

An Exploratory Sequential Mixed Methods Design to Identify Criteria for Continuous Performance Evaluation

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Abstract: An alternative to the ubiquitous annual performance evaluation is continuous performance evaluation that is posed to give more objective, frequent and constructive feedbacks. Despite researchers recommending following a continuous performance evaluation for employees, there are hardly any progress in this regard. One of the hindrances is in identifying the evaluation criteria. Identifying the relevant criteria – both from employers and employee’s perspective – is important for the success of a continuous performance evaluation process. Given its novelty, it calls for an exploration to understand a holistic set of criteria. For this purpose, an exploratory sequential mixed method was adopted in the Information Technology Industry in India. In the first phase, an unstructured interview was conducted among 11 software engineers (employees). Based on the responses, a semi-structured interview was conducted among 52 software engineers. A qualitative content analysis of the interview transcripts resulted in 33 criteria. Criteria that were similar, synonymous and complementary were combined. An acceptable interrater reliability was obtained in the content coding and categorization process (Krippendorff’s $\alpha = 0.822$). This was followed by a focus group discussion among employers (represented by 15 project managers) and 11 criteria were eliminated and seven were added. In the second phase, the importance of 28 criteria were sought using a questionnaire based survey. A simple random sampling was adopted and 498 responses were received. (Cronbach’s $\alpha = 0.786$). After elimination for incompleteness and erratic information, responses from 443 participants were considered for quantitative analysis. An exploratory factor analysis was conducted on the responses with 28 criteria subjected to exploratory factor analysis. Two criteria were not included for analysis due to a low mean sampling error value. The 26 most relevant criteria were categorized into six factors based on their factor loading. The main criteria factors were titled: Diagnostic, Dynamic, Proactive, Prompt, Resourceful and Responsible. These factors and the criteria within these factors can be used for continuously evaluating the performance of employees.

Keywords: Continuous Performance Evaluation, Criteria for evaluation, Exploratory sequential method, Mixed Method, Software engineer, Reward and Recognition

1. Introduction

Performance evaluation of employees is an important step in measuring the employee productivity. Such evaluations are in general conducted annually using a performance appraisal system (PAS) (Pichler, 2012). The annual appraisal using PAS has two major drawbacks (Schraeder, Becton and Portis, 2007; Lunenburg, 2012). First, the long frequency of the appraisal process (Nelson, 2000). As it is an annual affair, errors such as subjectivity, recency error, bias, halo effect, stereotyping creeps in, resulting in improper evaluations (Boice and Kleiner, 1997). Second, there is a stubborn fixation regarding target or goal achievement (Niven and Lamorte, 2016). These drawbacks can be addressed to an extent by having an ongoing or continuous method for performance evaluation of employees (Sreejith, 2015). While achieving the targets or goals that are usually fixed at the beginning of the appraisal period are important (Sahai and Srivastava, 2012), any steps towards achieving such goals are equally important. Hence there is a need for continuous performance evaluation of employees (CPEE).

Although the importance of CPEE has been highlighted by researchers, there is no known process by which CPEE could be operationalized. In order to implement and sustain, any organizational process, it should produce certain periodic outputs (Guerra-López and Hutchinson, 2013), which is meaningful to its administrators and beneficiaries. One such output of CPEE could be to offer a proper and timely rewards and recognition (R&R) for the employees. R&R is a motivational tool used for appreciation which could boost employee performance and productivity (Hansen, Smith and Hansen, 2002). Research underline that R&R is strongly and positively correlated to the performance of employees (Balakrishnan, Soundararajan and Parayitam, 2022).

R&R is often masqueraded as employee awards. Employee awards often follow a standard operating procedure and highly formal in nature. In general, the employee awards are based on nominations from the managers, which are scrutinized by an individual committee and one among the several nominated employees is offered the award (London and Higgot, 1997). Employees are often clueless about what about their performance fetched them the award. In other words the criteria for such awards are often unknown. Similar to PAS, the criteria for such evaluations are developed mostly by the employers with no known input from the employees (Pettijohn, Parker and Pettijohn, 2001). Additionally, the employee awards are heavily dependent upon the PAS and it is

mostly an annual affair (Zhang, Shum and Belarmino, 2023). Hence the drawbacks for PAS are also applicable for the existing employee awards process.

