

Confirmatory Factor Analysis of Strength Awareness Scale in a Sample of Indonesian Female Leaders

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Abstract. This study aimed to test psychometric properties of strength use scale (SUS) as a unidimensional concept with 14 question items on a sample of female leaders who work in two manufacturing companies. The investigation, the subjects used consisted of 521 females in management positions at various levels. Confirmatory Factor Analysis (CFA) was applied to analyze the factor validity of the unidimensional SUS consisting of 14 items. Additionally, Indonesian version of SUS was validated using a confirmation approach. In line with previous studies, the analysis confirmed the unidimensionality of the scale, which measures a singular strength through factors. The demands on internal consistency, composite reliability, and convergent validity were met. The results showed that Indonesian version of SUS is comparable to the original English version, representing a valid and reliable measure of strength used in Indonesian. Therefore, future studies should consider adding subjects with different sociodemographic backgrounds.

Keywords: Confirmatory factor, strength awareness, females, leader, Indonesia

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Introduction

The results of several surveys conducted both abroad and in Indonesia, show there is an increase in the number of female leaders in organizations. According to the [International Business Report \(2020\)](#), global statistics rank Indonesian females in senior managerial positions as 4th among several countries in Asia, Europe, and Africa. This is because female leaders plays an important role in the organization by increasing company value, enhancing financial performance, aiding economic growth, fostering innovation, reducing bankruptcy risk, and possessing better social responsiveness ([Burns et al., 2017](#)). Despite the increased number of female leaders, data shows that male managers still dominates ([Webster & Flood, 2015](#); [Hejase et al., 2013](#)).

According to [Riantoputra and Gatari \(2017\)](#) female leaders, specifically in Indonesia, are faced with various kinds of problems such as a lack of awareness of the capacities and an unsupportive surrounding environment. In addition, leaders are faced with the challenge of continuously updating knowledge and skills, compounded by a lack of confidence, a limited understanding of the abilities, long-term personal goals, and conducive learning process ([Doornbos et al., 2004](#); [Hryniewicz & Vianna, 2018](#)). Due to these

conditions, [Diener et al., \(2011\)](#) stated that strength was essential for the leaders to achieve optimal function. Furthermore, working on strength can increase self-confidence, hope for success, persistence, and ability to overcome failure ([Proctor et al., 2011](#)). According to [Passarelli et al., \(2010\)](#), individuals who recognize the potential has greater concern for self-development. In line with this study, [Oosterwijk \(2018\)](#) showed that realization of strength enhanced self-confidence, focus on success, persistence, and the ability to overcome obstacles.

Strength awareness can be instrumental in making positive attributions about success in building a career and adapting to organizational demands ([Evers, 2016](#)). Female leaders who are aware of the strength are more confident in making decisions, with positive actions intricately associated with skills development and optimism about the future.

Strength has received more attention in several studies since the emergence of strength based perspective ([Peterson et al., 2007](#)). It refers to the characteristics that enabled individuals to perform better, such as being creative, more curious, persistent, integrity and honest ([Peterson et al., 2007](#)). [Peterson et al., \(2007\)](#) suggested that strength were the tendency to be stable in various situations. According to [Peterson et](#)

al. (2007), these characteristics causes several positive results, namely self-acceptance, happiness, competence, self-confidence, social support, and respect for others. Given the unique strength inherent in each individual, cultivating awareness is necessary (strength awareness) (Soria & Stubblefield, 2015).

According to Mahomed and Rothmann (2019), strength awareness includes recognizing strength and discerning when to leverage it effectively. Similarly, Govindji and Linley (2007) define acknowledging inherent strength, leading to enhanced self-identity, self-esteem, and improved well-being and performance. Organizations actively promote strength awareness among female leaders, recognizing its significant benefits (Miglianico et al., 2020). This is crucial, as heightened awareness empowers female leaders to navigate uncertain economic landscapes proactively. In this study, Govindji and Linley's (2007) definition is adopted, emphasizing the recognition of strength to create opportunities for increased self-identity, self-esteem, and enhanced overall well-being and performance.

