Portraying an employee performance management system based on multi-criteria decision analysis and visual techniques

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Abstract

Purpose – Performance appraisal is one of the most critical and indispensable human resource practices for organisations. However, it generates dissatisfaction among employees as it is often viewed as complex and ineffective. The purpose of this paper is to present a new performance management system that integrates multi-criteria decision analysis (MCDA) methods – the analytic network process (ANP) and PROMETHEE – with the visual techniques of the GAIA plane and the stacked bar chart. MCDA methods allow a structured and consistent evaluation integrating qualitative and quantitative criteria.

Design/methodology/approach – The authors developed a structured and transparent performance management system. It is based on the MCDA methods PROMETHEE and ANP.
It also incorporates the visual techniques: GAIA and stacked bar chart. Feedback for trainings and developments can precisely be formulated.

Findings – Visual techniques permit clear identification and quantification, for each employee, of the areas that need improvement through training and development, which contributes to the resource-based view of organisations. A real case study has been portrayed to show the added value of the MCDA methods and the visual techniques in employee performance management.

Originality/value – The paper describes a new employee performance system adopted in an organisation. The multi-criteria analysis transparently combines qualitative and quantitative decision criteria into a

holistic and transparent evaluation. The visual techniques permit us to gain a deep insight into the employees' skills profile and capture fine details where individuals perform or underperform.

Keywords: MCDA, ANP, PROMETHEE, Visual techniques, Personnel evaluation, Performance management

1. Introduction

Companies need to measure and improve their performances in all business areas if they want to remain competitive. Employees' performance is not an exception, especially as employees are often considered the most important and complex asset of an organisation (Coff 1997, Vaiman and Vance 2008). Performance appraisals evaluate the job performance of employees and the results are then communicated to and discussed with the relevant employees. It measures how well employees perform job-relevant tasks and further helps in distinguishing the more efficient employees. According to Workman (2009), managers are not only "…involved in the gathering of information about employees such as their performance measurements compared to their objectives and other work-related activities", but they also "monitor" employees' attitudes, organisational behaviour and absenteeism. Performance evaluations are thus the basis for determining the development and training needs of employees.

The motivation for conducting our study is thus. Reviewing and evaluating the performance of employees is an important task as critical decisions for employees, such as those relating to promotions, pay rises, rewards, retention, training needs etc., rely on the accurate assessment of employees. Many researchers, such as Cho and Lee (2012) and Liu et al. (2007), have also highlighted that performance management leads to better organisational performance. Paradoxically, it is claimed that managers often trivialise the process or even totally avoid it (Pettijohn et al. 2001). The results of a US survey (Watson Wyatt Worldwide 2004) of 1,200 employees, in which 90% of the respondents participated in a performance management programme, showed that only 30% believed the process helped them to improve their performance. Furthermore, less than 40% said the system established clear performance

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goals or generated honest feedback. It is therefore not surprising that employees see it as a bureaucratic process and a waste of time that does not add much value. Few managerial tasks are viewed more negatively or performed as unevenly as performance review or appraisal (Aguinis et al. 2011). Often, performance appraisals are months overdue (Heathfield 2007), at times leading to a lapse in trust and leadership ability (Reinke 2003). This contradiction between the notional high benefits and neglect in practice may be attributed to managers being ill-equipped to conduct effective appraisals.

It is also argued that most performance appraisals are a 'managerial prerogative' (see arguments made by Biron et al. (2011)) and hence is a 'behavioural performance appraisal' (Snell and Youndt 1995). The drawback here is that it could be biased and unfair. Others argue that there are aspects of 'employee initiatives', where, certain behaviours can lead to increased performance (e.g. Wood and Marshall 2008). It is understood that robust selection and training initiatives by organisations helps to socialise employees, ensuring that they have the requisite abilities required by organisations (e.g. Selvarajan and Cloninger 2012). However, here too performance appraisals cannot be solely based on 'employee initiative'. Further, there are 'mutually agreed' performance parameters that lead to certain agreed performance behaviours and outcomes (e.g. Gruman and Saks 2011), but again these cannot be assessed in isolation. The key here is to have a combination of criterion, which this study aims to portray through a case study.

In addition, it is argued that "…the use of eHR software in people management gives a new momentum and increased dominance to key Western-originated practices, such as HR based performance management" (Alcaraz et al. 2012, p. 106). In addition, "cultural" differences in managing people in the subsidiaries of global organisations worldwide can be a challenge in settings such as global software organizations, which "represent one kind of workplace setting within the new economy" (D'Mello and Eriksen 2010, p. 81). Such "new economy" organisations face fresh challenges, as for example in call centres where the "…'gaze' of the electronic boards displaying their unceasing demands on staff combined with tele-computing and the automatic distribution of calls (ACD) ensures that backlogs are always driving performance" (Alferoff and Knights 2008, p. 31).

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It is therefore important to design and implement a transparent, unbiased, structured and effective performance management method. Responding to this contemporary and critical challenge, this paper introduces a new transparent and structured employee performance appraisal method based on the combination of two multi-criteria decision analysis (MCDA) methods, PROMETHEE (Brans 1982, Brans and Vincke 1985) and the analytic network process (ANP) (Saaty 2001), complemented with visual techniques (Nemery et al. 2012). This novel method aims to define the evaluation criteria clearly, comparing and evaluating employees' performances, which would lead to a transparent, structured and competitive appraisal method. Employees' strengths and weaknesses can thus be detected easily and justified using visual techniques. Therefore, specific recommendations for improvements can be formulated. The main advantage of PROMEHTEE is the setting of thresholds, which means that above them the score does not contribute anymore to their overall performance appraisal. This particular feature permits to avoid staff to strive to maximise their score on the considered criteria by concentring their time and efforts and neglecting tasks that do not contribute.

The structure of the paper is as follows. In section 2, we assess the importance of performance management by reviewing the extant literature. In section 3, we describe the MCDA evaluation method and section 4 is devoted to the case study. Finally, in section 5 we provide conclusions and recommend future research directions.

2. Literature review

A structured, consistent and transparent appraisal enhances organisational commitment and organisational citizenship behaviour (Narcisse and Harcourt 2008, Organ 1988). In contrast, an inferior appraisal method, in which employees and managers disagree about their contribution, can create conflict (Heathfield 2007) and even lead to negative consequences, such as theft, vandalism, intentional idleness, absenteeism (Sania Zaheer 2011) and intention to resign (Brown et al. 2008). Poor appraisals tend to

avoid differentiation. The majority of the employees are wrongly ranked highly to avoid disappointment, unhappiness (Heathfield 2007), inter-employee jealousy, hostility (Law 2007) and the manager's discomfort in providing negative feedback (Chen et al. 2007). A poor appraisal method also prevents any true, transparent, structured, and honest, value adding development or improvement as everyone is already "artificially" excellent. At an organisational level, performance management ensures that employees' performances and skills are aligned with the strategic goals of the company. A comprehensive assessment can define whether the organisation has the necessary capacities in house (Merritt 2007). It also supports the implementation of strategic changes (Amaratunga and Baldry 2002) and fosters good workplace harmony (Heathfield 2007).

