (Neck and Houghton, 2006) through explanations of what to do and how to do. Therefore, this issue is interesting and important as suitable staff development behaviour for goal achievement. The main challenge of SL is to develop individuals to behave as leaders as well as maintaining long work retention in the organisation. SL performance can be expressed in both formal and informal situations or incidents which enable people to complete tasks and achieve effective productivity and outcomes (Katewa and Heystek, 2019; Lopdrup-Hjorth *et al.*, 2011).

Development of SL can be integrated from four main theories: *social cognitive theory*, *self-regulation theory*, *self-control theory* and *intrinsic motivation theory* (Bendell *et al.*, 2019; Houghton *et al.*, 2004; Manz, 1986; Megheirkouni, 2018; Neck *et al.*, 2013; Neck and Manz, 2013), as detailed below.

Social cognitive theory. Social cognitive theory was proposed by Bandura (2001) as a concept which combines behaviourism and cognitivism. The theory states that human behaviours are formed through social learning as well as the ability to recognise, retrieve and use past accumulated knowledge. Social cognitive theory holds that knowledge acquisition occurs through social learning and can be directly related to observing the social interactions of others within the environment (Newman *et al.*, 2018). Social cognitive theory considers that human behaviours are partly formed by previous learning experiences and partly by interaction or observation of other people's behaviours. This results in individual learning through following various behaviours observed in others during work operation (Ring and Kavussanu, 2018). Social cognitive theory focuses on the basis of learning from experience and that individual learning results from a cause and effect relationship comprising three components: *personal factor*, *environmental factor* and *behavioural factor*. All these factors have interrelated influence and are characterised as related causes and effects.

Self-regulation theory. Self-regulation theory is a concept based on social cognitive theory. It assumes that human behaviours are not the results of reinforcement and/or punishment from only the external environment but that people behave or act to control their feelings, thoughts and actions by doing what is called *self-regulation*. Baumeister and Vohs (2018) suggested self-regulation as a way to regulate oneself to express or act as required to follow the desired direction; it represents an individual's attempt to change his/her internal mind to respond with the desired outcome.

Self-regulation is a process by which people set individual goals to pass their own behavioural record and use their own strategies to fulfil these goals as operators and process controllers (Zimmerman, 1998). Self-regulation can be divided into three components: *self-observation*, *self-judgement* and *self-reaction* as follows.

(1) *Self-observation* is behavioural performance about learning conditions and includes two main parts: *goal setting* and *self-monitoring*. *Goal setting* is the attempt to determine desirable behaviours to perform or set criteria for particular behaviours to be changed. *Self-observation* is referred to as the human process to observe and record the targeted behaviours they experience and use the information to observe their own actions.

(2) *Self-judgement* is a process which applies various guidelines to compare what is happening from the targeted behaviours before making judgement and amending the targets. Guidelines for making judgement are based on three criteria: *types of standards*, *goal properties* and *importance of goal attainment*.

(3) *Self-reaction* allows a person to evaluate possible choices to achieve the target. This evaluation is based on belief in the possibility of success as expected. *Self-reaction* influences motivation to change behaviours.

Self-management and self-control theory. Bandura (2001) mentioned that *self-control* is the ability to express and determine one's own thinking, emotion, feeling and action so as not to encounter problems, obstacles or situations with internal mental conflict. Similarly, Rosenbaum (1980) suggested that self-control represents the ability to inhibit a particular action or behaviour through reason and patience to achieve desirable results which avoid negative consequences. Self-control is the ability of a person to manage the environment as desired (Welsh *et al.*, 2018). If problems, obstacles or situations of self-conflict are encouraged, Bandura's self-control theory believes that a suitable behaviour or ability will be selected to reach the expected goals. Later, Rosenbaum (1980) and Rosenbaum *et al.* (2018) modified and further expanded the characteristics of individual self-regulation as follows.

(1) Using *self-statements*, a person controls all their emotional and physical expression through self-observation to evaluate their own record or recognition with reinforcement or motion to perform better behaviours with rewards.

(2) *Problem-solving strategies* are applied in steps by setting plans, analysing problems, creating choices, evaluating choices, following the selected choices and evaluating choice results and consequences.

(3) Self-regulation is the ability to wait patiently to obtain success and rewards without doing anything arbitrarily and without performing any behaviours other than those planned or intended. It also includes the ability to regulate desire and wait for success and rewards.

(4) Self-regulation is the ability of conscious personal management to control, operate and achieve plans, guidelines or goals. Self-perception helps a person to be confident in their own potential to conduct work as planned and achieve the expected goals.

Intrinsic motivation theory. *Intrinsic motivation theory* is a concept used to explain human behaviours to work with full potentials without receiving any rewards or reinforcements. Intrinsic motivation theory values the attributes of work or work activities because these encourage curiosity, interest, the need to know and develop relevant responsibilities to enhance work challenge and interest (Wang *et al.*, 2016). These factors promote various behaviours (Kuvaas *et al.*, 2017). According to this concept, Choochom (2012) and Choochom *et al.* (2001) stated that intrinsic motivation occurs as a result of individual need which encourages a person to perform different behaviours. In addition, emotion also influences related intrinsic motivation. Sometimes, amusement and excitement occur simultaneously with learning and developing individual potentials. Thus, intrinsic motivation is a response factor to individual needs to reach the goal. Intrinsic motivation focuses on *task intrinsic*

incentives such as challenges, responsibilities and newness. Previous research confirmed that intrinsic motivation has positive effects including creativity, work effectiveness, job satisfaction, work commitment and quality of working life (Choochom, 2012; Choochom *et al.*, 2010; Gagné and Deci, 2005).