In the context of fostering strength awareness, it is important to note that the original English version of strength use scale (SUS) has already been translated into Hebrew (Littman-Ovadia et al., 2014) with good reliability (Cronbach α from .88 to .92) in a study focusing on strength-based career counseling. Furthermore, a work-adapted version built upon the original scale exist in English (Ho & Kong, 2015) and French (Dubreuil et al., 2014), along with a Dutch translation (van Woerkom & Meyers, 2015). This was partially derived from the 'Strength Knowledge Scale' and SUS (Govindji & Linley, 2007). Previous studies using SUS (e.g., Proctor et al., 2011; Wood et al., 2011; Douglass & Duffy, 2015a, 2015b; Quinlan et al., 2015; Rickard et al., 2016) contributed to the continued international interest to extend the exploration of generic strength application in other cultural and geographic contexts (Norrish & Vella-Brodrick, 2009). Therefore, this study investigates psychometric properties of strength awareness scale in Indonesian.

Park et al. (2004) stated that strength awareness was a unidimensional concept, based on interpersonal strength. As a unidimensional concept, it was also put forward by Govindji and Linley (2007), focusing on knowledge of strength of an individual. For this study, the concept proposed by Govindji and Linley (2007) was used. SUS developed by Govindji and Linley (2007) is one of the instruments derived from strength application concept. It is unidimensional and comprises 14 items, each rated on a seven-point Likert scale ranging from 1 (strongly disagree), 2 (disagree), 3 (somewhat disagree), 4 (neutral), 5 (somewhat agree), 6 (agree), to 7 (strongly agree). The items were added up to obtain the total strength awareness score. This

measure was selected for several reasons. First, SUS has been widely applied in studies assessing strength awareness across the general adult population. Second, it extend beyond evaluating employees, but also including leaders, as demonstrated in Thun and Kelloway (2011). Third, SUS has consistently showed satisfactory reliability and validity in previous studies. For example, Proctor et al. (2010) yielded a Cronbach's alpha for strength awareness of .95, showing strong psychometric properties. Several other reports have used SUS. However, this study represents the inaugural application of the instrument model for female leaders in Indonesia. It also aims to analyze psychometric properties of SUS, in order to determine the usability status on Indonesian female leaders.

Methods

Research Design

This study adopted quantitative method, using confirmatory factor analysis (CFA) to assess the empirical constructs in a structural model. Variables were measured using instruments, allowing for the analysis of a dataset through statistical procedures (Cresswell, 2009).

Participants

The study examined female leaders meeting specific criteria, with focus on those employed in profit-oriented companies. This choice stemmed from the recognition that leadership dynamics, challenges, and career opportunities differ significantly between profit and non-profit sectors. Profit-driven organizations typically feature a distinct career ladder, offering upward mobility and being generally perceived as more demanding. In contrast, non-profit organizations tend to follow a spiral pattern, rotating employees through various positions (Ban et al., 2003). To ensure precision in participant selection, adherence was given to Simmering's (2011) definition of female leaders, comprising those in bottom, middle, and top management roles. Additionally, individuals with family responsibilities, such as spouses or children, working more than 40 hours per week were included. This criterion aligns with parameters set by previous research conducted in the context of Taiwan by Wang et al. (2018).

The study was conducted at 2 Foreign Investment Companies (PMA) in Indonesia, both operating in the manufacturing sector. Based on agreement, these companies were referred to as PT. X and PT. Y to maintain confidentiality. PT. X was established in 2013, while PT. Y was founded in 2016. The selection of these locations was driven by specific criteria. Firstly, both companies have a significant female workforce, with a majority of employees and leaders being women. PT. X has a total of 19,438 employees,

with 731 female leaders, constituting 56% of leadership. Similarly, PT. Y comprises 18,562 employees, including 491 female leaders, making up 58% of the leadership.

The average weekly working hours for employees at both companies range from 50 to 60 hours. The selection of these locations was based on factors such as a significant representation of female employees and leaders. The sample size was determined through power analysis, following Preacher and Hayes's (2006) formula. With a power of .95, an effect size of .2, and a significance level of .05, the calculated minimum sample size was 314 respondents. However, 521 participants were included in the study and categorized as follows.

Instruments

Strength application scales was developed into several instruments, such as SUS from Govindji and Linley (2007). This scale was unidimensional and comprised 14 question items. Responses were represented by seven Likert scales ranging from 1 (strongly disagree), 2 (disagree), 3 (somewhat disagree), 4 (neutral), 5 (somewhat agree), 6 (agree), to 7 (strongly agree). The instrument was selected based on 3 reasons. Firstly, several studies related to strength awareness adopted SUS to assess the use of diverse individual strength in the general adult population. Secondly, this measurement tool has been applied not only with employees but also leaders, as in Thun and Kelloway's research (2011). Third, the instrument has satisfactory reliability and validity. This was proven in previous studies such as in Proctor et al. (2010) where Cronbach's alpha strength awareness of .95 was documented.