A detailed review of the literature on performance appraisals reveal four main characteristics that lead to certain appraisal criterion. These are *position* characteristics, *organisation* characteristics, *personal* characteristics, and *task and target* characteristics. The following table 1 defines and details these against the literature.

Main characteristics and criteria of performance appraisal	Sub-characteristics and criteria of performance appraisal	References
Position characteristics: Defined as characteristics related to the position held. The person is assessed according to the position held. This is a 'managerial prerogative'.	Supervisory, managerial, leadership, customer focus, working relationships, initiatives etc. Because this is managerial prerogative, this is mainly conducted by managers. This could be included in 360 degree or goal setting.	(Landy and Farr 1980, Colquitt et al. 2007, Armstrong and Taylor 2014, Prowse and Prowse 2009, Beausaert et al. 2011, Biron et al. 2011, Obisi 2011, McCarthy and Garavan 2001, McCarthy and Garavan 1999)
Organisational characteristics: Defined mainly as the person-organisation fit. Person here is	Fit to organisational culture, fit to business/sector/industry, fit to business environment, etc. Because this is managerial prerogative, this is mainly	(Landy and Farr 1980, Salanova et al. 2005, Armstrong and Taylor 2014, Prowse and Prowse 2009, Beausaert et al. 2011, Biron et al. 2011, Obisi 2011,

assessed to the closer fit. This is also a 'managerial prerogative'.	conducted by managers. This could also be included in 360 degree or goal setting.	McCarthy and Garavan 1999, McCarthy and Garavan 2001)
Personal characteristics: Defined as mainly the personality or personal traits required for the assessed work. This is based on the 'employee initiation', linked to their personality traits and personal attributes.	Organisational citizenship behaviour (OCB), self-development, flexibility, number of projects, work travel, overtime, etc. This could be conducted by managers or be self-reports. This could also be included in 360 degree goal setting.	(Barrick and Mount 1991, Tett and Burnett 2003, Prowse and Prowse 2009, Armstrong and Taylor 2014, de Waal 2010, Eisenhardt 1985, Selvarajan and Cloninger 2012, Snell 1992, Snell and Youndt 1995, McCarthy and Garavan 1999, McCarthy and Garavan 2001, Organ 1988)
Task and Target characteristics: Defined as task and targets set by the organisation. Assessment here would be against these set tasks and targets. This is mutually (management and employee) set performance targets.	These could be sales or output targets, tasks defined by the organisation, absenteeism, loyalty, integrity, etc. This could be conducted by managers or be self-reports. This could be included in 360 degree or goal setting.	(Locke et al. 1981, Rotundo and Sackett 2002, Armstrong and Taylor 2014, Prowse and Prowse 2009, Gruman and Saks 2011, Skule 2004, Ubeda and Santos 2007, Ng and Feldman 2010, McCarthy and Garavan 1999, McCarthy and Garavan 2001)

Table 1 - Table portraying the extant literature on the characteristics and criteria of performance appraisal.

In terms of the types of performance appraisals conducted by organisations, '360° feedback is a performance appraisal approach that relies on the input an employee's superiors, colleagues, subordinates, sometimes customers, suppliers and or spouses.' (McCarthy and Garavan 2001, p.6). However although studies suggests that 360° feedback leads to increased performance, some studies suggest that receiving feedback from peers would be poorer quality and less valid. It is also suggested that 360° feedback is

time consuming and may not result in an increase in employee performance that an annual appraisal could achieve (Fletcher 2008, McCarthy and Garavan 1999). Although this suggests that in some organisations the 360° feedback method does not improve the overall commitment and performance, Rai and Singh (2013) argue that companies who adopt this method of feedback are more likely to have employees who perform better than employees in a company who do not support this method.

A further feedback method to performance appraisals is goal setting. Goal setting is argued to be one of the most effective performance appraisal types that contribute to an increase in performance and motivation (Kuvaas 2011). Stansfield and Longenecker (2006) suggest that supplying employees with goals in the performance appraisal process increase performance by allowing them to have something to believe in and work towards. They also suggest that goals give managers clear objectives to evaluate their employees against. Although many researchers suggest that this method of feedback is successful, Schweitzer et al. (2004) argue that goal setting does not increase employee performance if the employee does not adopt the goal or if the goal is too simple. These researchers explored the role of goal setting, wherein they found that in some cases setting goals in performance appraisals led to unethical behaviour. It is also argued that setting goals is only appropriate when the goals are hard as they are more motivating than low and easy goals (Locke and Latham 2006). Similarly Schweitzer et al. (2004) suggest that the goals must be significant to the employee as they must be achievable in context and difficult enough to challenge the employee.

Thus the extant literature above does not specifically issue guidelines for conducting a performance appraisal, though useful inferences can be drawn from the literature on behavioural change. However, the developmental function of appraisal, where it is increasingly becoming a key performance criterion in itself, has not been integrated with the career management policies and practices in organisations. According to Borman (1991) there has been a lot of focus on the development of valid and reliable predictors, rather than construct-valid criterion measures. He argues that a criterion should reflect those behaviours and outcomes at work that competent observers (those responsible for performance appraisals)

can agree constitute necessary standards of excellence to be achieved. In other words a set of performance criteria should cover all important performance requirements of the assessed job. Thus, performance appraisal criteria tends to be almost entirely context-dependent, measured using 'whatever is available' (see arguments made by Guion 1991). He comes up with objective performance criteria that should include turnover, absenteeism, production rates/sales, work samples and tracking performance.

In this study the authors undertook a three stage process to determine the performance appraisal criteria (see figure 1 below). First, an in-depth literature review was done to design a set of criteria for the organisation to choose from (see table 1 above). This was a priori. Second, the representatives i.e. management of the organisation (including personnel/HR) were consulted and the criteria finalised. Third, the criteria also took into consideration the culture and tradition of the industry/sector as well as the organisation. Six performance management criteria were found to be relevant to the company. These are categorised as comprising a mix of managerial prerogative, mutuality, and employee initiative (two criteria apiece). These are discussed under *section 4.2* problem modelling.

In summary, an effective, structured, consistent and transparent performance management method has a positive impact on individuals, teams and the organisation, resulting in valuable and rare resources and hence a competitive advantage for firms. Employee performance measurement practices and methods are multi-dimensional and complex. Therefore, MCDA can support and capture this activity in a structured and constructive way. In addition, the use of MCDA methods and visual techniques can aid in developing greater understanding of and communicating the strengths and weaknesses of each employee, as well as the organisation's collective skills. The next section addresses in detail the proposed MCDA and visual techniques.

3. MCDA performance management method

3.1. *MCDA method*

Multi-criteria decision making methods are widely employed as is evident from the reviews of various applications, for example TOPSIS (Behzadian et al. 2012), PROMETHEE (Behzadian et al. 2010) and AHP (Forman and Gass 2001, Ho 2008, Kumar and Vaidya 2006, Liberatore and Nydick 2008, Omkarprasad and Sushil 2006, Sipahi and Timor 2010). However, their application in the field of human resources management has been limited. AHP has previously been applied in human resources recruitment (Saaty et al. 2007). Fuzzy AHP has been utilised to prioritise human capital measurement indicators (Bozbura et al. 2007) and undertake employees' performance appraisal (Manoharan et al. 2011). MacBeth has been used to assess the performance of civil servants (Ensslin et al. 2000). AHP and cluster analysis have been combined for the evaluation of planning processes (Frezatti et al. 2011). AHP has also been used with the balanced scorecard to assess organisational performances (Bentes et al. 2012).