Characteristics of SL

SL is a process that strategically manages people's perceptions and behaviours to enable them to set directions and perceive what they need to work in an effective manner. Leadership strategies can be classified into three types: behavioural-focused strategies, natural reward strategies and constructive thought pattern strategies (Houghton *et al.*, 2004; Maykrantz and Houghton, 2018; Neck *et al.*, 2019).

Leadership emanates from a person's internal influence or power to exhibit behaviour which achieves the expected results and allows self-development and effective working processes. Self-leadership behaviours are agreements between organisations and employees. When people are instructed in self-leadership development, positive effects mostly occur as a result of the independence to design work systems, having creativity, using psychology to enhance power, having mutual trust and reliability as well as team potential development. Mechanisms of self-leadership include the following strategies.

(1) Behaviour-focused strategies increase self-awareness for managing one's own behaviours (Reddy and Jooste, 2015). These strategies are difficult for individuals to master as they rely on self-observation, self-goal setting, self-reward, self-punishment and practice (Furtner *et al.*, 2018; Sesen *et al.*, 2017; Politis, 2015; Zeijen *et al.*, 2018).

- Self-observation increases awareness of behaviours or work operation in an effective way to improve performance. Self-observation also assists people as individuals to modify each part of their behaviour.
- Self-goal setting fixes one's own goals concerning behaviour, work goals and life goals which can be modified to reach the target.
- Self-reward is giving rewards or returns to oneself when behaving or operating successfully to reach the goals. A reward also motivates a particular behaviour to achieve the desirable result.
- Self-punishment is a process whereby a person explores weaknesses in work operations or working methods to learn how to fix them and avoid possible mistakes which might occur in the future.
- Practice is a behaviour that can be continuously performed to improve capability, skill and expertise.

(2) Natural reward strategies centre on the more enjoyable aspects of work or responsibilities (Houghton *et al.*, 2004; Manz, 2015); they are determined or formed by individuals based on work or operational experiences. Such rewards may be in the form of amusement, satisfaction and enjoyment which enhance the perception of meaningful and satisfactory work or activities (Ziyae and Heydari, 2016).

(3) Constructive thought pattern strategies enable a person to attain leadership by creating thinking patterns through self-evaluation, developing belief, imagining operations for successful work and positive self-talking (Ay *et al.*, 2015). Leadership requires SL, motivation process, thinking control and development of individual thought patterns. When thought patterns are trained and familiar, they will result in desirable outcomes to mitigate against problems of undesirable behaviours from

work pressures or other problems resulting from incomplete thought patterns (Park *et al.*, 2016). SL absorbed through self-evaluation enables a person to analyse problems and find solutions under different pressures. It also includes self-talk or self-dialogue which is a mechanism to evaluate and learn through patience, eliminate negative thinking and be encouraged to face and deal with possible problems (Breevaart *et al.*, 2016). In addition, mental imagery involves imagining future scenarios to accomplish work operations by linking previous experiences.

Research methodology

Population and sample

The research population sample consisted of 2,120 SMEs in the accommodation and hotel business in the north of Thailand (The Office of Small and Medium Enterprises, 2017). Sample size was calculated as 20 times the number of questions in the questionnaire following the methodology of Siddiqui (2013). The sample size was set at 420 front desk reception staff who verified guests' reservations and checked room availability. The respondents also dealt with financial or general customer documents because SMEs have few employees who all shoulder several responsibilities. Convenient random sampling was applied by selecting samples from regional name lists of The Office of Small and Medium Enterprises Promotion and sent by letter. Out of 420 distributed questionnaires, 385 were returned but only 374 were completed.

Instrument development

Table I lists the four construct definitions of social learning and related references. To confirm content validity, all items were developed from previous concepts, theories and research as applicable to the Thai context. The most important requirement for a good instrument is content validity. Assessment items in an instrument should cover the key contents of a

Constructs	Definition	References
Self-visualising and goal setting	Awareness of goals to increase work effort through developing clear targets or guidelines for future work operations with the self-confidence to overcome challenges and problems to achieve results	Houghton *et al.* (2004), Manz (1986), Manz (1992), Manz (2015), Neck *et al.* (2013), Reddy and Jooste (2015), Furtner *et al.* (2018), Sesen *et al.* (2017), Politis (2006), Zeijen *et al.* (2018)
Self-reward and positive thinking	Giving self-rewards or performing favourite activities after successfully completing the assigned tasks. Adopting positive thinking to maximise self-abilities and preferences	Ay *et al.* (2015), Breevaart *et al.* (2016), Houghton *et al.* (2004), Manz (1986), Manz (1992), Manz (2015), Neck *et al.* (2013), Manz (2015), Park *et al.* (2016)
Self-observation and cueing	Determining and examining methods and activities for effective operation through attention to detail to achieve the required results. Setting targets to increase self-awareness and confidence to successfully perform in challenging or difficult situations	Ay *et al.* (2015), Breevaart *et al.* (2016), Houghton *et al.* (2004), Neck *et al.* (2013), Manz (2015), Park *et al.* (2016)
Self-talking and evaluating beliefs	Enhancing awareness, performance, confidence and general well-being. Guidelines for working methodology can enhance results through personal reminders	Ay *et al.* (2015), Breevaart *et al.* (2016), Houghton *et al.* (2004), Manz (1986), Manz (1992), Manz (2015), Neck *et al.* (2013), Manz (2015), Park *et al.* (2016)

