

Validation of the psychological safety, psychological empowerment, intrapreneurial behaviour and individual performance measurements

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Validation of
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safety

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Abstract

Purpose – The purpose of this study is to assess the validity of the psychological safety (PS), psychological empowerment (PE), intrapreneurial behaviour (IB) and individual performance (IP) construct measurements originally developed in Western individualistic cultures.

Design/methodology/approach – Proportionate stratified systematic sampling was used among the production/operations middle managers in Nigerian medium enterprises (MEs), resulting in 355 valid responses. The measurements were analysed through internal consistency analysis, content, convergent and discriminant validity analysis.

Findings – The result shows that all four construct measurements are suitable and appropriate to gauge the respective constructs in collectivistic cultures such as Nigeria.

Research limitations/implications – Cross-sectional self-reported data were used to analyse the result of this study, which may lead to common method variance.

Practical implications – Organizations, especially MEs, can use the validated measurements of this study to enhance work results in the Nigerian context.



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Social implications – Collectivistic cultures can benefit from the widely used measurements of PS, PE, IB and IP despite been originally developed in Western individualistic cultures.

Originality/value – This paper extends the body of knowledge by validating the measurements of PS, PE, IB and IP in collectivistic cultures such as Nigeria. Measurement validation for these constructs is scarce in this context. Thus, this study will provide a consistent and efficient reference for forthcoming studies and improve the credibility and replicability of future research results in collectivistic cultures.

Keywords Psychological empowerment, Intrapreneurial behaviour, Individual performance, Measurement validation, Psychological safety

Paper type Research paper

1. Introduction

Organizational survival and advancement profoundly rest on the employee individual performance (IP) (Ermalina, Hendriani, & Efni, 2017), particularly that of production/operations middle managers (Mahmoud, Ahmad, & Poespowidjojo, 2017). Therefore, high-performing managers can confront competitive compressions (Jyoti & Dev, 2017). Intrapreneurial behaviour is believed to boost the IP of managers (Gawke, Gorgievski, & Bakker, 2017a; Mahmoud, Ahmad, & Poespowidjojo, 2018a, 2018b). Even so, the workforce in factor and efficiency-driven economies (such as Nigeria) are witnessing a dearth level of intrapreneurial engagements (Bosma et al., 2013).

Moreover, preceding works of literature recognized the importance of psychological safety (PS) and psychological empowerment (PE) in nurturing the intrapreneurial behaviour (IB; Pradhan & Nath, 2012; Mustafa, Martin, & Hughes, 2016) and IP of managers (Mahmoud, Ahmad, & Poespowidjojo, 2018c), particularly in Western cultures (Fellnhofer, Puumalainen, & Sjögrén, 2016; Frazier, Fainshmidt, Klinger, Pezeshkan, & Vracheva, 2016; van Dop, Depauw, & Driessens, 2016). On the other hand, limited studies exist on the relationship between PS, psychological empowerment, IB and IP of managers in developing countries and the context of medium enterprises (MEs) in particular. Likewise, studies that evaluate the suitability of these constructs barely exist in the context of developing countries such as Nigeria and expressly among MEs (Mahmoud et al., 2018c).

Consequently, there is copious evidence in the literature that warrants this study, for instance, the paucity of PS literature in developing countries, especially in the African context, and the concentration of PS literature in English speaking cultures (Frazier et al., 2016), which have prompted many researchers to recommend a further cross-cultural validation of the PS measurements across nations and industries (Edmondson & Lei, 2014; Frazier et al., 2016). In the same way, studies that validate PE as a single construct have not been seen in the Nigerian context.

Equally, the paucity of IB literature in developing countries has led to the recent calls for further cross-cultural validation of the IB construct measurements (Fellnhofer et al., 2016). It is, therefore, essential to validate the recently developed generic IP measurement (Koopmans et al., 2014a) in the context of Nigeria and other developing countries because job-specific performance measurements have dominated the IP literature.

Likewise, the cultural and economic differences between the Western world and the developing countries (Hofstede, 1983) could threaten the suitability of adopting constructs from the former in the latter. The construct measurements in this study originated from Western cultures, and thus, it may not be appropriate to use them in the context of Nigeria and many other developing countries without further contextual validation. Nigeria and many developing countries have a collectivistic culture with group orientation, in which people view themselves as members of larger groups that support the goals of others when

compared to most developed Western societies who are individualistic and self-oriented (Hofstede, 1983; Triandis, 1995). This study will, therefore, provide more information on measurements of the study constructs from the collectivist point of view. Findings of this study will support the extant literature on IB and performance in Nigeria and other developing countries with similar culture. This will also enable forthcoming researchers to compare findings across different settings.