AHP and Macbeth provide good and justifiable results; however, they are based on pairwise comparisons, which render them difficult to use with a high number of alternatives. For example, in our case study (section 4), in which 111 employees are assessed, we would require $(111^2-111)/2 = 6105$ comparisons for each criterion. Therefore, for our study, we have decided to use a pairwise-based method only for the evaluation of the criteria and to use PROMETHEE for the appraisal of the performances. An AHP-PROMETHEE combination has already been proposed in previous research (Bogdanovic et al. 2012, Brucker et al. 2004, Gervásio and Simões da Silva 2012, Herva and Roca 2013, Macharis et al. 2004, Turcksin et al. 2011, Venkata Rao and Patel 2010, Venkatesan and Kumanan 2012, Wang and Yang 2007, Yang and Deuse 2012), albeit not in the context of employee performance appraisals. When dependencies between criteria exist, ANP is used. Recently, ANP has also been combined with PROMETHEE (Hamzeh et al. 2015, Kilic et al. 2015, Govindan et al. 2014, Kabak and Dağdeviren 2014, Peng and Xiao 2013). This hybrid method will also be used in this this paper. Studies (Millet 1997, Whitaker 2007) have found that a pairwise method is more precise than a direct evaluation (e.g. using a

scale 1 to 5), therefore ANP is used for the weights. ANP is tedious for a large number of alternatives, therefore we prefer PROMETHEE to evaluate the alternatives. PROMETHEE (Brans 1982, Brans and Vincke 1985) requires only a few parameters. It is easy to explain to non-technical persons, in our case human resource managers, and for them to use and user-friendly software is available (Gilliams et al. 2005). It does not need the definition of technical parameters as in ELECTRE. A normalisation of the scores in not needed and therefore the evaluation of each criterion can be expressed by its own units. Thus, it overcomes the drawback that ranking depends on the normalisation method selected (Ishizaka and Nemery 2011, Tofallis 2008). The decision maker needs to define a preference function that is generally characterised only by an indifference and preference threshold (Ishizaka and Nemery 2013, Nemery et al. 2012). These thresholds are important to avoid over-emphasising criteria. For example, by setting a preference threshold at 7 days of overtime, any additional day would not count toward a better appraisal. This ensures that the work-life balance of the employee is not affected. Similarly, an indifference threshold of two days means that an employee needs to work at least two days to have his extra time counted in his appraisal.

Several version of PROMETHEE exists. PROMETHEE I provides only an ordinal ranking (i.e. no score), where incomparability is possible. PROMETHEE II gives a complete cardinal ranking. PROMETHEE III allows detecting proximities between net flow values but requires an additional parameter α. With the visual representations GAIA, it is possible to directly appreciate the proximities between the flow values. Therefore, PROMETHEE III is not needed. PROMETHEE IV is PROMETHEE II followed by a mathematical programming for an optimal resource allocation. This is not the purpose of our paper. By consequence, the most appropriate version for our study is PROMETHEE II.

It is to note that PROMETHEE may suffer from rank reversal (De Keyser and Peeters 1996), as any other MCDA method based on pairwise comparisons (Wang and Luo 2009). However, it has been proved

that rank reversal may affect only very close actions (Mareschal et al. 2008) and therefore they can be neglected as in practice they can be considered as the same evaluation.

This hybrid method is complemented with two descriptive visual methods, GAIA and stacked bar charts.

3.2. GAIA

The graphical representation of actions evaluated on two criteria can be seen on a plane of two axis. An evaluation with three criteria can be seen on a space of three dimensions. If more criteria are considered, then the representation of four or more dimensions cannot be seen as we are in a hyperspace. If we still want to represent graphically several criteria (axis) on a plane, we need to do a projection of the hyperspace into this plane. The projection needs to be done on the right angle in order to preserve the maximum information projected. The mathematical method that allows finding the right projection is called principal component analysis (Brans and Mareschal 1994). Only the end result of the projection is relevant for the employee appraisal because it allows representing the full picture of the appraised components.

The GAIA plane is a descriptive tool that represents all components of the problem on a plane. It is therefore an important complementary tool of PROMETHEE, which represents only the final results. It facilitates the decision process as easy conclusions can be drawn visually. Near actions on the plane will often have very similar rows in the variance-covariance matrix Φ. The decision maker can thus easily identify actions with similar or opposite performances. Moreover, the decision maker can compare criteria as their position on the plane is an indication of their conflicting or correlated behaviour. Their length represents the distinguishing power between actions. A wash criterion has a short arrow; a discriminating criterion has a long arrow.

4. Organisational context of case study: Gamma

4.1. Company background

The case study organisation, "Gamma", is a US-owned and headquartered business process outsourcing (BPO) services provider focused on mid-market companies. The company supports various business processes across the entire outsourcing client organisations. It has operations at several subsidiary locations in India. Gamma initially started its BPO business in 2004. Of these locations in India, it has 112 associates in Suratkal, 150 in Pimpri, 12 in Mumbai and 18 in Bangalore. The data for this study were collected at the Suratkal operation.

We found that the performance management strategy of Gamma included reward strategies that were directly linked to monthly and annual performance, shadowing, internal training, leadership development, mentoring and role modelling. This is discussed in greater detail in section 4.2.

4.2. Problem modelling

The authors acted as independent consultants in constructing the performance model together with the senior managers. A literature review was undertaken by the authors and the performance management criteria identified were discussed with the senior managers. Six performance management criteria were found to be relevant to the company. We have thus come up with this list of criteria through the following process:

1. We undertook an in-depth literature review to come up in designing a set of criteria for the organisation to choose from. This was a priori (see table 1).

2. The representatives i.e. management of the organisation (including personnel/HR) were consulted and the criteria finalised.

3. Sub-Criteria were grouped and a upper criteria were defined.

4. Lastly the criteria also took into consideration the culture and tradition of the industry/sector as well as the organisation.

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These are categorised as comprising a mix of managerial prerogative, mutuality, and employee initiative (two criteria apiece) and are defined and discussed in detail below.