Table I. The four construct definitions of self-leadership

measurement construct (Churchill Jr, 1979). When developing instruments to assess SL, researchers adapted conceptual theory (Houghton *et al.*, 2004; Manz, 1986; Neck *et al.*, 2013; Neck a Manz, 2013) since content validity is usually developed through an extensive literature review or interviews with academicians and practitioners. First, we defined each variable as relevant to the study context based on previous SL literature. Second, we identified key elements of each definition and then developed questions to cover the definitions (Table II). The questionnaire was developed in Thai language. In addition, we chose an appropriate measurement scale as a five-point rating Likert scale with the following options; not at all accurate (1); somewhat accurate (2); a little accurate (3); mostly accurate (4); and completely accurate (5). Furthermore, questions were verified for content validity by five qualified experts in leadership, organisational behaviour, human resource development, industrial psychology and behavioural science research fields to satisfy content validity requirements and determine appropriateness of the research constructs. Based on feedback from the experts, redundant and ambiguous questions were either modified or eliminated. New items were added wherever deemed necessary. All research instruments satisfied each question's index of item-objective congruence (IOC) at > 0.80–1.00. Rovinelli and Hambleton (1976) stated that if five experts were used for content validation, then an IOC value of approximately 0.80 would be regarded as statistically significant. The Thai SL questionnaire was used for data collection. We also translated the questionnaire into English to publish and share knowledge with academics and researchers around the world. Cross-translation was performed by Thais with both Thai and English proficiency and revisions were then made to ensure that the English version accurately reflected the content of the Thai original. This process continued until all reviewers agreed that the translation was as accurate as possible, given that some Thai words do not have exact English equivalents.

Question	Notation	Description
1	SL 1	If I am assigned to do an important task, I can see clear imageries or guidelines for work operation
2	SL 2	I develop imageries or guidelines to overcome challenges which I encounter
3	SL 3	I feel confident and imagine successful operation before I start to work
4	SL 4	I think of successful results of work operation before I start to work
5	SL 5	I set clear goals for work operation
6	SL 6	I am always aware of mental goals to increase work effort
7	SL 7	I specify clear goals for my work operation
8	SL 8	I have clear guidelines for work operation and I follow them
9	SL 9	I pay attention to working methods to achieve good results
10	SL 10	I follow up and examine progress of work operations and assignments
11	SL 11	I take short notes to remind myself what to do
12	SL 12	I use predetermined records and schedules as guidelines for successful work operation
13	SL 13	I have the self-confidence to cope with difficulties and challenges which I encounter
14	SL 14	I try to examine whether my thoughts or beliefs are correct and if I can solve the encountered problem or not
15	SL 15	When I am in challenging situations, I tell myself that I can pass through them
16	SL 16	When I am in troublesome situations or face difficulties, I perform self-talk to encourage myself
17	SL 17	When I complete my work assignment successfully, I give myself rewards such as treating myself to favourite activities
18	SL 18	When I complete my work successfully, I give myself special rewards (going to the cinema, eating out at a good restaurant, going shopping etc.)
19	SL 19	When I complete my work successfully, I give myself rewards such as favourite items
20	SL 20	I perceive my work positively more than negatively
21	SL 21	I find work activities or responsibilities to be suitable for my capability and preferences

Table II.
SL questionnaire

Finally, the questions were pilot studied to verify internal consistency reliability using corrected item-total correlation and Cronbach's alpha with 30 participants who were similar to the sample but not research sample members. Results are shown in Table III. One very significant specification is that assessments must be free of error for consistent findings. The corrected item-total correlation value measures the reliability of a multi-item scale and is often used as an instrument for improving such scales. It measures the relationship between each item and the total score without that item. Henrysson (1963) stated that a corrected item-total correlation value ranging between 0 and 0.19 refers to a question that is not discriminating well, between 0.2 and 0.39 indicates good discrimination while values of 0.4 and above indicate very good discrimination. Here, all values of corrected item-total correlation were over 4.00, indicating that the questions showed very good discrimination. Reliability refers to the internal consistency of a measurement scale and assesses the degree of items as homogeneous. Only variables with stable and constant responses to a repeated set of tests can be accepted as reliable (Cronbach, 1951). Examining for item unidimensionality is assumed to be the main aspect of reliability which may otherwise face major underestimation. Cronbach's alpha was used to assess the questionnaire to determine invalid items which would impact on data accuracy (Miller, 1995). Cronbach's alpha reliability coefficient results showed overall SL as 0.951 for internal consistency. For reliable results, Bonett and Wright (2015) suggested that the Cronbach's alpha coefficient should be more than 0.60.