The scale adaptation process was performed to ensure the suitability of SUS for the context of female leaders in Indonesia. Each item from the original scale by Govindji and Linley (2007) was translated into Indonesian and tailored to the characteristics of the subject, namely female leaders. The translation of the Strength Use Scale (SUS) followed the International Test Commission (ITC) Testing Guidelines, as outlined in the Adaptations (2016). The scheme for the adaptation process is presented in Figure 1.

Research Procedure

All participants provided informed consent, agreeing to the use of data at the group level. Data was collected over a one month period, spanning from April 18 to May 20, 2020. The collection methods were online using Google Forms and direct meetings with subjects through several company HRD.

Table 1
Characteristic of research subjects

Category	Frequency	Percentage
Level		
Bottom management	327	62.8%
Middle management	194	37.2%
Education		
SMA	412	79,1%
S-1	109	20.0%
Company		
PT. X	237	45.5%
PT. Y	284	54.5%
Age		
< 26	53	10.2%
26-40	414	79.5%
> 40	54	10.4%

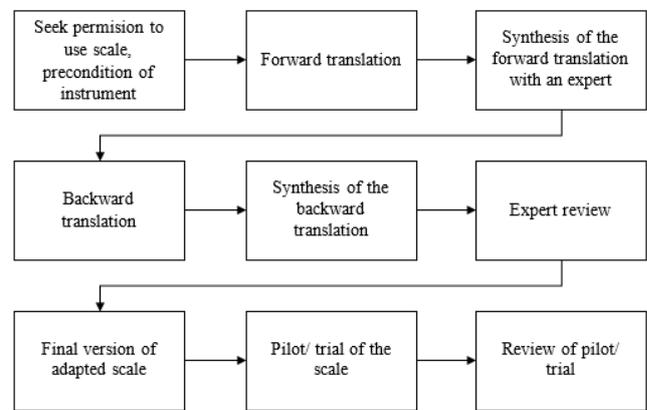


Figure 1. Scheme of the scale adaptation process

Data Analysis

Theoretically, strength awareness model, as proposed by Govindji and Linley (2007), was unidimensional and comprised 14 items.

Results and Discussion

Result

CFA was used to confirm indicators for factor verification. In this study, evaluation using CFA applied a convergence model, and the acceptable range of parameter estimates were determined through Maximum Likelihood Estimation (MLE). The estimation comprised an iterative process by which the observed covariance matrix is compared with the theoretical matrix to reduce the residue. This step is crucial for establishing the convergence of CFA model. Fit indices were examined to assess the goodness of fit of the data, comprising absolute, incremental, and parsimony indices (Hooper et al., 2008).

Table 2

Match test of CFA model

Model	Output	Information
Root mean square error of approximation (RMSEA)	.019	Good fit
Goodness of fit (GFI)	.98	Good fit
Adjusted goodness of fit (AGFI)	.97	Good fit
Normed-fit index (NFI)	.99	Good fit
Comparative fit-index (CFI)	1.00	Good fit
Parsimony goodness-of fit (PGFI)	.72	Good fit
Parsimony normed fit index (PNFI)	.84	Good fit