First, it is argued that employee "performance management" is crucial but it is still a "managerial prerogative" to choose how employees' performances are appraised, analysed and managed (see e.g. Beausaert et al. 2011, Biron et al. 2011, Obisi 2011). This was evident as the case study organisation's responsibilities are standardised and imposed top-down with an overriding concern for procedures and methods. Employees are thus accountable for their actions, regardless of the results. Thus the expectations and desired behaviours are already communicated and set by the management, against which employees are assessed, through the formalised performance appraisal method. Thus results are purely based on set and expected performance criteria. Appraisals are based on supervisor observation of behaviour and feedback is used as a remedial tool (for employee performance research in different cultural contexts, see e.g.Eckert et al. 2009). In effect, this method eliminates vagueness and increases predictability by formalising the performance process. By attempting to regulate actions, this approach to performance management focuses on issues such as trust, transparency, structure, reliability and efficiency (e.g. Rai and Singh 2013). This method also remains effective as long as the task environment stays stable and predictable over time. Thus, when the behaviour of the employee is observed, a behaviour-based contract is optimal because the employee's behaviours are the purchased commodity, i.e. employees are compensated and rewarded for better "performance". This is the simple case of "complete" information. In the case of "incomplete" information, the employer can purchase information concerning the employee's behaviours and reward those behaviours. Research shows that the use of this approach relates positively to the completeness of information on cause-effect relations (see e.g. Snell and Youndt 1995). When it comes to performance, human resource management based on "behaviour control" (Eisenhardt 1985, Snell 1992) is positively related to firm performance when knowledge of cause-effect relations is complete. Two aspects of the case study organisation that could be linked to this category are "working relationships" and "initiatives". These were chosen after consultation with the senior management of the

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organisation. "Working relations" is defined as subordinate-supervisor/manager relations, peer-peer relations and employee-client relations. Similarly, "initiatives" is defined as the actions, behaviours and attitude of employees who take the initiative at work, e.g. those that need minimal supervision and take decisions when required (think on their feet). These two areas can also be linked to what Snell and Youndt (1995) call "behavioural performance appraisal". Thus, behaviour here means observable activity that can be assessed. Further, attitude here means the established ways of responding to people and situations based on formalised beliefs, values etc., of the organisation and assessed under 'initiatives', as they are person oriented.

Second, in terms of mutually set performance targets, the management in the case study organisation undertook subordinate performance appraisals based on the results they achieved and monetary rewards were closely linked to employee performance outcomes. Examples of similar practices have been observed in other studies (e.g. Gruman and Saks 2011, Skule 2004, Ubeda and Santos 2007). Linking personal interests with the achievement of organisational targets is an approach to performance that gives individuals discretion over the processes they use, but still provides incentives for outcomes that benefit the firm (e.g. Kerr 1985). This can be linked to the employment relations literature, subscribing to the "unitarist" perspective (the general philosophy that every workplace is an integrated and harmonious entity that exists for a common purpose) in contrast to the "pluralist" perspective (the general philosophy that an enterprise contains people with a variety of different interests, aims and aspirations) (Williams and Adam-Smith 2010). Hence, within the pluralist perspective, 'mutuality' in the case study organisation was gained as both employee and the organisation benefited with common goals. Moreover, because this industry suffers from high levels of staff turnover and absenteeism, the employees in the case study organisation were assessed on their 'seniority' (loyalty) and levels of absenteeism. Thus, in the context of the case study organisation, mutuality tended to apply more when standards of desirability were mutually accepted, clear and transparent. This was made clear at different stages in their careers to all employees within the organisation. Theoretically too, as long as the firm has very clear, acceptable objectives, then a

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mutuality orientation towards performance management may elicit acceptable performance (Kerr 1985, Snell and Youndt 1995). Here, two dimensions/criteria, namely seniority and absenteeism, were argued to be relevant (e.g. Ng and Feldman 2010). This was also confirmed by the senior management of the organisation. Seniority was defined as the number of years the employee had spent in the organisation and absenteeism was the number of days in the year the employee did not attend work, over and above the regular stipulated leave. The stipulated leave for the organisation was 15 days per annum.

Third, in terms of employee initiatives, certain behaviours can lead to increased performance (e.g. Wood and Marshall 2008). It is argued that rigorous selection and training helps to socialise employees, ensuring that they have the requisite abilities, as well as understanding and internalising the values and goals of the organisation (e.g. de Waal 2010, Eisenhardt 1985, Selvarajan and Cloninger 2012, Snell 1992). It is also argued that this needs to be followed up with rigorous performance management. In this way employees are likely to act in the interest of the firm on their own initiative. This leads to the creation of goal congruence among the organisation's members by searching for and selecting people who fit the needs of the firm and will also lead to a homogeneous workforce (Snell and Youndt 1995). In addition, this development of "fit" goes further when deciding on training and the processes involved within the performance management/appraisal method and strategies. Thus, when the approach to performance management is based on employee initiative, it is envisaged that performance is higher. In the context of the case study organisation, the advantage of partly resorting to employee initiative in the context of performance management helped in preventing performance problems. The case study organisation's presumption here was that careful staffing, training and performance management practices prevented deficiencies that might be impossible to remedy later. Furthermore, this strategy may lead to better performance when standards are ambiguous, as was found to be with the case study organisation. Under this category the choices for dimensions/criteria were "self-development" and "flexibility". "Self-development" was defined as the initiative of employees to develop knowledge, skills and attitudes for themselves (their career) that would be beneficial either directly or indirectly to the organisation. This

could be initiated by the organisation or self-initiated. "Flexibility" was defined as the ability of employees to change according to organisational circumstances. Under Flexibility were grouped three sub-criteria, namely number of projects, work travel and overtime. "Number of projects" means the number of projects employees deal with and opt to work on. "Work travel" is defined here as the willingness to travel and number of times they actually travelled for work-related matters. Finally, overtime is defined here as the willingness to do overtime and actual number of extra hours (over and above the stipulated eight hours a day) worked by each employee per annum. The case study organisation had similar options for both these areas, i.e. "self-development" and "flexibility". These two dimensions/criteria can be validated through Snell and Youndt (1995) assertion (in the context of employee initiatives) that "... executives can expect actions consistent with the interests of the firm without having to spell out the specific behavioural sequences required of individuals" (p. 716).

In the context of this study, the six dimensions/criteria discussed above can be integrated in a multi-criteria problem structuring exercise. As in any problem structuring exercise, the model must be broken down into three basic components: *goal*, *criteria* (and optionally sub-criteria) and *alternatives*. The goal is given by the problem statement: in our case, the need for a transparent and structured employee performance evaluation method. The criteria are defined above and are represented by the six dimensions/criteria (see Fig. 1). In terms of generalisability, other criteria can be added or withdrawn according to the particular specificity and uniqueness of the company. The methodological framework described here is independent of these specificities and can be applied to all models.
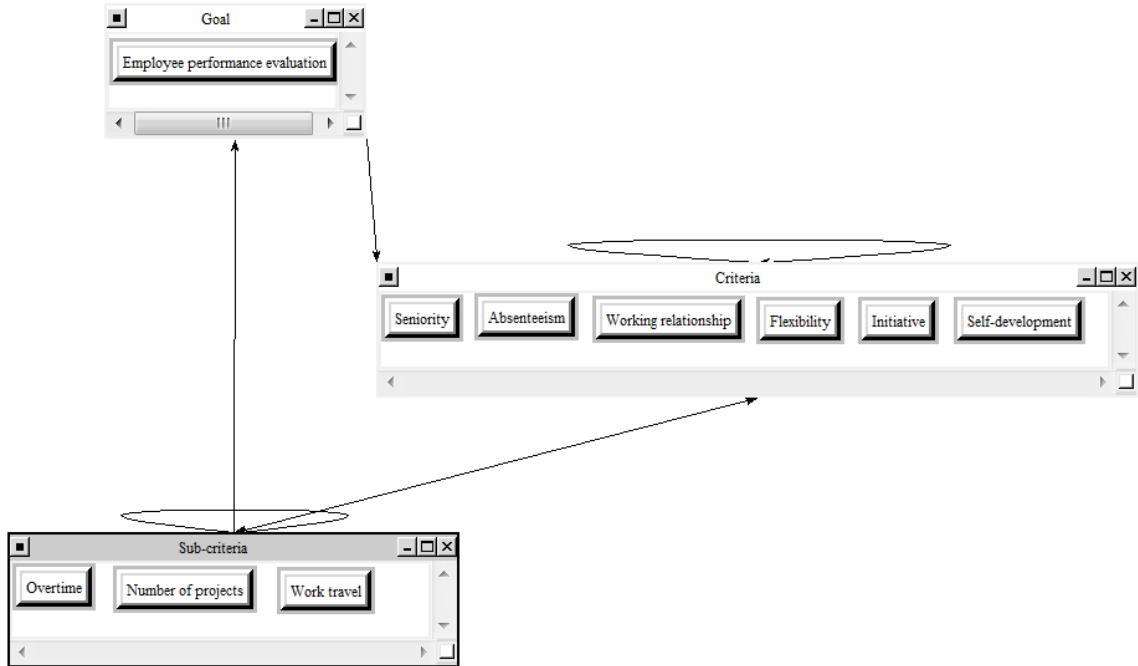
Figure 1. Criteria network for employee performance evaluation