In order to address these drawbacks, R&R should be offered in an ongoing and continuous manner. Although the importance and the positive correlation between R&R and employee performance has been established (Luthans, 2000; Bradler *et al.*, 2016), it has not known to be widely practiced in organizations. An initial step in this regard would be to build a set of well-defined criteria that are acceptable to both employees and employers. Hence the objective of this study is to identify the set of criteria with respect to both employees' and employers' perspectives.

The scope of this research is limited to Information Technology (IT) organizations due to the alarming rate of attrition (Pallathadka *et al.*, 2022) and the presence of younger population (Gen Y and Gen Z) who are knowledge workers (Shujahat *et al.*, 2019). They expect frequent appreciation and continuous feedback regarding their performance (Arora and Dhole, 2019). In this research, employees are represented by Software Engineers and the employers are represented by Project Managers.

2. Method

As the employees cherish getting recognized not only for their contributions but also for their efforts, it is important to understand their expectations. This can be sequentially explored. Exploratory sequential method has two cascading phases (Ivankova, Creswell and Stick, 2006; Creswell, 2014). In the first phase a qualitative approach is followed, and in the second phase, a quantitative approach. The results obtained during the qualitative phase becomes the input for quantitative phase. Accordingly, this research was broadly divided into two phases: Phase I is the qualitative process of identifying the criteria, both from employees and employers' perspectives; and Phase II is about further exploring the importance of the criteria from a large set of respondents using survey method. An overview of the exploratory sequential method is illustrated in Figure 1.

2.1 Phase I: Qualitative

With only a broad idea in mind, the objective in this phase was to gather as much information as possible in form of vignettes, experiences and expectations that the employees have in terms of *what would they like to be recognised for*. The question was straightforward: What did they (the employees) think the employers should consider rewarding and recognizing them. At the end of this phase, a set of criteria should be identified which is consensual to both employees and employers. For this a three stage approach was developed. Stage 1 and 2 were interviews with employees to identify the criteria, along with content analysis and triangulation and Stage 3 was to corroborate these results with the employers. These stages are explained in detail.

2.1.1 Stage 1: Unstructured Interview

An unstructured interview (Zhang and Wildemuth, 2009; Chauhan, 2022) with the employees was carried out to explore and understand their opinions regarding the criteria that they expect to be used for evaluating their performance. The respondents were recruited strictly based on the inclusion criteria that the software engineer should have completed at least one appraisal cycle and have undergone a traditional performance appraisal process. This is important because the respondent could explain the expectations in a realistic manner. The respondents were briefed about the purpose of the interview, that their identity would remain confidential and that they can withdraw from the interview at any point of time. Only one withdrawal happened due to a personal emergency. The interviews were conducted at a neutral location such as cafeteria or a common atrium. Each interview lasted on an average for about 45 minutes, with the shortest completed one at 28 minutes. Initially 12 software engineers from three different organizations were identified for the interview. Information saturation was reached at about the ninth interview. Nevertheless, 11 interviews were completed.