The purpose of this paper is to validate the PS, psychological empowerment, IB and IP in the Nigerian context. Hitherto, no such study was found. Therefore, it is essential to validate the construct measurements prior to any empirical study that may require further multivariate analysis. This will offer additional understanding of the construct measurements in developing countries and facilitate their use in forthcoming researches.

2. Literature review

2.1 Individual performance

IP is defined as employee outcomes and behaviours that are associated with and support organizational goals (Vel, Park, & Liu, 2018). Notwithstanding the implication of IP in both research and practice, little agreement exists on how IP should be conceptualized and measured. This disagreement is detrimental because the valid measurement is a precondition for impeccably establishing the predictors of IP or the efficacy of interventions to increase it (Koopmans et al., 2016). Academics and organization practitioners tend to use customized measures of performance, which lead to measures that do not ordinarily permit comparison across jobs or industries (Welbourne, Johnson, & Erez, 1998).

Many studies described IP as a construct that comprises task and contextual performance (Motowidlo & Van Scotter, 1994). *Task performances* are individual components that positively influence the organizational technical core, whereas *contextual performances* support the social, psychological and organizational setting for the basic functioning of the technical core (Borman & Motowidlo, 1993). The current study will focus on both task performance (*in-role performance*) and contextual performance (*extra-role performance*), because they are the positive behaviours that comprise positive IP, in line with similar studies (see for instance: Yang & Hwang, 2014; Mustapa & Mahmood, 2016).

Studies on IP and human resources challenges focus mainly on larger firms rather than MEs and thus require more empirical attention (Carlson, Upton, & Seaman, 2006). However, most of the IP measurements used in preceding studies do not capture the generic IP measurements. Therefore, this study aims to validate the recently developed generic performance measurement (Koopmans et al., 2014b) among the managerial staff of Nigerian MEs.

2.2 Intrapreneurial behaviour

Intrapreneurship is the organizational entrepreneurship processes that spur innovative actions (Valka, Roseira, & Campos, 2020). The IB concept was formed from the entrepreneurship orientation (EO) concept, representing employees' actions through risk-taking, innovativeness and proactive actions (Covin & Slevin, 1991; Antoncic & Hisrich, 2003; Mahmoud et al., 2017). Though EO is adherent to the firm-level analysis, IB focuses on the individual-level analysis and the literature is subjugated by the former (Gawke, Gorgievski, & Bakker, 2017b), with diminute attention devoted to *the individual-level EO*, i.e. IB (Blanka, 2018).

Past studies showed middle managers as the leading source of entrepreneurial actions and, therefore, most likely to demonstrate IB (Hornsby, Kuratko, Shepherd, & Bott, 2009). Furthermore, organizations must prompt an intrapreneurship-oriented atmosphere to

achieve positive managerial/employee outcomes (Valka et al., 2020). Therefore, IB is a requisite for MEs to foster unique opportunities and managerial performance (Bakar, Mahmood, Ramli, & Saad, 2016; Fellnhofer et al., 2016). The validation of individual-level IB measurement in the Nigerian context, precisely among ME managers, is essential.

2.3 Psychological safety

Edmondson (1999) defined PS as a belief shared by team members or organization members that their organization or team is safe for taking relational risks. PS is the ability of employees to demonstrate themselves without any fear of adversarial costs as to position, personal image or career (Kahn, 1990). Thus, employees evaluate whether colleagues, superiors or employers will humiliate them for initiating a novel idea, asking questions, requesting feedback or reporting a blunder (Edmondson, Kramer, & Cook, 2004). Therefore, PS climate offers a work atmosphere where organization members feel safe to express their thoughts or ideas without being reprovved (Baer & Frese, 2003). Finally, it is essential to note that PS is a multilevel construct that serves as an individual and team level construct (Edmondson & Lei, 2014; Frazier et al., 2016). Nevertheless, PS literature is scarce at the individual level, especially in the Nigerian MEs context.