4.3. Influence matrix

As the criteria are not independent, the case study organisation managers marked the dependencies in table 2.

Please note that the left column influences top row. Hence, seniority does not influence any of the criteria on the top row. Absenteeism is found to influence the majority of criteria apart from seniority. Working relationships does not influence any criteria other than work travel. Flexibility influences overtime, number of projects and work travel. Initiative influences most criteria other than seniority, absenteeism and work relationship. Self-development only influences flexibility, initiative and number of projects. Overtime influence absenteeism, flexibility, initiative and number of projects. Number of projects influences seniority, flexibility, initiative and work travel. Lastly, work travel influences flexibility, initiative, overtime and number of projects.

Table 2 Influence matrix

	Seniority	Absenteeism	Working relationship	Flexibility	Initiative	Self-development	Overtime	Number of projects	Work travel
Seniority									
Absenteeism			X	X	X	X	X	X	X
Working relationship									X
Flexibility							X	X	X
Initiative				X		X	X	X	X
Self-development				X	X			X	
Overtime		X		X	X			X	
Number of projects	X			X	X				X
Work travel				X	X		X	X	

4.4. Criteria

   To evaluate the importance of the criteria described in section 4.2, the ANP method was used. A pairwise questionnaire was sent to the human resources manager of the case study organisation, Gamma. Figure 2 shows the data related to the completed questionnaires.

Figure 2. Questionnaire for evaluating performance criteria

However, we need also to take into account the dependencies (section 4.3). Therefore, further questions have been asked to the human resources manager (Figure 3). For example, if we evaluate number of projects and overtime knowing that absenteeism belongs also among the criteria, which is one is the most important. The HR manager believes that the number of projects is stronger dependent with absenteeism than overtime. Therefore in order to not overweight the number of projects, a stronger preference (6 times) is given to overtime.

Figure 3. Questionnaire for evaluating dependencies

From each comparison matrix, the local priorities are calculated using the eigenvalue method developed by Saaty (1977):

$$\mathbf{A} \cdot \mathbf{p} = \lambda \cdot \mathbf{p} \tag{1}$$

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where **A** is the comparison matrix; **p** is the priorities or weight vector; λ is the maximal eigenvalue.

The calculated priorities are entered in the supermatrix. For example in bold, we see the priorities of

Figure 2. These are the weight of the criteria before the dependencies are taken into account.

Table 3: Supermatrix

	Goal	Criteria						Sub-criteria		
	Employee performance evaluation	Absenteeism	Felxibility	Initiative	Self-development	Seniority	Working relationship	Number of projects	Overtime	Work travel
Employee performance evaluation	0	0	0	0	0	0	0	0.333	0.333	0.5
Absenteeism	**0.163**	0	0	0	0	0	0	0	0	0
Felxibility	**0.052**	0.165	0	0.250	0.417	0	0	0	0	0
Initiative	**0.240**	0.082	0	0	0.083	0	0	0.333	0.333	0
Self-development	**0.027**	0.174	0	0.250	0	0	0	0	0	0
Seniority	**0.433**	0	0	0	0	0	0	0	0	0
Working relationship	**0.085**	0.079	0	0	0	0	0	0	0	0
Number of projects	0	0.082	0.770	0.111	0.5	0	0	0	0.333	0.083
Overtime	0	0.270	0.068	0.159	0	0	0	0	0	0.417
Work travel	0	0.148	0.162	0.230	0	0	1	0.333	0	0

The limit matrix is then calculated by squaring the supermatrix many times until the entries have

converged. The results are shown in Table 4. In bold, we can see how the weights changed when

dependencies are taken into account.

Table 4: Limit matrix

	Goal	Criteria						Sub-criteria		
	Employee performance evaluation	Absenteeism	Felxibility	Initiative	Self-development	Seniority	Working relationship	Number of projects	Overtime	Work travel
Employee performance evaluation	0.174	0.174	0.174	0.174	0.174	0	0.174	0.174	0.174	0.174
Absenteeism	**0.031**	0.031	0.031	0.031	0.031	0	0.031	0.031	0.031	0.031
Felxibility	**0.080**	0.080	0.080	0.080	0.080	0	0.080	0.080	0.080	0.080
Initiative	**0.151**	0.152	0.151	0.151	0.152	0	0.152	0.152	0.152	0.152
Self-development	**0.052**	0.052	0.052	0.052	0.052	0	0.052	0.052	0.052	0.052
Seniority	**0.082**	0.082	0.082	0.082	0.082	0	0.082	0.082	0.082	0.082
Working relationship	**0.019**	0.019	0.019	0.019	0.019	0	0.019	0.019	0.019	0.019
Number of projects	0.167	0.167	0.167	0.167	0.167	0	1.167	0.167	0.167	0.167
Overtime	0.104	0.104	0.104	0	0.104	0	0.104	0.104	0.104	0.104
Work travel	0.138	0.138	0.138	0	0.138	0	0.138	0.138	0.138	0.138

Finally, the priorities of each cluster are normalised. *Initiative* is found to be the criterion with the greatest weight. As this organisation falls within the knowledge sector, initiative is an important performance indicator. *Seniority* is the second most important criterion in this company because the attrition is very high, which is very common in young IT companies. The turnover time is about 2 years. Therefore, the company wants to retain the employees and gave a high weight to this criterion (Pereira et al. 2015). The weight of the sub-criteria must be multiplied by the weight of flexibility (e.g. Nbrs projects $= 0.052 \cdot 0.77$). The weights of the criteria can be found in Table 5.