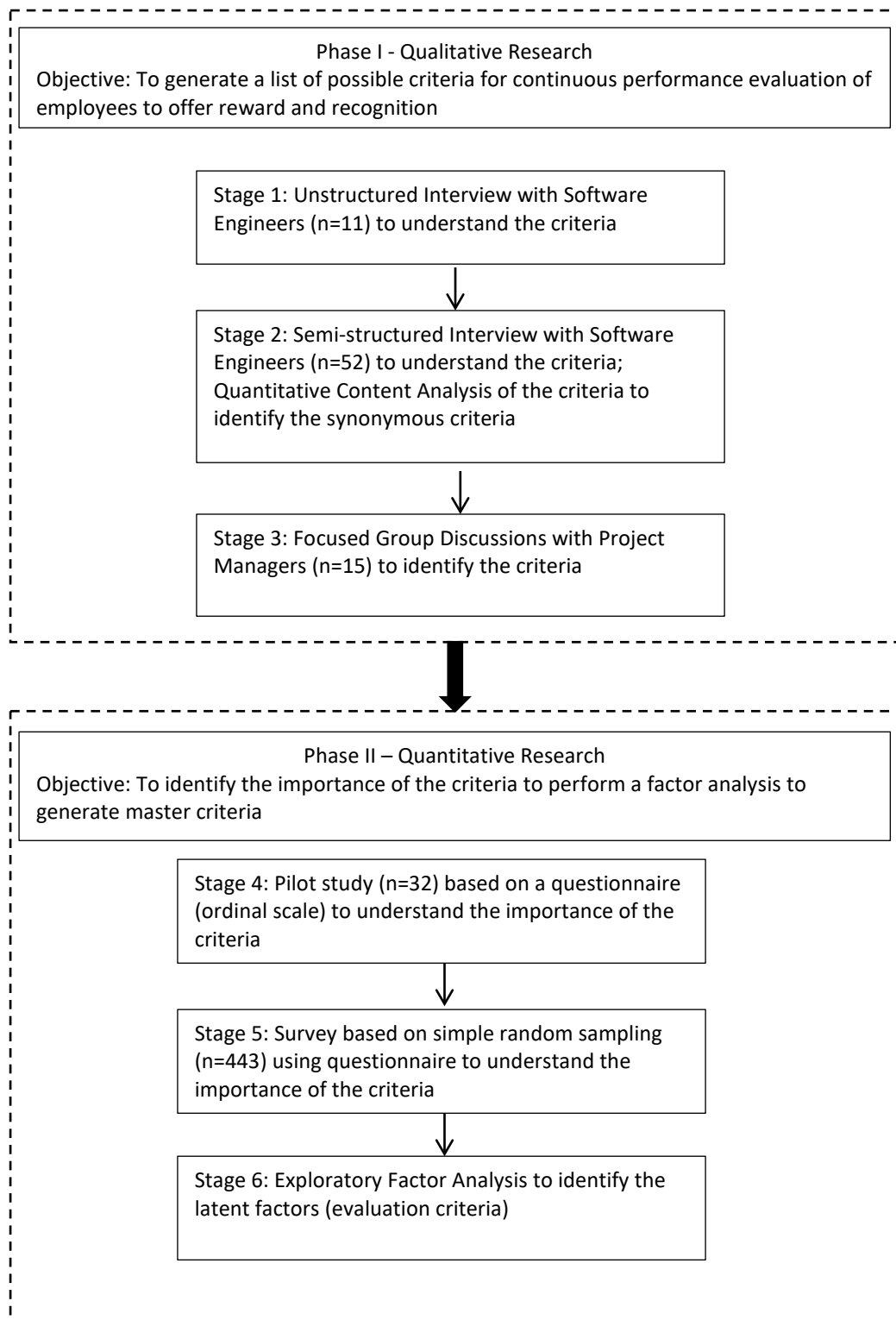


Figure 1: Illustration of the exploratory sequential process followed in this paper

The transcripts of these interviews were carefully read and a quantitative content analysis was performed on each of them. The objective of the content analysis was to identify terms or phrases that can be considered as a possible criterion for continuous performance evaluation. Synonymous words and phrases were grouped together. Thus a set of 31 unique criteria were identified from all the 11 interviews.

2.1.2 Stage 2: Semi-structured Interview

For a better understanding regarding the sufficiency of these criteria, another round of semi structured interview was conducted among 52 software engineers. These participants were not part of Stage 1. The participants were given the list of identified criteria and were asked to include or remove any more criteria as they find important. Out of the 31 criteria, none of them were removed, but two more criteria were added.

Criteria from these two stages were then triangulated with the criteria available from literature. Although there were no specific criteria available in the literature for continuous performance evaluation, the generic set of criteria used to evaluate software engineers were identified. Synonymous criteria (for eg. 'ability to reiterate the client requirements' and 'seeking for clarification from clients on the requirement' were mapped to *Customer Interaction*). The triangulation resulted in correctly mapping about 83% of the criteria identified until stage 2. The coding was also conducted by another independent researcher from the linguistic area to ascertain the mapping accuracy. A satisfactory inter-rater reliability (Hayes and Krippendorff, 2007) was obtained (Krippendorff's $\alpha = 0.822$). This indicated that the set of criteria identified from the literature and the interviews have sufficient coherence.