RMSEA : Root mean square error if approximation

GFI : Goodness of fit statistic

AGFI : Adjusted goodness of fit

Statistic

RMR : Root mean square residual

SRMR : Standardized root mean square residual

NFI : Normed-fit index

NNFI : Non normed fit index

CFI : Comparative fit index

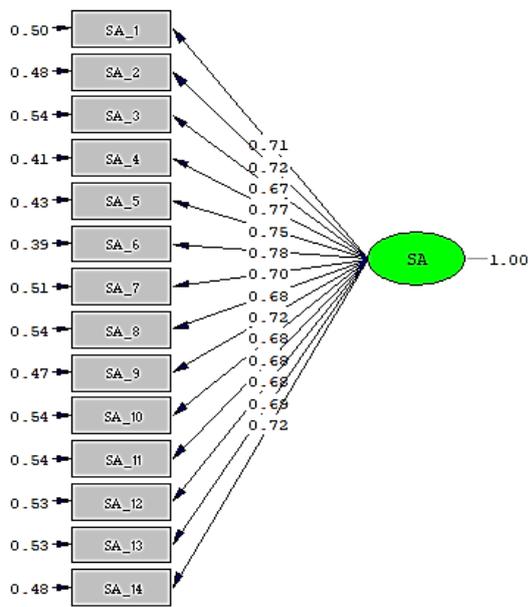
RFI : Relative fit index

IFI : Incremental fit index

PGFI : Parsimony Goodnessof-Fit Index

PNFI : Parsimony Normed Fit

Index



Chi-Square=92.06, df=77, P-value=0.11600, RMSEA=0.019

Figure 2. Second-Order Confirmatory Factor Analysis Model

Based on Table 2, all 13 criteria for model fit suggested that the results can be used for study implementation. Validity is a crucial aspect, serving as a test to ascertain the true significance of indicator variables in accurately reflecting the construct or latent variables. In the results of this study, employing the first-order confirmatory factor analysis, it was determined that the obtained measurement model was

in line with the original model. This was indicated by a good fit, as affirmed by the model's fitness, and loading factors exceeding .40 (Ferdinand, 2014). Table 3 provide a comprehensive list of the adapted items from the Strength Use Scale translated into Indonesian.

Construct/Composite Reliability (CR) Measure

A Construct Reliability (CR) value of .70 or higher indicates robust reliability, while a reliability range of .60 to .70 is deemed acceptable, provided that the validity of the indicators in the model is good (Ghozali, 2017). The CR can be computed using the following formula:

$$CR = \frac{(\sum SLF)^2}{(\sum SLF)^2 + (\sum e)}$$

Information:

CR : Consistency of a measurement

∑SLF : Total standard loading factor of each item

∑e : Number of errors for each item

Average Variance Extracted (AVE) Measure

This measure aims to assess the number of variants represented by a series of items on the scale compared to measurement error. Based on CR, the result was .935 and AVE value was .506. Therefore, it is important to note that all reliability values were classified as good/adequate.

Table 3

Strength use scale (SUS)

No	Statement
1	Saya secara teratur dapat melakukan apa yang dapat saya lakukan dengan baik
2	Saya selalu fokus pada kekuatan/sisi positif saya
3	Saya selalu berusaha untuk menggunakan kekuatan saya
4	Saya mencapai apa yang saya inginkan menggunakan seluruh kemampuan yang saya miliki.
5	Saya menggunakan kemampuan saya setiap hari
6	Saya menggunakan kemampuan saya untuk mendapatkan apa yang saya inginkan dalam hidup ini
7	Pekerjaan saya memberikan banyak kesempatan kepada saya untuk menggunakan kemampuan saya
8	Kehidupan saya memberikan saya banyak cara yang berbeda dalam menggunakan kemampuan saya
9	Menggunakan kekuatan yang saya miliki datang secara alami
10	Mudah bagi saya untuk menggunakan kekuatan yang saya miliki dalam melakukan sesuatu
11	Saya dapat menggunakan kemampuan saya pada banyak situasi yang berbeda
12	Hampir seluruh waktu saya habiskan untuk mengerjakan sesuatu yang saya mampu mengerjakannya dengan baik
13	Menggunakan kemampuan saya adalah hal yang lazim saya lakukan
14	Saya dapat menggunakan kemampuan saya dengan berbagai macam cara

Discussion

In this study, a confirmation approach was adopted to validate Indonesian version of SUS. The analysis confirmed the uni-dimensionality of the scale, measuring a single power using factors, consistent with previous reports (Govindji & Linley, 2007; Wood et al., 2011). The internal consistency, CR, and convergent validity requirements were all satisfied. The results suggested that Indonesian version of SUS was comparable to the original English version, representing a valid and reliable measure of strength usage.

Study related to the use of SUS has been conducted in various countries. Wood et al. (2011) supported the validation of SUS in the general adult population (N=227) to increase its generalizability in the US. Wood et al. (2011) used traditional factor and parallel analyses to determine the factorial structure of the measuring tool. The results showed that a single force use factor could be extracted from the data based on eigenvalues. Items were loaded between .66 and .87 on a single factor and accounted for 70.25% of the total variance. Beyond the US, SUS showed slightly different results. In Germany, Huber et al. (2017) attempted to validate a translated version of SUS in a sample of native German speakers. Furthermore, traditional EFA and CFA approaches (through Structural Equation Modeling/SEM) were applied to validate the instrument. EFA showed that a single factorial model, explaining 58.4% of the variance, with factor loadings ranging between .58 and .86, could be extracted from the data. The first factor has an eigenvalue of 8.60, with the remaining clearly below the cut point (.855 to .172). However, 3 items did not load sufficiently on a single use-of-force factor (with factor loadings ranging from .336 to .410). CFA was then conducted to determine whether the hypothesized structure of German SUS sample fit the data. The temporal stability of this tool is another important metric to consider, and it can be assessed through longitudinal measurement invariance (LMI). The fit of German version of the initial model was less than satisfactory. Therefore, various modifications need to be implemented to improve model fit and measurement quality.