Table 5 Weight of the criteria

Criteria		Weight
Seniority		0.19709
Initiative		0.36432
Absenteeism		0.07410
Working relationship		0.04531
Flexibility		0.19336
Self-development		0.12583
Flexibility sub-criteria	unnormalised weight	
Number of projects	0.40827	0.078943
Work travel	0.33765	0.065288
Overtime	0.25408	0.049129

4.5. Preference functions

PROMETHEE has six preference functions: usual function, U-shape, V-shape, Level (Figure 5), V-shape, V-shape with indifference (Figure 4), Gaussian (Figure 6). They can be separated into three type as the usual (indifference = preference = 0), the V-shape (indifference = 0) and the U-shape (indifference = preference) are particular cases of the V-shape with indifference (Figure 4).
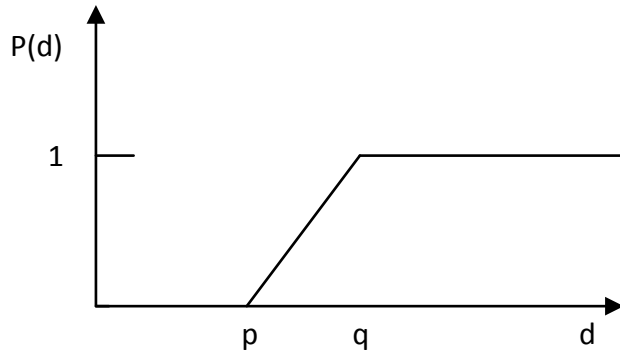
Figure 4: V-shape with indifference preference function
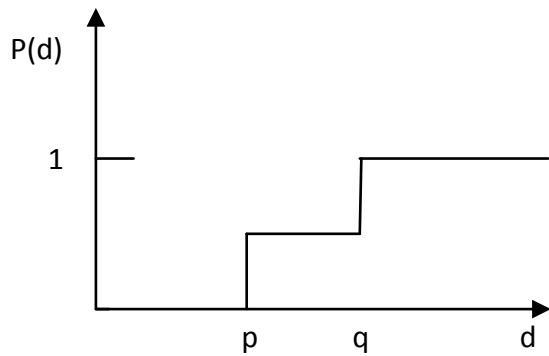
Figure 5: Level preference function
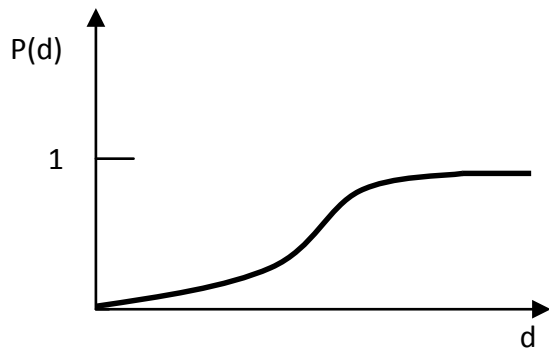
Figure 6: Gaussian preference function

The managers were explained the different preference functions. They decided to opt for a

V-shape with indifference preference function because the thresholds were important to avoid

overweighting some criteria. We then defined the thresholds in interaction with the mangers. The

first step is to understand if a threshold exists. If a minimum performance needs to be achieved then an indifference threshold is added. Similarly in order to prevent overemphasising criteria, preferences threshold are also used.

Table 6 Thresholds used in the PROMETHEE model for staff evaluation

Criterion	Indifference threshold Preference threshold	Explanation
Seniority (year)	2	Efficiency of the employee will only be significant when he has completed two years in the company.
	5	The industry has a norm of high turn-over. Hence, somebody that stays more than 5 years is perceived to be less efficient and less in demand in the market and as a consequence having a low performance.
Initiative	1	Initiative is evaluated on a scale 1-10, where any difference counts. Therefore the indifference threshold has been set to the minimum scale.
	10	Initiative is evaluated on a scale 1-10, where any difference counts. Therefore the indifference threshold has been set to the maximum scale.
Absenteeism (days)	7	It is company rule that up to seven days absenteeism is acceptable.
	10	Any absenteeism above 10 days does not make any difference because indifferently of the duration, the employee is called to a disciplinary procedure.
Working relationship	1	Working relationship is evaluated on a scale 1-10, where any difference counts. Therefore the indifference threshold has been set to the minimum scale.

	10	Working relationship is evaluated on a scale 1-10, where any difference counts. Therefore the indifference threshold has been set to the maximum scale.
Self-development	1	Self-development is evaluated on a scale 1-10, where any difference counts. Therefore the indifference threshold has been set to the minimum scale.
	10	Self-development is evaluated on a scale 1-10, where any difference counts. Therefore the indifference threshold has been set to the maximum scale.
Number of projects	1	It is expected that at least one project a year is completed
	3	More than three projects will overload the employee's time and will then affect the quality of work
Work travel (days)	7	Travels below 8 working days has an insignificant impact on the business
	30	We do not want to have staff that only travel, therefore the preference threshold is set to 30 days.
Overtime (days)	3	Up to three days overtime do not affect the ranking because it is normal expectation
	7	Seven days overtime or more days will not affect the ranking because we do not want that employee do too many days overtime and their wok-life balance is affected

4.6. Aggregated Preference Functions

To evaluate the extent to which action *a* is preferred to *b* overall in terms of the criteria, the preference index $\pi(a,b)$ is calculated with a weighted sum (4) of the preference degrees $P_i(a,b)$. The weights w_i, calculated previously in section 3.2, represent the importance of each criterion in the decision.

$$\pi(a,b) = \sum_{1=1}^{n} P_i(a, b) \cdot w_i \tag{1}$$

where $P_i(a,b)$ is the score of the preference function, w_i the weight of criterion c_i and n the number of

criteria. Table 7 and Table 8 shows the global preference degree for employee A1.

Table 7 Global preference degree $\pi(A1,x)$, where x is other employees

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
0	0.05897	0.07032	0.07536	0.0369	0.06529	0.07032	0.14423	0.07032	0.06529

A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
0.07032	0.06529	0.06529	0.06529	0.22035	0.14625	0.17987	0.16023	0.18673	0.16023

A21	A22	A23	A24	A25	A26	A27	A28	A29	A30
0.11584	0.0843	0.1108	0.1703	0.11584	0.12982	0.15128	0.11975	0.18673	0.24521

A31	A32	A33	A34	A35	A36	A37	A38	A39	A40
0.18673	0.16023	0.18673	0.21972	0.21469	0.21469	0.10577	0.16526	0.21972	0.21469

A41	A42	A43	A44	A45	A46	A47	A48	A49	A50
0.25416	0.21469	0.26915	0.26423	0.26912	0.38272	0.29888	0.31869	0.34828	0.24119

A51	A52	A53	A54	A55	A56	A57	A58	A59	A60
0.24622	0.20574	0.24622	0.20574	0.24018	0.20574	0.23727	0.23224	0.22721	0.23224

A61	A62	A63	A64	A65	A66	A67	A68	A69	A70
0.23727	0.2602	0.17421	0.11975	0.18931	0.15632	0.16526	0.1703	0.16929	0.20003

A71	A72	A73	A74	A75	A76	A77	A78	A79	A80
0.20895	0.17742	0.17533	0.1438	0.09437	0.1438	0.16526	0.1108	0.0843	0.13876

A81	A82	A83	A84	A85	A86	A87	A88	A89	A90
0.16526	0.22979	0.1703	0.20394	0.19888	0.18428	0.13485	0.22476	0.12478	0.1438

A91	A92	A93	A94	A95	A96	A97	A98	A99	A100
0.13485	0.18428	0.12982	0.26825	0.20024	0.25819	0.12478	0.13318	0.17533	0.18428

A101	A102	A103	A104	A105	A106	A107	A108	A109	A110
0.16526	0.22476	0.17533	0.18428	0.16526	0.18428	0.20473	0.25819	0.2442	0.29866