2.4 Psychological empowerment

PE is the psychosomatic amount to which individual elements of the workforce have the occupational control and ability on their work decision and develop meaning and impact from their jobs (Liden, Wayne, & Sparrowe, 2000). PE is also defined as the motivational conception of self-efficacy, which is attentive to enabling employees rather than just delegating (Conger & Kanungo, 1988). Spreitzer (1995) broadly defined the PE construct as the enriched intrinsic task motivation established in a set of four different cognitions (meaning, impact, self-determination and competence) that reflect the employee orientation concerning their job role.

Thomas and Velthouse (1990) argued that PE measurement is multidimensional given that it consists of four dimensions; moreover, the absence of any of these four dimensions will inhibit the complete PE construct (Spreitzer, 1995). Therefore, the distinct PE dimensions cannot sufficiently gauge the construct discretely (Mahmoud et al., 2018c). Consequently, Seibert, Wang, and Courtright (2011) suggested and verified the validity of compressing the four PE dimensions into a unitary/unidimensional construct. Accordingly, this paper adopts the unidimensional PE construct consistent with preceding literature (Park, Kim, & Krishna, 2014; Fong & Snape, 2015; Iftikhar, Shahid, Shahab, Mobeen, & Qureshi, 2016). This study aimed to validate the unidimensional PE construct among MEs in the Nigerian context, which is lacking in the study context.

2.5 Relationship between psychological safety, psychological empowerment, intrapreneurial behaviour and individual performance

Preceding studies indicate the relationship between PS, psychological empowerment, IB and IP. For instance, PS has been significantly associated with various positive work outcomes such as the IP dimensions (Idris, Dollard, & Tuckey, 2015; Frazier, Tupper & Fainshmidt, 2016; Frazier et al., 2016). Likewise, PE proved to be related to performance at the individual level (Li et al., 2015; Ölçer & Florescu, 2015; Sun, 2016). In addition, studies assessing IB and the IP relationship indicate a significant positive relationship (Bakar et al., 2016; Fellnhofer et al., 2016). Nevertheless, it is worth noting that the literature on these variables is scarce in developing countries.

3. Methodology

3.1 Research design, population, sample and data collection procedure

This paper adopts the quantitative methodology through hand-delivered questionnaires to collect data from Nigerian MEs' production/operations managers. MEs are firms that employ 50–199 people (SMEDAN/NBS, 2013). Production/operations managers are strategic employees, as they are responsible for a firm's daily production/operations and the leading source of entrepreneurial behaviour (Hornsby et al., 2009) and performance (Bakar et al., 2016). The population studied covered 2,014 production/operations managers from each of the registered MEs from Sokoto Kano, Kaduna, Oyo and Lagos states in Northern and Southern Nigeria which host more than half of the country's MEs (SMEDAN/NBS, 2013). The sample size of 323 respondents was estimated (Krejcie & Morgan, 1970), which was later doubled to 646 to reduce the sampling error and attain the required sample size (Hair, Wolfinbarger, & Ortinall, 2008). This is consistent with the response challenges in the context of this study (Mahmoud, Garba, & Abdullah, 2020, Mahmoud, Mahmoud, Abubakar, Garba, & Daneji, 2021). To ensure the proper representation of each state, we used a proportionate stratified systematic sampling method to pick samples from each state of the population. From the 646 questionnaires, 407 have been reclaimed, out of which 355 were usable, representing a 55% usable rate of response.

3.2 Measurements

This study adopted all the construct measurements from preceding researches; IP was adopted from the 13 items measurement of task and contextual IP by Koopmans et al. (2014a), IB was adopted using 15 items originally developed by Stull (2005), PS was adopted using 7 items originally developed by Edmondson (1999), PE was adopted from the 12 items originally developed by Spreitzer (1995) as a unidimensional construct (Seibert et al., 2011). A five-point Likert scale was used for all the items with ratings ranging from 1 to 5 (strongly disagree to strongly agree). This scale can accurately measure the concepts (Hair, Black, Babin, & Anderson, 2010; Tay, Tan, Yahya, & Rasli, 2020).

3.3 Content validity

The content or face validity works as a method over which an expert panel or a small sample is consulted to judge the selected items' aptness in measuring a particular construct (Hair, Money, Samouel, & Page, 2007; Sekaran & Bougie, 2010). Therefore, content validity is built on experts' assessment (Dahiya & Rangnekar, 2020). A minimum of three and a maximum of ten experts are required for a satisfactory content validity result (Lynn, 1986). Seven management experts from two universities reviewed the questionnaire to ascertain the content validity. The outcome revealed a lower ambiguity level since all items of the constructs were adopted. However, all items on PS and IB have been rephrased to reflect the individual level of analysis.