While the employees offer their wish list of criteria, for all practical reasons, it has to be validated from an administration perspective. For this purpose, a round of focused group discussion was arranged with the employers.

2.1.3 Stage 3: Focus Group Discussion

In Stage 3, the criteria identified until stage 2 was validated by a group of managers who would use these criteria to evaluate their employees. Hence for an all-round perspective the managers' viewpoints are also mandatory to be incorporated. Two rounds of focus group discussions were conducted with seven and eight managers respectively. The anchor point of the discussion revolved around the criteria. As the objective is validation, they were asked about the identified criteria and sought its importance for continuous performance evaluation. In the discussion that lasted on an average 34 minutes, the managers upheld 21 of the 33 criteria, eliminated 11 criteria and inserted 7 more thus making it to 28 criteria.

The list of criteria in each stages is listed in Table 1. At the end of Phase I, a comprehensive set of 28 criteria were identified. This necessitated further exploration with respect to the perceived importance of each of these criteria. Hence a large scale survey research was designed.

2.2 Phase II: Quantitative

In Phase II, the criteria identified in Phase I was developed into a questionnaire with a 5-point Likert scale. The demographics of the respondents were also sought, and questions such as "How important do you think *timeline adherence* as a criteria for evaluating your performance" were asked for each criteria.

2.2.1 Stage 4: Pilot Test

In Stage 4, a pilot test of the questionnaire was done for the following objectives: to check for content and construct validity, reliability, time taken to complete the questionnaire and to seek any more criteria that were initially left out (open ended questions). The pilot study was done among 32 randomly identified employees. The content validity was established as there were no additional questions that were asked to be included. Certain questions were reworded slightly so as to better convey the intended meaning. Due to the difficulty in conducting a test-retest method, the reliability of the questionnaire was established using statistical measure (Cronbach's $\alpha = 0.786$). The respondents took an average 12 minutes to complete the questionnaire. As the instrument contained sufficient validity and reliability, it was sent to a larger set of respondents.

2.2.2 Stage 5: Survey Method

Using simple random sampling among the population, the questionnaire was sent through an online survey platform. Out of the 1322 questionnaires sent, 498 respondents completed the questionnaire (response rate: 37.6%). Among these only 443 were complete in all respects, and hence the final analysis was performed on the 443 responses.

Table 1. List of criteria for CPEE identified from each stages of Phase I

SI No	Criteria	Stage 1	Stage 2	Literature	Stage 3
1	Quantity of Work	✓	✓	✓	
2	Timeline adherence	✓	✓	✓	✓
3	Customer interaction	✓	✓	✓	✓
4	Target achievement	✓	✓	✓	✓
5	Timely Reporting	✓	✓	✓	✓
6	Documentation	✓	✓	✓	✓
7	Reviewing				✓
8	Analytical Ability	✓	✓	✓	✓
9	Work planning			✓	
10	Creativity		✓	✓	✓
11	Communication skills	✓	✓	✓	✓
12	Knowledge updation	✓	✓	✓	✓
13	Initiative	✓	✓	✓	✓
14	Understanding big-picture				✓
15	Additional Responsibilities	✓	✓	✓	✓
16	Presentation skills	✓	✓	✓	✓
17	Negotiation skills		✓	✓	✓
18	Ideas / Suggestions	✓	✓	✓	✓
19	Innovation			✓	
20	Patents / Publications			✓	
21	Self-learning	✓	✓	✓	✓
22	Leadership			✓	✓
23	Team Cooperation	✓	✓	✓	✓
24	Punctuality	✓	✓	✓	✓
25	Mentoring			✓	✓
26	Perseverance	✓	✓	✓	
27	Humor Sense	✓	✓	✓	
28	Critical Thinking	✓	✓	✓	
29	Passion	✓	✓	✓	
30	Resilience	✓	✓	✓	
31	Commitment	✓	✓	✓	✓
32	Knowledge sharing	✓	✓	✓	✓
33	Proactiveness	✓	✓	✓	
34	Code of Conduct				✓
35	Social Volunteering	✓	✓	✓	✓
36	Agility	✓	✓	✓	
37	Corporate Social Responsibility			✓	
38	Business domain knowledge	✓	✓	✓	
39	Multi-tasking	✓	✓	✓	
40	Improving morale				✓
41	Quality of the job	✓	✓	✓	✓
42	Process Adherence	✓	✓	✓	
43	Cost saving			✓	
44	Co-curricular activities	✓	✓	✓	
45	Best Practice				✓
Number of criteria in each stage		31	33	40	28