A111
0.20876

Table 8 Global preference degree π(x, A1), where x is other employees

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
0	0	0	0	0	0	0	0.04913	0.04913	0.04913

A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
0.04913	0.04913	0.04913	0.04913	0.04913	0.04913	0.04913	0.04913	0.04913	0

A21	A22	A23	A24	A25	A26	A27	A28	A29	A30
0	0	0.04913	0.04913	0.04913	0.04913	0.04913	0.04913	0.04913	0.04913

A31	A32	A33	A34	A35	A36	A37	A38	A39	A40
0.04913	0.04913	0.04913	0	0.01228	0	0.01228	0	0	0

A41	A42	A43	A44	A45	A46	A47	A48	A49	A50
0.01228	0	0.02456	0	0	0	0.01228	0	0	0

A51	A52	A53	A54	A55	A56	A57	A58	A59	A60
0	0.04913	0	0.01228	0.04913	0	0.03685	0	0	0.04913

A61	A62	A63	A64	A65	A66	A67	A68	A69	A70
0	0	0	0	0	0	0	0	0	0

A71	A72	A73	A74	A75	A76	A77	A78	A79	A80
0	0	0	0	0	0	0.04913	0.04913	0	0

A81	A82	A83	A84	A85	A86	A87	A88	A89	A90
0	0	0	0	0	0	0	0	0	0

A91	A92	A93	A94	A95	A96	A97	A98	A99	A100
0	0	0	0	0	0.01228	0	0.01228	0	0.01228

A101	A102	A103	A104	A105	A106	A107	A108	A109	A110
0.01228	0	0.01228	0	0.01228	0	0.01228	0	0	0

A111
0

4.7. Outranking flows

As each action is compared with *m*-1 other actions, two flows can be defined:

Positive flow:

$$\Phi^+(a) = \frac{1}{m-1} \sum_{x \in A}^{m} \pi(a, x) \tag{2}$$

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with *m* being the number of actions of set *A*. This score represents the global strength of action *a* in comparison to all the other actions, which needs to be maximised.

Negative flow:

$$\Phi^-(a) = \frac{1}{m-1} \sum_{x \in A}^{m} \pi(x, a) \tag{3}$$

with *m* being the number of actions of set *A*. This score represents the global weakness of *a* in comparison to all the other actions, which needs to be minimised.

In the case of employee A1, introducing the global preference degrees of Table 7 in (2), we optain $\Phi^+(A1)$ = 0.1782. If we introduce the global preference degrees Table 8 of in (3), we have $\Phi^-(A1)$ = 0.0144.

4.8. Ranking

The complete ranking of PROMETHEE II is given by the net flow:

$$\Phi(a) = \Phi^+(a) - \Phi^-(a) \tag{4}$$

For example, the net flow of employee A1 is $\Phi(a)$ = 0.1782 - 0.0144 = 0.1638. The higher the net flows, the better the rank of an action. Table **9** shows the 111 employees of the case study organisation ranked from the best to the worst performing. This is a relative ranking, where the sum of all net scores is 0. The net score difference between the two extremes is only 0.31408, which indicates a fairly homogeneous workforce. The managers are the most performing staff with all the nine first positions filled by them. The net scores can be used for reward. Each employee *i* with a positive net score would be entitled a reward proportional to its score:

$$Reward = \frac{Budget\ for\ reward}{\sum_{i=1}^{k} Positive\ net\ score_i} \cdot net\ score_i \tag{5}$$

where k is the number of positive net scores

**Table** 9 Net score for each staff member using PROMETHEE

#	Name	Score	#	Name	Score	#	Name	Score
1	A1 - Senior Manager 1	0.16384	38	A93 - Part-time Associate 8	0.01913	75	A67 - Junior Associate 5	-0.03073
2	A11 - Assistant Manager 4	0.12906	39	A75 - Junior Associate 13	0.01868	76	A95 - Deputy Adminstration Manager	-0.03128
3	A2 - Senior Manager 2	0.11435	40	A80 - Junior Associate 18	0.01513	77	A65 - Associate 28	-0.03337
4	A5 - Shift Manager 1	0.11429	41	A60 - Associate 23	0.01366	78	A45 - Associate 8	-0.03588
5	A9 - Assistant Manager 2	0.10898	42	A33 - Senior Associate 6	0.01194	79	A51 - Associate 14	-0.03618
6	A14 - Assistant Shift Manager 3	0.10456	43	A97 - Assistant HR Manager	0.00931	80	A57 - Associate 20	-0.03649
7	A10 - Assistant Manager 3	0.10224	44	A37 - Project Associate 4	0.00802	81	A42 - Associate 5	-0.03872
8	A13 - Assistant Shift Manager 2	0.10081	45	A90 - Part-time Associate 5	0.00761	82	A39 - Associate 2	-0.03896
9	A12 - Assistant Shift Manager 1	0.10043	46	A72 - Junior Associate 10	0.00339	83	A68 - Junior Associate 6	-0.03931
10	A28 - Senior Associate 1	0.0884	47	A91 - Part-time Associate 6	-0.00135	84	A102 - Clerk 4	-0.03953
11	A3 - Deputy Manager 1	0.0862	48	A87 - Part-time Associate 2	-0.00226	85	A54 - Associate 17	-0.03959
12	A23 - Principal Associate 1	0.08491	49	A20 - Senior B-Development Manager	-0.00384	86	A84 - Junior Associate 22	-0.04077
13	A7 - Shift Manager 3	0.077	50	A89 - Part-time Associate 4	-0.0044	87	A41 - Associate 4	-0.04082
14	A78 - Junior Associate 16	0.07091	51	A76 - Junior Associate 14	-0.00677	88	A53 - Associate 16	-0.04103
15	A4 - Deputy Manager 2	0.06984	52	A36 - Project Associate 3	-0.00754	89	A40 - Associate 3	-0.0413
16	A8 - Assistant Manager 1	0.06782	53	A34 - Project Associate 1	-0.00768	90	A69 - Junior Associate 7	-0.04401
17	A6 - Shift Manager 2	0.06687	54	A35 - Project Associate 2	-0.00836	91	A58 - Associate 21	-0.04432
18	A25 - Principal Associate 3	0.05818	55	A99 - Clerk 1	-0.0094	92	A59 - Associate 22	-0.04442
19	A16 - Team Leader Project 2	0.05363	56	A63 - Associate 26	-0.01053	93	A62 - Associate 25	-0.04556
20	A77 - Junior Associate 15	0.05044	57	A30 - Senior Associate 3	-0.01158	94	A82 - Junior Associate 20	-0.04721
21	A19 - Overall	0.047	58	A104 - Clerk 6	-	95	A61 - Associate 24	-