Data analysis

Different statistics were used for data analysis in each part. First, we used descriptive statistics to explain the characteristics of the respondents. Second, Pearson's correlation coefficient was used to test relationships among the questionnaire and variables. Third, EFA was utilised to identify relationship structures between the measured questionnaires. Finally, CFA examined whether construct measurements concurred with both theoretical and empirical data. Both EFA and CFA analyses were performed on single samples. For the

Factor	Question number	IOC	Corrected item–total correlation	Cronbach's alpha
SL				0.951
	SL 1	1.000	0.791	
	SL 2	1.000	0.715	
	SL 3	1.000	0.764	
	SL 4	1.000	0.830	
	SL 5	1.000	0.683	
	SL 6	1.000	0.745	
	SL 7	1.000	0.729	
	SL 8	1.000	0.609	
	SL 9	1.000	0.567	
	SL 10	0.800	0.509	
	SL 11	1.000	0.472	
	SL 12	1.000	0.634	
	SL 13	1.000	0.752	
	SL 14	1.000	0.719	
	SL 15	1.000	0.759	
	SL 16	1.000	0.553	
	SL 17	0.800	0.789	
	SL 18	0.800	0.750	
	SL 19	1.000	0.648	
	SL 20	1.000	0.633	
	SL 21	1.000	0.564	

Table III.
Pre-test of IOC and Cronbach's alpha constructs

first, second and third data values we used IBM SPSS 21.0 while IBM AMOS 21.0 was employed for testing CFA.

Data analysis

Table IV presents demographics of the 374 respondents; 60.96 per cent were female and the remainder (39.04 per cent) were male. Half (53.21 per cent) were between 20 and 30 years old, followed by 31–40 (30.75 per cent) and 16.04 per cent between 41 and 50 years old. Over half (63.37 per cent) had a bachelor degree, 20.86 per cent had lower than bachelor degree and 15.78 per cent had a master degree. For experience, 42.78 per cent had 4–5 years' experience, 35.83 per cent had between two and three years' experience, followed by more than five years (13.64 per cent) and 7.75 per cent with less than one year experience. For position in organisation, 54.28 per cent were senior staff and the rest held junior positions (45.72 per cent).

Exploratory factor analysis

Data were subjected to many iterative EFA cycles. For each iteration, we tested the anti-image correlation. The item with the least anti-image correlation was discarded and the process was repeated with the remaining questions. Each iteration was assessed using Bartlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Our goal was to improve the KMO measure to at least 0.5. Leech *et al.* (2013) stated that the critical value should exceed 0.50 and that factor analysis cannot be conducted below this critical value.

We used principal component analysis to determine factor extraction, analysed by the Varimax method with Kaiser normalisation. The factor correlation matrix indicated that inter-factor correlations were insignificant; hence the Varimax method was used for rotation.

The first step must be taken into consideration before the KMO and Bartlett's test. The KMO test was applied to assess sampling adequacy for each variable in the structure

Variable	Frequency	%
Gender		
Male	146	39.04
Female	228	60.96
Age (years)		
20–30	199.00	53.21
31–40	115.00	30.75
41–50	60.00	16.04
Education		
Under bachelor degree	78.00	20.86
Bachelor degree	237.00	63.37
Master degree	59.00	15.78
Experience (years)		
<1	29.00	7.75
2–3	134.00	35.83
4–5	160.00	42.78
>5	51.00	13.64
Position		
Staff	171.00	45.72
Senior staff	203.00	54.28

Table IV. Demographics of the respondents

while Bartlett's test was applied to determine the sign of the correlation significance between the study variables. For the KMO test, the value should be at least 0.60 to indicate sample adequacy to conduct EFA, while Bartlett's test was used to investigate the hypothesis, with results either pointing to rejecting the null hypothesis or accepting an alternative hypothesis depending on *p*-value significance. Both KMO and Bartlett's tests are very important for exploratory factor analysis. Table V shows the KMO conformity test results for the 21 questions at 0.920. Consistent with Hair *et al.* (2010), the KMO value concurred with the critical value at between 0.8 and 1 as very high and adequate to conduct EFA. Bartlett's test of sphericity depicted a significance level of 0.000 as very significant, consistent with Watkins (2018) who stated that the significance level of *p*-value should be less than 0.05 to indicate sufficient correlation between the variables.

Factor loading represents the correlation coefficient between each question and the common factor. After conducting an analysis of a principal component factor, common factors can be attained by merging questions that have highly related factor loadings. After the principal component factors of the valid questions were recalculated, a solution encompassing three factors was found which accounted for 64.332 per cent of the total variance (Table VI).

To accept interpretation of the factors, Tabachnick and Fidell (2007) suggested that questions with poor factor loading of less than 0.32 should be removed. A good factor loading value should be over 0.55. Orthogonal matrix rotation based on the largest variance was performed to select questions with loading factors greater than 0.55 as the common factors (Liu *et al.*, 2018). Table VI presents the four extracted common factors along with the matrix of loading factor after rotation. An individual common factor was allowed a mark to show the common and possible attributes of the factor, consistent with the latent variable of the SEM model.

Table VII shows the EFA findings of the SL questionnaire with questions categorised into four SL dimensions (latent factors) as self-visualising and goal setting, self-reward and positive thinking, self-observation and cueing and self-talking and evaluating beliefs. Factor I accounted for 8.223 per cent of the eigenvalues and encompassed Questions 1–7 with factor weights of 0.695–0.804. This factor was hence constituted self-visualising and goal setting. Factor II accounted for eigenvalues at 2.684 and included Questions 17–21 with factor weights of 0.667–0.813. This factor was hence denoted as self-reward and positive thinking. Factor III accounted for 1.442 of the eigenvalues and consisted of Questions 12–16 with factor weights of 0.622–0.784. This factor was hence named self-observation and cueing. Finally, Questions 8–11 constituted the self-talking and evaluating beliefs dimension (Factor IV) of SL with factor weights at 0.639–0.819. The accumulated percentage of self-visualising and goal setting, self-reward and positive thinking, self-observation and cueing and self-talking and evaluating beliefs variance was 64.332.