3.4 Pilot study

After the content validity scrutiny of the study's four constructs, namely, PE, PS, IB and IP, a pilot study was conducted (Mahmoud et al., 2018c) to observe the items' comprehension and clarity to respondents. Pilot studies are a crucial step prior to the actual collection of data to eliminate vague items from the questionnaire (Mahmoud et al., 2018c; Tay et al., 2020). Sample responses are typically small for most pilot tests (Fink, 2003); nevertheless, it is acceptable to raise it to a hundred (Dillman, 2007) thus, this study distributed 60 questionnaires only for the pilot test which is considered a small sample compared to the population. A total of 60 questionnaires were administered randomly to

production/operations managers of MEs, 41 of which were completed and returned, making a pilot response rate of 68.3%. The data were analysed for the items' reliability by the Statistical Package Social Science (SPSS) version 24, which revealed greater reliability results with Cronbach coefficients beyond 0.7 (Table 1).

4. Data analysis

4.1 Data screening

Prior to the data analysis, the raw data were screened to avoid errors that could impact the final analysis. The screening of data is essential, as it assists researchers in detecting any possible violations to basic multivariate analysis assumptions (Hair et al., 2007; Mahmoud, Muharam, & Mas'ud, 2015). The initial step is the analysis of missing data values. Missing data denotes the nonappearance of appropriate value(s) on any of the study variables for data analysis (Hair et al., 2010). The frequency test was computed using SPSS version 24 to ascertain if any data value was missing. No single case of missing data was observed in this study, and this is a sequel to the precautionary measures taken by the researcher by checking through all questions on receipt of each returned questionnaire to make sure all questions are duly responded.

The next procedure is the reverse coding of negatively worded items. All questions that were negatively worded in the questionnaire were reversed, including IB3, PS1, PS3, PS5. The SPSS transformation function was used to reverse these items to ensure similar responses with all items under the same category of constructs in the questionnaire (Tay et al., 2020).

The third step is the outlier assessment, which involves the univariate and multivariate outliers. Outliers are extreme item scores that could significantly influence the results – either too low, too high – or an exceptional mixture of values through several variables (Hair et al., 2010). Outliers can seriously misrepresent regression coefficient estimates and lead to inconsistent results (Verardi & Croux, 2008); however, a researcher can decide to retain or exclude outlier cases depending on their type (Hair et al., 2010). To detect the univariate outliers, we used a standardized Z score value method to identify responses that have a standardized value of ± 3.29 or above (Tabachnick & Fidell, 2007). As a result, 52 outlier cases were identified and deleted with above-standardized Z score values.

Likewise, the Mahalanobis distance (D2) was computed to detect multivariate outlier cases (Tabachnick & Fidell, 2007). Given the 47 items of the study questionnaire, the threshold recommended for the chi-square is 64. Consequently, any response with a Mahalanobis value of 64 or above must be deleted. However, no single case of a multivariate outlier was found. Thus, 355 responses were left for further analysis.

The fourth step is the normality check. *Normality* is evaluated either by graphical or statistical procedures. The statistical procedure analyses normality through skewness and kurtosis, whereas the graphical procedure is analysed through histogram residual plot. The histogram residual plot represents the data distribution shape for all constructs and their contiguity to normal distribution. The histogram residual plot needs to look at normality

Table 1.
Results of reliability
analysis (pilot study)

| Constructs | No. of Items | Cronbach's alpha |
|------------|--------------|------------------|
| IP | 13 | 0.804 |
| IB | 15 | 0.822 |
| PS | 07 | 0.835 |
| PE | 12 | 0.779 |
| Total | 47 | |

distributed to meet the normality assumptions (Tabachnick & Fidell, 2007). In a big sample of more than 200 responses, the graphical procedure is recommended rather than the statistical procedure because a big sample lessens the standard error, which inflates the statistical skewness and kurtosis values (Field, 2009). Since the sample responses of this study are more than 200, the graphical method for evaluating normality of the collected data is utilized instead of the statistical approach (Tabachnick & Fidell, 2007). The residual plot appears to be distributed normally in this study, and, therefore, the assumptions of normality were satisfied.