2.2.3 Stage 6: Factor Analysis

To identify the latent structure of the 28 criteria, an exploratory factor analysis (EFA) was performed on the responses using maximum likelihood method. As an initial step before factor analysis, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) test and Bartlett’s test were conducted on the data. As a general practice, only those criteria with KMO value greater than 0.5 are acceptable (Nunnally and Bernstein, 1994). Two criteria (*Best Practice* and *Code of Conduct*) were removed due to low KMO value, and the resultant overall KMO was found to be 0.7201. Bartlett’s test of sphericity is conducted on the data set with 26 criteria to examine homogeneity of variance and was found acceptable (Bartlett’s test $\chi^2=649.28$; $df=25$; $p \text{ value}<0.05$). This indicated that the data set was factorable. The EFA resulted in indicating the latent structure among these 26 criteria, identified using eigen value (Table 2) and scree plot (Figure 2)

Table 2. Eigen values and percentage of variance explained by the number of factors (first 10)

No	Eigen Value	% Variance	Cumulative %
1	7.375428	28.37%	28.37%
2	3.599614	13.84%	42.21%
3	2.890953	11.12%	53.33%
4	1.963142	7.55%	60.88%
5	1.679835	6.46%	67.34%
6	1.269327	4.88%	72.22%
7	0.998493	3.84%	76.06%
8	0.854821	3.29%	79.35%
9	0.785312	3.02%	82.37%
10	0.685383	2.64%	85.01%
11

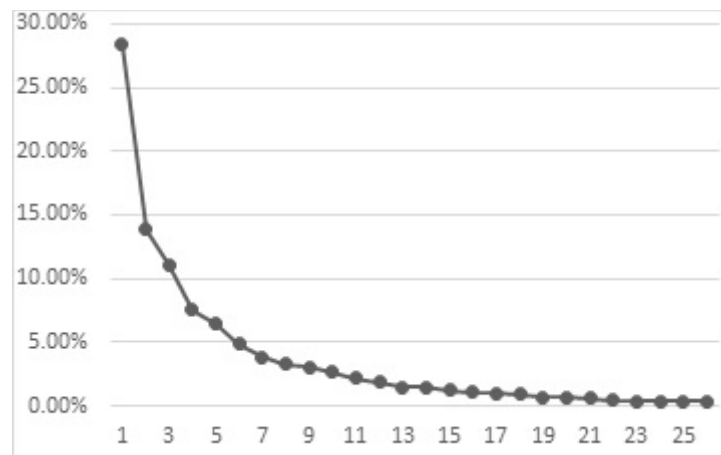


Figure 2: Scree Plot indicating the number of factors to be extracted from 26 criteria

From Figure 2, it can be noticed that there are four major bends, indicating that at least four factors can be extracted from the criteria present in the data set. However, the exact number of criteria cannot be completely visualized from the scree plot. The number of factors can be decided from the eigen values in Table 2. The number of factors can be as many as the number of rows of eigen values with more than 1 (Crawford *et al.*, 2010; Ahn and Horenstein, 2013).

3. Results and Discussion

From Table 2 the first six rows include eigen values which are greater than 1, indicating that there are six factors which can be extracted. These values cumulatively explain more than 70% of the variance. The factor loading for all criteria obtained after *oblimin* rotation are grouped and shown in Table 3. Factor loadings less than 0.45 are not considered and those above 0.45 are listed under the corresponding factor (considered as main criteria) as shown in Table 4.