Cronbach's alpha reliability test was verified to confirm the proper dimension of the factors after conducting EFA (Table VIII). The alpha value for all 21 items was 0.922. The four common dimensions ranged between 0.771 and 0.902. They were all higher than the minimum requirement for Cronbach's alpha coefficient value of 0.70. According to the reliability results, Bonett and Wright (2015) suggested that to be acceptable the Cronbach's alpha coefficient value should be more than 0.60. Furthermore, a Cronbach's alpha coefficient

Kaiser-Meyer-Olkin measure of sampling adequacy		0.920
Bartlett's test of sphericity	Approximate chi-square	4186.655
	df	210
	Significance	0.000

Table V.
KMO and Bartlett's tests

Component	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	8.223	39.158	39.158	8.223	39.158	39.158	4.543	21.632	21.632
2	2.684	12.780	51.938	2.684	12.780	51.938	3.503	16.682	38.314
3	1.442	6.869	58.807	1.442	6.869	58.807	3.124	14.874	53.188
4	1.160	5.526	64.332	1.160	5.526	64.332	2.340	11.144	64.332
5	0.772	3.678	68.010						
6	0.698	3.323	71.333						
...	...	...	...						
21	0.215	1.024	100.000						

Table VI.
Interpretation of total variance by exploratory factor analysis

Question	Common factor	Factor weight I	II	III	IV
SL 1	0.649	0.774	0.143	0.082	0.154
SL 2	0.700	0.801	0.171	0.086	0.150
SL 3	0.667	0.791	0.110	0.111	0.128
SL 4	0.607	0.725	0.140	0.145	0.201
SL 5	0.688	0.804	0.081	0.173	0.073
SL 6	0.569	0.734	0.061	0.148	0.071
SL 7	0.556	0.695	0.136	0.179	0.151
SL 8	0.675	0.384	0.240	0.067	0.682
SL 9	0.740	0.179	0.166	0.096	0.819
SL 10	0.533	0.142	0.088	0.312	0.639
SL 11	0.550	0.117	0.116	0.321	0.648
SL 12	0.520	0.160	0.258	0.622	0.203
SL 13	0.552	0.113	0.300	0.648	0.173
SL 14	0.708	0.139	0.201	0.784	0.184
SL 15	0.675	0.223	0.265	0.731	0.144
SL 16	0.626	0.185	0.253	0.715	0.127
SL 17	0.609	0.227	0.667	0.270	0.199
SL 18	0.687	0.151	0.753	0.280	0.135
SL 19	0.724	0.150	0.791	0.258	0.102
SL 20	0.755	0.168	0.813	0.230	0.113
SL 21	0.719	0.068	0.810	0.203	0.131

Note(s): Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.

Table VII. EFA findings of the SL questionnaire

value close to 1.0 indicated that internal consistency of the items in the scale was excellent (George, 2011). Therefore, each individual factor possessed good internal consistency.

First- and second-order CFA were sequentially carried out on the 21 questionnaire questions and the four latent factor dimensions (self-visualising and goal setting, self-reward and positive thinking, self-observation and cueing and self-talking and evaluating beliefs). Table IX depicts the first- and second-order CFA results of the SL questionnaire and latent factors. For *self-visualising and goal setting* dimension (Factor I), Questions 1–7 exhibited factor loadings of 0.687–0.821 with R^2 of 0.472–0.673. For *self-reward and positive thinking* dimension (Factor II), Questions 17–21 presented factor loadings of 0.701–0.829 with R^2 of 0.492–0.688. For *self-observation and cueing* dimension (Factor III), Questions 12–16 depicted factor loadings of 0.655–0.822 with R^2 of 0.429–0.676. Finally, Questions 8–11 constituting *self-talking and evaluating beliefs* dimension (Factor IV) had factor loadings of 0.584–0.786 with R^2 of 0.341–0.617. However, some R^2 values were very low; SL 10 and SL 11 were less than four as also very low for prediction. Tayraukham (2010) suggested that low R^2 values in CFA could be found in cases where the questions were not covered in the research scope.

Extracted common factors	Cronbach's alpha
SL (21 items)	0.922
I: Self-visualising and goal setting (7 items)	0.902
II: Self-reward and positive thinking (5 items)	0.890
III: Self-observation and cueing (5 items)	0.845
IV: Self-talking and evaluating beliefs (4 items)	0.771

Table VIII. Cronbach's alpha reliability test after conducting EFA

Main indicator (latent factors)	Question	Factor loading	R^2
I	SL 1	0.798***	0.636
$b = 0.529$***	SL 2	0.821***	0.673
$R^2 = 0.280$	SL 3	0.773***	0.597
	SL 4	0.727***	0.529
	SL 5	0.801***	0.642
	SL 6	0.703***	0.494
	SL 7	0.687***	0.472
II	SL 17	0.785***	0.616
$b = 0.831$***	SL 18	0.793***	0.629
$R^2 = 0.691$	SL 19	0.785***	0.617
	SL 20	0.829***	0.688
	SL 21	0.701***	0.492
III	SL 12	0.655***	0.429
$b = 0.844$***	SL 13	0.771***	0.595
$R^2 = 0.713$	SL 14	0.758***	0.575
	SL 15	0.822***	0.676
	SL 16	0.743***	0.552
IV	SL 8	0.747***	0.558
$b = 0.652$***	SL 9	0.786***	0.617
$R^2 = 0.425$	SL 10	0.584***	0.341
	SL 11	0.624***	0.389