4.2 Internal consistency

Internal consistency is the magnitude to which all items are measuring the same concept on a certain scale or subscale (Sun et al., 2007). The most frequently used techniques for gauging instruments' reliability for organizational studies are the composite reliability and Cronbach's alpha coefficient (McCrae, Kurtz, Yamagata, & Terracciano, 2011; Peterson & Kim, 2013).

Though Cronbach's alpha has been more popular among researchers, it is accompanied by the composite reliability in this study for two important reasons. First, the coefficients of composite reliability offer a reliability estimate that is considerably less biased than the coefficients of Cronbach's alpha since the later posits that all items equally contribute to the construct with no regard to the real contribution of individual loadings (Barclay, Higgins, & Thompson, 1995; Gotz, Liehr-Gobbers, & Krafft, 2010). Secondly, Cronbach's alpha may either underestimate or overestimate the reliability of the scale.

Meanwhile, the coefficient of composite reliability considers that the indicators have loadings that are divergent and which may be construed in the same manner as Cronbach's alpha. For any of the reliability coefficients used, a reliability coefficient value beyond 0.70 is considered sufficient for a satisfactory model, whereas coefficient values lower than 0.60 are not reliable (Hair, Ringle, & Sarstedt, 2011). However, coefficient values of 0.95 and higher are problematic, as they indicate the items are redundant (Hair et al., 2019).

Table 2 displays the coefficients of composite reliability and Cronbach's alpha for the study constructs. As presented in Table 2, the internal consistency for all variables in this study is valid since all the constructs present a value above 0.70 and lower than 0.95 (Hair et al., 2019).

4.3 Validity test

4.3.1 Convergent validity. Convergent validity is the amount to which research items represent the study constructs correctly correlated with other measures of the matching construct (Hair, Black, Babin, Anderson, & Tatham, 2006). The average variance extracted (AVE) was used to examine the convergent validity for each construct (Fornell & Larcker, 1981). The AVE for each variable must not be less than 0.50 to realize a sufficient convergent validity (Chin, 1998). In the course of achieving the minimum of 0.50 AVE values, five items were deleted from the 47 questionnaire items, namely, PS6, IB2, IB3, IB4 and IP13, meaning that three items were not relevant for the IB construct and one item each for the IP and PS constructs. Finally, a sufficient convergent validity was achieved for each construct, with AVE values of more than 0.50 for all the study constructs (Table 2).

| Constructs | AVE | Composite reliability | Cronbach's alpha |
|------------|-------|-----------------------|------------------|
| IB | 0.594 | 0.945 | 0.935 |
| IP | 0.510 | 0.921 | 0.906 |
| PE | 0.569 | 0.939 | 0.928 |
| PS | 0.521 | 0.866 | 0.815 |

Table 2.
Internal consistency
and convergent
validity

4.3.2 *Discriminant validity.* The amount to which a specific construct diverges from other constructs is referred to as the *discriminant validity* (Duarte & Raposo, 2010). The Fornell and Larcker (1981) AVE square root technique was employed to ascertain discriminant validity in this study by comparing the constructs' correlations with AVE square roots (Fornell & Larcker, 1981). Table 3 portrays the AVE square root values (in boldface), compared with correlations among the study constructs, which specifies that all the AVE square root values are higher than the constructs' correlations. This signifies an acceptable discriminant validity (Fornell & Larcker, 1981).

5. Discussion

The PS, PE, IB and IP constructs have gained universal popularity among organizational psychology and management scholars, but the measurement validation of these constructs in non-Western cultures has been rare, especially within the African context. Thus, this study will develop the broad applicability and practicality of these construct's measurement in the Nigerian context. Studies on the organizational behaviour constructs such as PS, PE, IB and IP are also generally very uncommon in the context of MEs (Carlson et al., 2006), particularly in Nigeria (Abdullah, Bilau, Enegbuma, Ajagbe, & Ali, 2011; Mahmoud et al., 2018c; Mahmoud et al., 2018b). Indeed, no study was found to validate the PS, PE, IB and IP constructs' measurement used for this study in the Nigerian setting.