Both Park et al. (2004) as well as Govindji and Linley (2007) argued that strength were considered to be trait-like factors with relative stability over time. The application or use of strength is considered stable over time, unless individuals are exposed to- or engage in strength-based developmental initiatives (Huber et al., 2017; Park et al., 2004). Therefore, it was expected that strength-use, without intervention, should stay relatively stable over time.

All items of Indonesian version of SUS loaded sufficiently on a single strength use factor. According

to MacCallum et al. (1999), the factor loading of an item of at least .70, should be retained in an instrument. Item numbers 8 ('*Saya dapat menggunakan kemampuan saya pada banyak situasi yang berbeda*'; .60), 9 ('*Menggunakan kekuatan yang saya miliki datang secara alami*'; .43), 10 ('*Mudah bagi saya untuk menggunakan kekuatan yang saya miliki dalam melakukan sesuatu*'; .44), 11 ('*Saya dapat menggunakan kemampuan saya pada banyak situasi yang berbeda*'; .60), 12 ('*Hampir seluruh waktu saya habiskan untuk mengerjakan sesuatu yang saya mampu mengerjakannya dengan baik*'; .59), 13 ('*Menggunakan kemampuan saya adalah hal yang lazim saya lakukan*'; .68), and 14 ('*Saya dapat menggunakan kemampuan saya dengan berbagai macam cara*'; .52) fall below this threshold and could be considered for elimination. However, alternative guidelines propose retaining items when the scale demonstrate convergent validity and factors load $>.60$ (Huber et al., 2007) or at least $>.40$ (Hair et al., 2010). The original English version of SUS (Govindji & Linley, 2007) used a principal components analysis on an initial pool of 19 items, showing 3 components with eigenvalues greater than 1. A further analysis of the 14 items comprising this component showed a single 'strength use' factor with loadings all $>.50$ (56.2% total variance). These items were then selected to constitute the original SUS (Govindji & Linley, 2007). In the original version, item no. 12 had the lowest factor loading (.51), followed by no. 6 (.52) and no. 7 (.53).

Indonesian version of SUS follows the instructions from previous studies (Wood et al., 2011). It comprises 14 questions exploring proficient or outstanding abilities, with respondents rating their agreement on a scale from 1 to 7. However, the instructions connect questions to strength use and outcomes, leaving a gap in explaining the 'nature of strength.' This lack of clarity raises uncertainty about whether participants are considering inherent capacities or refined psychological talents. For instance, respondents might think of character, behaviors, thoughts, or feelings in various situations, including amoral actions such as lying or stealing. The generic approach, while flexible, risks introducing artifacts due to the absence of a clear definition of strength. Participants may reference diverse aspects such as self-efficacy, personality traits, or cultural backgrounds in the responses. Therefore, including a definition in the introduction of the instrument could enhance the examination of strength in a more generic context. To further optimize this approach, participants should be afforded the opportunity to articulate the specific nature of the strength they are referencing, whether through an open text field or during an interview. This aspect has not been addressed in previous practices.

Study Limitations

A significant consideration pertains to the ambiguity surrounding the concept of strength as shown by participants. The introduction of SUS fails to offer a specific definition or example. While participants may interpret strength as character attributes, it could also comprise talents, skills, behaviors, or other associated outcomes. Therefore, future applications of SUS may prove advantageous by providing participants the opportunity to articulate the understanding of strength. This could be achieved through an open-text field or by incorporating inquiries during interviews, thereby enhancing the precision and relevance of the collected data.

Conclusion

In conclusion, psychometric performance of the Indonesian version of the SUS has demonstrated its effectiveness. The scale was recommended for further investigations exploring how the application of individual strength correlated with increased levels of well-being, health, or other outcomes influenced by strength. Future studies should delve into areas such as (1) the impact of promoting the application of individual strength during education on future levels of well-being and health, and (2) how the implementation of strength in the workplace, particularly among employees, could be influenced by design guidelines or working conditions to enhance awareness. The version of SUS introduced for the study on Indonesian-speaking female leaders supported the results that the use of individual strength was positively related to well-being. Additionally, there is a need for further scientific exploration of the impact of individual uses of strength in various countries and cultures.

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