Note(s): ***indicates .001 significance level, b is factor weight, R^2 indicates accuracy

Table IX.
Results of first- and second-order CFA of the SL questionnaire

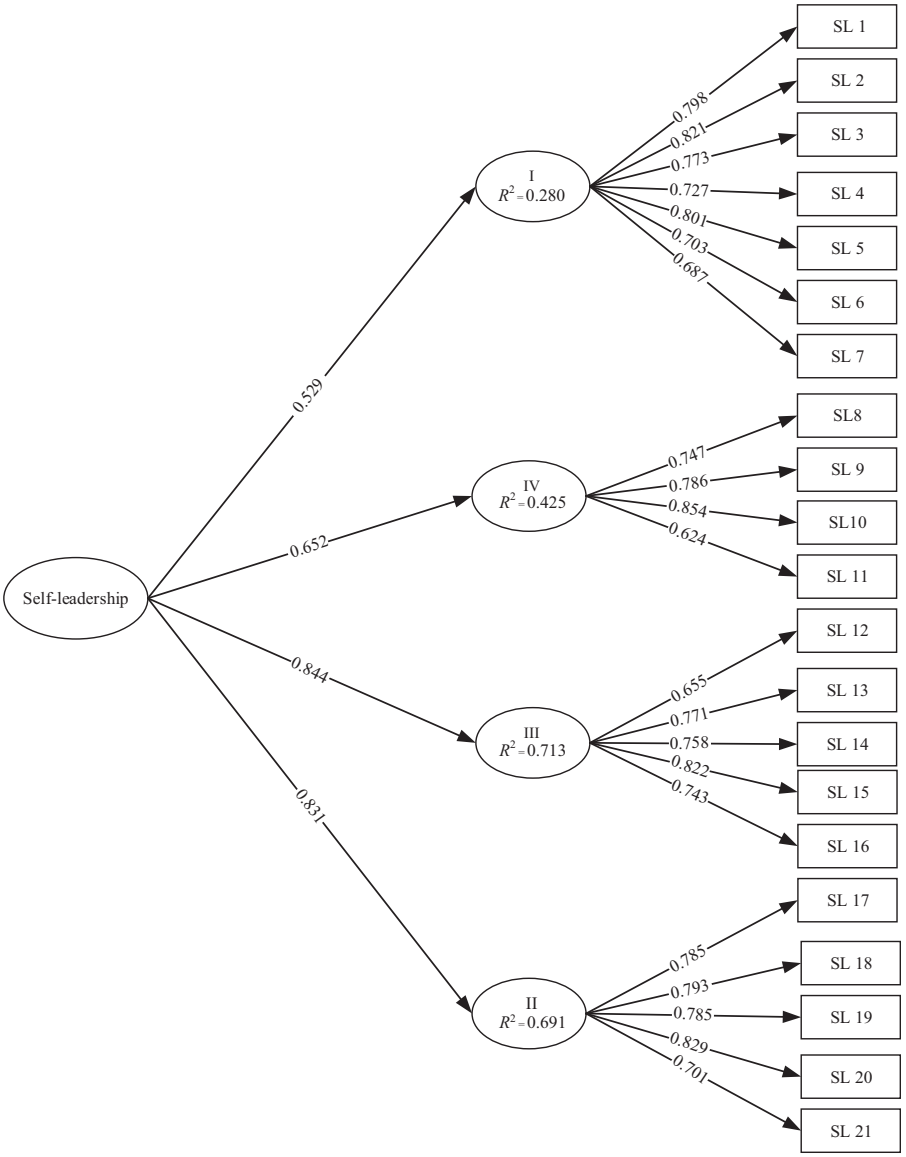
Meanwhile, Stone *et al.* (2013) stated that in some research fields low R^2 values could be expected. Areas that attempt to predict human behaviour or psychology are more difficult to predict than science and commonly have R^2 values lower than 0.50. Our research aimed to predict perception of human behaviour in SL and low R^2 values were, therefore, expected.

To measure overall model fitness, many measurements were chosen for each category of goodness of fit metrics. Table X and Figure 1 illustrate the CFA result of SL where $\chi 2 = 199.904$, df = 170, $p = 0.058$, GIF = 0.950, AGIF = 0.932, RMSEA = 0.022 and RMR = 0.018 concurring with the empirical data. Results were consistent with Byrne (2016) and Wiratchai (1995) who stated that the goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), the Tucker and Lewis index (TLI) and the comparative fit index (CFI) should

Types	Index	Fit standard of fitness	Value	Result
Absolute fit	Chi-square ($\chi 2$) test	>0.05	0.058	✓
	$\chi 2$/degree of freedom	<2	1.176	✓
	RMR	<0.02	0.018	✓
	RMSEA	<0.05	0.022	✓
Incremental fit	GFI	>0.90	0.950	✓
	NFI	>0.90	0.951	✓
	RFI	>0.90	0.939	✓
	IFI	>0.90	0.992	✓
	TLI	>0.90	0.990	✓
	CFI	>0.90	0.992	✓
Parsimonious fit	PGFI	>0.50	0.699	✓
	PNFI	>0.50	0.770	✓
	PCFI	>0.50	0.803	✓

Table X.
CFA results of model variables in relation to empirical data

be more than 0.9 or close to 1. The root mean square residue (RMR) should not exceed 0.02 and the root mean square error of approximation (RMSEA). The parsimony comparative fit index (PCFI), parsimony goodness of fit index (PGFI) and parsimony normed-fit index (PNFI) should have values over 0.50.