Therefore, this study bridges the validation gap to establish the appropriateness of the constructs in the Nigerian context because most of the construct measurements were developed in Western cultures. We submitted data to preliminary screening and construct validity to achieve this purpose. The content validity established that all measurements of the constructs had sufficient face validity. In the process, proper modifications were made wherever necessary in some of the constructs items based on expert comments. This is because the construct items may be misconstrued in the Nigerian MEs' context if the content measurements are not properly validated. Furthermore, favourable pilot test results have also been witnessed through high-reliability values, so no item was deleted during the pilot test stage.

Moreover, the convergent and discriminant validity were accomplished. In the convergent validity, all item loadings with values that are lower than 0.40 have been deleted (Hair, Hult, Ringle, & Sarstedt, 2014), including IB2, IB3, IB4, PS6 and IP13. Cronbach's alpha and composite reliability values show that all the constructs had sufficient reliability values greater than 0.7 (Hair et al., 2011). Likewise, the AVE values indicate adequate convergent validity for each construct (Chin, 1998). The discriminant validity result also specifies that all the constructs had sufficient validity. Thus, the measurements of all four constructs are appropriate and valid for further empirical studies that relate to such constructs in the Nigerian context.

However, it is noteworthy that five items were deleted from the 47 items of the four constructs due to poor loadings; this includes three items from the IB construct (IB2, IB3 and IB4), one item

Table 3.
Correlations of
variables and square
roots of average
variance extracted

| Constructs | IB | IP | PE | PS |
|------------|--------------|--------------|--------------|--------------|
| IB | <i>0.771</i> | | | |
| IP | 0.678 | <i>0.714</i> | | |
| PE | 0.618 | 0.494 | <i>0.754</i> | |
| PS | 0.599 | 0.508 | 0.611 | <i>0.722</i> |

Note: Italic figures represent the square root of AVE

from the PS construct (PS6), and one item from the IP construct (IP13). Thus, the study results revealed some variations of items for all the constructs except PE which has a complete set of valid items without deletion in the Nigerian context. Consequently, all measurements of the study constructs are reliable and valid for future empirical research in Nigeria.

6. Theoretical and practical implications

This paper theoretically conceptualized all study constructs as valid individual level unidimensional constructs that can be utilized for research studies in Nigeria. Though some studies used PE (Spreitzer, 1995; Sun, 2016), IB (Bakar, Ramli, Saad, Poespowidjojo, & Ibrahim, 2017) and IP (Koopmans et al., 2014b; Sun, 2016) as multidimensional constructs, several other studies established PE (Seibert et al., 2011; Fong & Snape, 2015), IB (Fellnhofner et al., 2016; Valsania, Moriano, & Molero, 2016) and IP (Fellnhofner et al., 2016; Johari & Yahya, 2016) as unidimensional constructs. Likewise, most studies focused on the team level PS (Edmondson, 1999; Edmondson et al., 2004); therefore, this paper also focused on and validated the individual level PS.

In sum, this study improved the preceding measurements and developed the literature by offering a better understanding of the unidimensional nature of PS, PE, IB and IP, which will be very helpful to future researchers. A vigorous process of measurement validation was used that comprised content/face validity, pilot testing, test of internal consistency, convergent and discriminant validity analysis to validate the construct measurements of the study. Empirically, the construct measurements proved to be internally consistent and valid and can confidently be used by scholars and practitioners in the study context. Thus, this study will improve the credibility and replicability of future research results in the Nigerian and African contexts and provide a consistent and efficient reference for forthcoming studies.

In practical terms, MEs should understand the importance of all measurements in the study constructs to improve work outcomes, because all the constructs are presented as unidimensional ones, as verified in this study. MEs must also understand the importance of all the study constructs in enhancing the production/operations managers' work results. For instance, MEs need to have psychologically safe and psychologically empowered managers to adopt IB, eventually resulting in the superior performance of individual managers, necessary for organizational survival (Mahmoud et al., 2018c).

7. Limitations, directions for future research and conclusion

In self-assessment measurements, cognitive bias issues are very likely, which could limit the study. This is because respondents may go for socially desirable answers against their honest opinions, which may be socially unfavourable. As such, forthcoming studies may incorporate the qualitative technique to augment the accuracy of these findings. Furthermore, a cross-sectional data collection method was used, collecting data only once, so future studies could employ the longitudinal data collection technique. The data was also limited to MEs in Nigeria, limiting results generalization to small, large and public sector organizations. Therefore, future researchers should test the validity of the study constructs across small, large and public sector organizations.