Table 3. Grouped factor loadings based on Exploratory Factor Analysis

Criteria	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Com	S. Var.
Quality of the job	0.700						0.706	0.293
Documentation	0.836						0.828	0.172
Analytical ability	0.467						0.686	0.314
Reviewing	0.531						0.539	0.460

Criteria	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Com	S. Var.
Presentation	0.868						0.818	0.182
Customer interaction		0.516					0.592	0.407
Communication		0.705					0.749	0.250
Negotiation		0.654					0.625	0.374
Knowledge updation			0.821				0.757	0.242
Initiative			0.745				0.810	0.189
Self-learning			0.657				0.744	0.255
Leadership			0.614				0.611	0.388
Timeline adherence				0.710			0.679	0.320
Timely reporting				0.722			0.786	0.213
Process adherence				0.585			0.568	0.431
Punctuality				0.818			0.798	0.201
Understanding big picture					0.455		0.645	0.354
Ideas and suggestions					0.695		0.728	0.271
Creativity					0.796		0.881	0.118
Cost saving					0.831		0.746	0.253
Additional responsibility						0.914	0.858	0.141
Knowledge sharing						0.617	0.759	0.241
Commitment						0.539	0.725	0.274
Improving morale						0.492	0.598	0.401
Team work						0.679	0.812	0.187
Mentoring						0.729	0.608	0.391

Table 4: Major Criteria (Factors) for CPEE to offer R&R and corresponding sub-criteria

Factor 1: Diagnostic	Factor 2: Dynamic	Factor 3: Proactive	Factor 4: Prompt	Factor 5: Resourceful	Factor 6: Responsible
Quality of the job	Customer Interaction	Knowledge updation	Timeline adherence	Understanding Big Picture	Additional Responsibilities
Documentation	Communication	Initiative	Timely reporting	Ideas and Suggestions	Knowledge sharing
Analytical ability	Negotiation	Self-learning	Process adherence	Creativity	Commitment
Reviewing	---	Leadership	Punctuality	Cost Saving	Teamwork
Presentation	---	---	---	---	Mentoring
---	---	---	---	---	Improving morale

As indicated in Table 4, the identified factors were named as: *Diagnostic, Dynamic Proactive, Prompt, Resourceful and Responsible*. The latent coherence among each of the corresponding sub-criteria among the main criteria can be used to evaluate employees to offer R&R. The identified six factors (main criteria) would have sufficient external validity, given its generic nature.

The success of the CPEE process lies in its continuity. Using the main criteria and sub-criteria identified, a multi-criteria decision making method can be employed to develop a well-structured process to make the evaluation happen in a continuous manner. Often managers are not really aware of the process of R&R and are equally clueless about the evaluation criteria, that discourages them from practicing it (Nelson, 2001). This study offers an initial understanding of the set of criteria for CPEE to offer R&R. The specific set of sub-criteria may vary for different industries, however the main criteria identified would stay relatively common.

The identified criteria for CPEE is not to be considered as a replacement for the organizations existing PAS, but instead it could be used as complementary. A timely feedback favourably increases the employees' justice perception (Singh, 2018). A robust and well-designed CPEE based on these identified criteria could offer objective and periodic assessment, offering a real time feedback to employees with regard to their performance (Heller, 2017). This could eliminate or reduce the errors due to the over dependency in PAS, and ensures transparency and fairness in evaluations. As it generates objective information periodically, the output from a

CPEE model can be used to model and predict employee performance (Alsobaey and Al-Alawi, 2023) and can enable better appraisal design (Wang, 2022).

4. Conclusion

The paper details an exploratory sequential mixed methods research to identify criteria for continuous performance evaluation of employees, specifically aimed at offering rewards and recognition. The study was conducted in two broad phases. In Phase I, a qualitative method was followed in three stages: unstructured and semi-structured interviews and a focus group discussion. A quantitative content analysis method was used for data analysis and a triangulation was also performed to ascertain the veracity and sufficiency of information. In Phase II a large scale quantitative method was followed in three stages. A questionnaire based survey was carried out using a pilot study and a main study, and latent factors were extracted based on exploratory factor analysis. Finally, six major criteria were identified for the continuous performance evaluation of employees: Diagnostic, Dynamic, Proactive, Prompt, Resourceful and Responsible. The study has major limitations such as concentrated only on the IT industry, relatively small sample size and lack of confirmation or validation of the identified factors. Developing a process for evaluation using the identified criteria could be a possible future direction in this area. Also the veracity of these criteria could also be verified in other industries.

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