Chi-square = 199.904, df = 170, p = 0.058, GFI = 0.950, AGFI = 0.932
RMSEA = 0.022, RMR = 0.018

Figure 1.
SL structural model

The questionnaire was investigated for construct validity using CFA. Loading factors of the 21 items were in the range of 0.584–0.829 at the first order, where a loading factor in excess of 0.30 was statistically significant (Kim and Mueller, 1978). CR of first-order CFA construct validity of self-visualising and goal setting dimension was largest (0.905) followed by self-reward and positive thinking (0.885), self-observation and cueing (0.866) and self-talking and evaluating beliefs (0.782), where CR in excess of 0.70 was regarded as statistically significant (Hair *et al.*, 2010). AVE was in the range 0.476–0.607, where an AVE value in excess of 0.50 was regarded as statistically significant (Zaiţ and Bertea, 2011). One of the four dimensions showed a value lower than 0.50, indicating a less-than-effective measure of the latent construct. For discriminant validity to assess whether the constructs were sufficiently distinct from each other evaluation measures disclosed weaknesses in the 'participation' and 'reasonableness' constructs. We could accept this result because Fornell and Larcker (1981) stated that if AVE was less than 0.50 but CR retained a value higher than 0.6, then convergent validity of the construct was still adequate. For second-order CFA, loadings of self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing were 0.529, 0.831, 0.844 and 0.652 respectively, with factor loading at over 0.30 and CR at 0.811 which was statistically significant. Finally, AVE (0.526) was also significant. The questionnaire and construct of SL were thus statistically valid and applicable to this empirical research. Convergent validity was tested following the suggestion of Diamantopoulos and Siguaw (2000) that AVE value should be higher than 0.4. AVE values of first- and second-order CFA construct validity in Table XI ranged from 0.476 to 0.607, indicating convergent validity of the measures.

Discriminant validity was tested following the suggestion of Fornell and Larcker (1981) that the square root of AVE should be higher than the squared correlation among the dimensions. Values obtained supported discriminant validity (Table XII). The value of AVE square root for each construct was greater than the level of correction involving the construct.

The final model comprised four self-leadership dimensions (latent factors), namely self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing with 21 questions. CFA verified construct validity of self-leadership.

Discussion

This empirical research proposed an SL questionnaire that encompassed self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing. The questionnaire was validated using EFA and CFA for a sample of 374 employees of small- and medium-sized enterprises. Factor analysis results confirmed the validity of the 21 questions as a reliable performance evaluation tool for human resource management departments, companies and researchers with CR and AVE of 0.811 and 0.526 respectively. Factor analysis results suggested that the SL questionnaire could be utilised as is, or with minimal modifications, to various business fields and/or settings.

The newly developed four-factor structure of SL fits well with empirical data of SME employees in the Thai context. The 21 questions divided into four factors were developed following Bandura (2001), Choochom *et al.* (2001), Gagné and Deci (2005), Houghton *et al.* (2004), Manz (1986), Neck *et al.* (2013), Phumiphan *et al.* (2016),Rosenbaum (1980), Vohs and Baumeister (2004) and Zimmerman (1998) who suggested that SL can be measured in the scope of self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing. Self-talking and evaluating beliefs gave high prediction of SL with R^2 of 0.713 via five questions in the questionnaire, self-talking and evaluating beliefs of employee help them to have clear guideline working and raise awareness of working and results including help them awareness to inspect and follow the work process

Latent factors/questions	Observable variable Factor loading	First-order CFA construct validity CR	AVE	Factor loading	Second-order CFA construct validity CR	AVE
SL					0.811	0.526
Self-visualising and goal setting		0.905	0.577	0.529		
SL 1	0.798					
SL 2	0.821					
SL 3	0.773					
SL 4	0.727					
SL 5	0.801					
SL 6	0.703					
SL 7	0.687					
Self-reward and positive thinking		0.885	0.607	0.831		
SL 17	0.785					
SL 18	0.793					
SL 19	0.785					
SL 20	0.829					
SL 21	0.701					
Self-observation and cueing		0.866	0.565	0.844		
SL 12	0.655					
SL 13	0.771					
SL 14	0.758					
SL 15	0.822					
SL 16	0.743					
Self-talking and evaluating beliefs		0.782	0.476	0.652		
SL 8	0.747					
SL 9	0.786					
SL 10	0.584					
SL 11	0.624					

Table XI.
Construct validity of first- and second-order CFA results

Variable	Mean	SD	I	II	III	IV
I	3.903	0.576	(0.759)			
II	3.845	0.538	0.551**	(0.689)		
III	3.867	0.509	0.453**	0.661**	(0.751)	
IV	3.875	0.571	0.407**	0.456**	0.587**	(0.779)

Note(s): **indicates 0.01 significance level. Values in parentheses represent square root of AVE

Table XII.
Discriminant validity analysis

(Choochom *et al.*, 2010; Kumsiri *et al.*, 2016; Nantharojphong and Siriwong, 2017; Phumiphan *et al.*, 2016). Self-reward and positive thinking also gave high prediction with an R^2 of 0.691 as a result of asking five questions. When employees have the power to reward themselves, this will increase their motivation to work and unleash their true potential (Nantharojphong and Siriwong, 2017; Kumsiri *et al.*, 2016). Self-observation and cueing gave a moderate forecast at 0.425 of R^2; these aspects will help to increase employee awareness, effectiveness and confidence to work in challenging or difficult situations (Kumsiri *et al.*, 2016; Choochom *et al.*, 2010). Finally, self-visualising and goal setting were lowest at R^2 of 0.280 using seven questions. When self-visualising, employees became aware of goals to increase work effort. They developed clear targets or guidelines for future work operations with the

self-confidence to overcome challenges and achieve results (Nantharojphong and Siriwong, 2017; Phumiphan *et al.*, 2016; Choochom *et al.*, 2010).