In conclusion, this study proves the validity and applicability of PS, PE, IB and IP construct measurements in Nigeria. Nonetheless, it is essential to note that some of the original items for PS, IB and IP construct measurements were not compatible with the Nigerian context and were deleted due to lower loadings. These items include PS6, IB2, IB3, IB4 and IP13. Hence, PS, IB and IP measurements retained in this study indicate slight variance with the original items of the constructs. Therefore, all the measurements presented in the results of this study can work as a crucial tool that will provide more insight into the PS, PE, IB and IP constructs in the context of Nigeria.

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Psychological safety

| | |
|------|-------------------------------------------------------------------------------------------------------|
| PS1* | If I make a mistake in this organization, it is often held against me |
| PS2 | I am able to bring up problems and tough issues in this organization |
| PS3* | People in this organization sometimes reject me for being different |
| PS4 | It is safe for me to take a risk in this organization. |
| PS5* | It is difficult for me to ask other members of this organization for help |
| PS6 | No one in this organization would deliberately act in a way that undermines my efforts |
| PS7 | In working with members of this organization, I have my unique skills and talents valued and utilized |

Psychological Empowerment

| | |
|------|---------------------------------------------------------------------------------|
| PEM1 | The work I do is very important to me |
| PEM2 | My job activities are personally meaningful to me |
| PEM3 | The work I do is meaningful to me |
| PEC1 | I am confident about my ability to do my job |
| PEC2 | I am self-assured about my capabilities to perform my work activities |
| PEC3 | I have mastered the skills necessary for my job |
| PES1 | I have significant autonomy in determining how I do my job |
| PES2 | I can decide on my own how to go about doing my work |
| PES3 | I have considerable opportunity for independence and freedom in how I do my job |
| PEI1 | My impact on what happens in my department is large |
| PEI2 | I have a great deal of control over what happens in my department |
| PEI3 | I have significant influence over what happens in my department |

Intrapreneurial Behaviour

| | |
|------|-----------------------------------------------------------------|
| IB1 | I approach new projects or activities in a cautious manner |
| IB2 | I do things that have a chance of not working out |
| IB3 | I avoid taking calculated risks |
| IB4 | I engage in activities that have a chance of not working out |
| IB5 | I will take calculated risks despite the possibility of failure |
| IB6 | I keep ahead of changes instead of responding to them |
| IB7 | I actively fix or improve things I don't like |
| IB8 | I act in anticipation of future problems, needs, or changes |
| IB9 | I take the initiative to start projects |
| IB10 | I tend to implement changes before they are needed |
| IB11 | I generate useful new ideas |
| IB12 | I develop new processes, services, or products |
| IB13 | I approach business tasks in innovative ways |
| IB14 | I find new ways to do things |
| IB15 | I often do things in unique ways |

Individual Performance

| | |
|------|-----------------------------------------------------------------|
| IP1 | I managed to plan my work so that it was done on time |
| IP2 | My planning was optimal |
| IP3 | I kept in mind the results that I had to achieve in my work |
| IP4 | I was able to separate main issues from side issues at work |
| IP5 | I was able to perform my work well with minimal time and effort |
| IP6 | I took on extra responsibilities |
| IP7 | I started new tasks myself, when my old ones were finished |
| IP8 | I took on challenging work tasks, when available |
| IP9 | I worked at keeping my job knowledge up-to-date |
| IP10 | I worked at keeping my job skills up-to-date |
| IP11 | I came up with creative solutions to new problems |
| IP12 | I kept looking for new challenges in my job |
| IP13 | I actively participated in work meetings |

Table A1.
Psychological safety

Author contributions are as follows: Mahmoud, Mahmoud Ahmad, Corresponding Author: Conceptualization (Lead), Data curation (Lead), Formal analysis (Lead), Funding acquisition (Lead), Investigation (Lead), Methodology (Lead), Project administration (Lead), Resources (Lead), Software (Lead), Validation (Lead), Writing – original draft (Lead), Writing – review & editing (Lead). Ahmad, Shuhymee bin: Conceptualization (Supporting), Funding acquisition (Supporting), Supervision (Lead), Writing – review & editing (Supporting). Poespowidjojo, Donny Abdul Latief: Funding acquisition (Supporting), Project administration (Supporting), Software (Supporting), Supervision (Supporting), Writing – review & editing (Supporting).

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