Four factors were found in this study, consistent with existing research in Thailand conducted by Kumsiri *et al.* (2016), Nantharojphong and Siriwong (2017) and Phumiphan *et al.* (2016) who performed both qualitative and quantitative assessments of self-leadership using the same four factors under different names. Employees who show self-leadership in the workplace will be of benefit to themselves and the company through assigning high responsibilities to their given tasks. They become role models of good behaviour to other colleagues (Jomhongbhibhat *et al.*, 2013; Upathum, 2015; Bumrungjit and Na Wichian, 2015; Paisitsakulkad and Thaijaidee, 2017; Yuenyaw, 2017; Keawsen *et al.*, 2018). Furthermore, results became more significant and relevant when all four SL dimensions were included. Future studies on SL should readily apply our selected 21 questions for data collection which offer high content and construct validity.

Theoretical implications

Our results supported previous SL concepts, theories and literature by developing and validating a questionnaire that explained all dimensions of SL in small- and medium-sized Thai enterprises. In addition, our findings concurred with previous research detailing self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing dimensions of SL. In addition, research results are consistent with existing concepts to assist researchers and academics to explain and support knowledge of SL in different situations or contexts.

Our results concur with existing concepts and theories of SL. Thus, researchers and academics can use these four dimensions to explain SL levels to employees in organisations as guidelines to encourage support and develop employee behaviour. Furthermore, these four dimensions with 21 questions can be applied for further research on SL as an instrument that has passed reliability, convergent and discriminant validity testing. Our findings offer a step forward towards a sophisticated understanding of processes which can strengthen SL in the future.

Practical implications

Our research extends the scope of previous concepts and theories from a Western country to Thailand and Asian contexts, focusing on the measurement of SL. Practitioners and human resource management departments can apply these 21 questions as an instrument for effective development of SL. In addition, our validation processes have other important implications for investigating behaviour, self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing dimensions which together shape the concept of SL. The instrument revealed strongly significant statistics for all four dimensions. First, self-visualising and goal setting gave a low prediction of SL. This result can be used to explain employee behaviour and use indicators of self-visualising and goal setting to develop employees in organisations. Thus, human resource management and development departments that wish to improve employees as self-visualising and goal setting should focus on indications or variables of SL.

Second, self-reward and positive thinking gave high factor loading and prediction. An important practical implication for human resource departments is the need to develop employees to have positive thinking and give rewards for achieving tasks. In particular, human resource departments and managers need to include indicators of self-reward and positive thinking to train and develop employees through programmes that support and encourage them to show and have self-reward and positive thinking behaviour.

Third, self-talking and evaluating beliefs showed high prediction and factor loading of SL dimensions, indicating that employees with SL behaviour will educate themselves regarding working practices and responsibilities by asking questions to achieve and deliver better outcomes. Human resource departments or managers can utilise these indicators of SL to train employees how to think and evaluate themselves regarding taking responsibilities.

Fourth, human resource departments and managers must fully understand SL traits to develop self-observation and cueing which are very important at work. Employees need to pay attention and care to follow correct working processes to achieve effective output. In addition, practitioners and managers can utilise our results to implement measures to investigate and develop employee behaviour via the dimensions revealed here.

Finally, managers can use the proposed scale as an assessment tool for effective evaluation of self-leadership. Validation of the self-leadership questionnaire has other important implications for managers to measure the four construct definitions as self-visualising and goal setting, self-reward and positive thinking, self-talking and evaluating beliefs and self-observation and cueing to indicate the behaviour or performance of employees regarding their responsibilities. The instrument presented strong significance for all four dimensions. Managers can therefore implement measures to investigate self-leadership of employee using our results.

Limitations and future research

Our study confirmed robust results but several limitations need to be considered (Saks, 2006; Smith and Noble, 2014). First, one limitation of this research resulted from self-evaluation of data collection which may be affected by bias of the respondents. Smith and Noble (2014) suggested that to reduce bias from research participants, researchers should recruit samples that meet the study aims and are willing to partake in the study processes. Second, the result may be affected by research method bias, particularly since the instrument was developed and tested in an accommodation Thai SME context. Having a well-designed research protocol explicitly outlining data collection and analysis can assist in reducing bias. Feasibility studies are often undertaken to refine protocols and procedures. Furthermore, Na-nan *et al.* (2018) suggested that methodology bias reduction of social research should recognise that cultures, economics, politics, technology and language can also influence questionnaire validation. Thus, variations occurring in other cross-cultural or context settings should also be investigated. Finally, this study operated as a survey research which collected data only from an accommodation group of SME employees in Thailand. Results may be influenced by a revealed instrument and further research should be conducted for participants in various industries to validate instrument reliability. The results of the study are based on the single sample. Next research should use two samples at least, one of them is for EFA and second is done for CFA.

Future research is also needed to further investigate and explore SL aspects of multi-culture, language, industries or societies to validate instrument robustness. The four dimensions of SL can be used as an independent variable to test other factors such as employee commitment, organisational citizenship behaviour and employee performance.

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