	Team Leader				0.01166			0.05416
22	A17 - Team Leader Coordinator 1	0.04629	59	A74 - Junior Associate 12	-0.01328	96	A106 - Clerk 8	-0.05479
23	A79 - Junior Associate 17	0.04623	60	A55 - Associate 18	-0.01367	97	A88 - Part-time Associate 3	-0.05877
24	A27 - Training Principal Associate	0.04579	61	A38 - Associate 1	-0.01411	98	A96 - HR Manager	-0.06112
25	A18 - Team Leader Coordinator 2	0.04444	62	A103 - Clerk 5	-0.0144	99	A47 - Associate 10	-0.06504
26	A52 - Associate 15	0.0439	63	A85 - Junior Associate 23	-0.01642	100	A107 - Clerk 9	-0.06616
27	A26 - Principal Associate 4	0.04387	64	A56 - Associate 19	-0.0182	101	A111 - Personal Assistant 2	-0.06639
28	A29 - Senior Associate 2	0.03936	65	A66 - Associate 29	-0.01838	102	A109 - Stenographer 2	-0.06991
29	A32 - Senior Associate 5	0.03855	66	A81 - Junior Associate 19	-0.01912	103	A71 - Junior Associate 9	-0.07277
30	A21 - Deputy B-Development Manager	0.03773	67	A70 - Junior Associate 8	-0.02101	104	A44 - Associate 7	-0.07369
31	A64 - Associate 27	0.035	68	A73 - Junior Associate 11	-0.02214	105	A94 - Adminstration Manager	-0.07738
32	A24 - Principal Associate 2	0.0336	69	A105 - Clerk 7	-0.02282	106	A43 - Associate 6	-0.07902
33	A98 - Marketing Manager	0.03064	70	A101 - Clerk 3	-0.02322	107	A110 - Personal Assiatant 1	-0.09057
34	A31 - Senior Associate 4	0.02619	71	A92 - Part-time Associate 7	-0.02467	108	A108 - Stenographer 1	-0.09314
35	A15 - Team Leader Project 1	0.02547	72	A86 - Part-time Associate 1	-0.02693	109	A49 - Associate 12	-0.10226
36	A22 - IT Manager	0.02396	73	A83 - Junior Associate 21	-0.02736	110	A48 - Associate 11	-0.11665
37	A100 - Clerk 2	0.0228	74	A50 - Associate 13	-0.02786	111	A46 - Associate 9	-0.15024

Figure 7 illustrates the GAIA plane. It portrays the full picture by representing all the employees on the same graph. This allows us to compare employees and at the same time helps to discover clusters. The findings show that the majority of the employees are in the middle left of the GAIA plane. The best performing employees are on right of the plane: they complete many projects, work several overtime hours, have a good working relationship and develop themselves. At the top left, Assistant Manager 1,

Senior associate 3 and Associate 18 opt for and undertake work travel are not often absent but undertake few projects, which affects their performance score. Based on these results, it may be worth the organisation investigating the fact that their travel duty hinders them to undertake several projects and also to propose a solution as a remedying measure. All employees on the right of the Figure 7 are doing a lot of overtime, have a good working relationship and a high self-development. Employee 95, 96, 107. 108, 109, 110 and 111 are in a cluster of particularly weak on the number of projects they undertake. Employee 8 is also weak on number of projects but (s)he strong in in other area (overtime, work relationship and self-development).
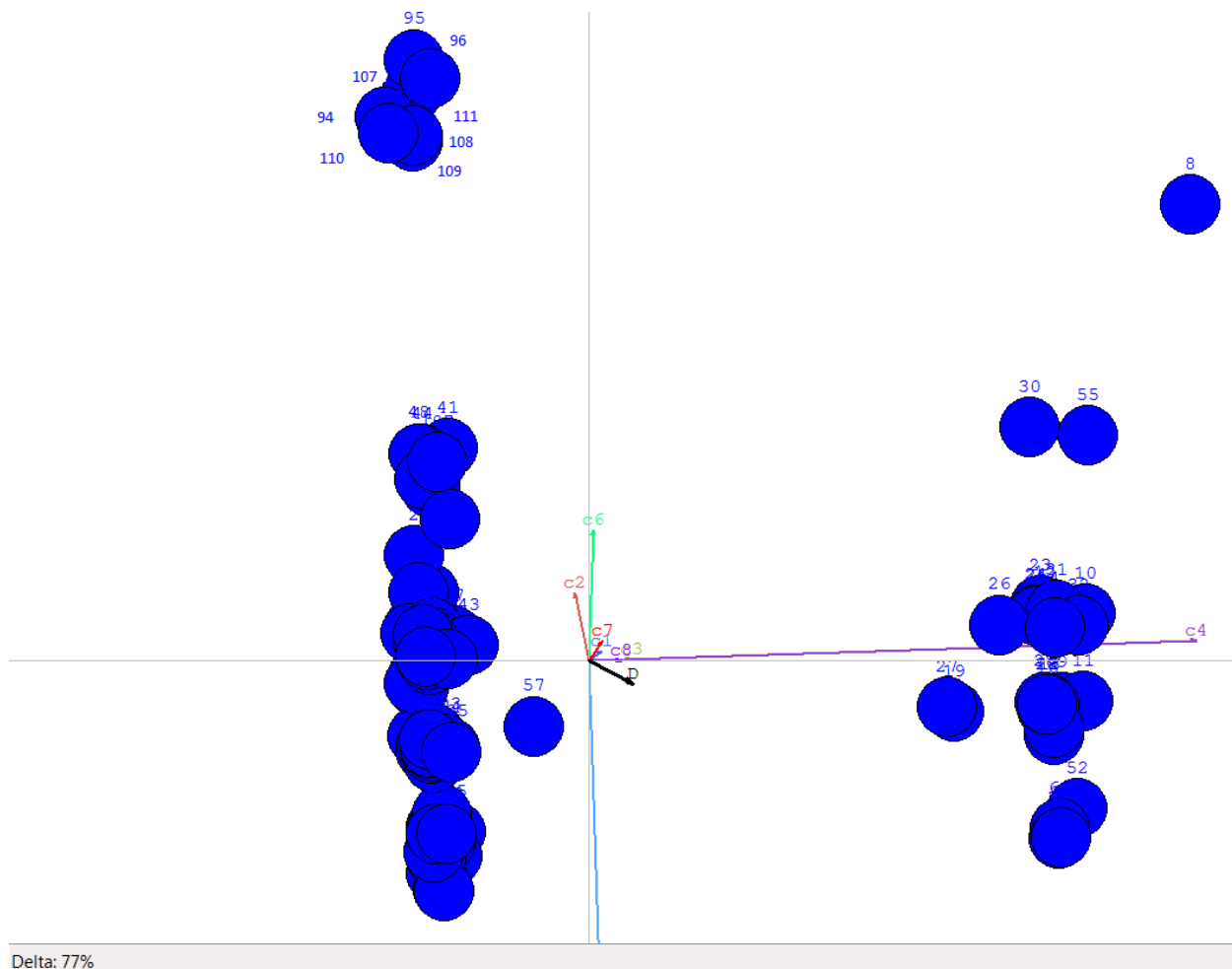
Figure 7. GAIA plane of the 111 employees (projection reliability δ=77%)

Figure 8 focuses on the centre of the GAIA plane in Figure 7. It indicates that *overtime* and *number of projects* are the two criteria that have the best discriminating power for evaluating employees because they have long arrows. The criterion *seniority* has a low discriminating power (short arrow), which indicates that the employees of this company have almost the same seniority. As the arrows for *working relationship*, *overtime* and *self-development* are pointing in the same direction, this indicates that these criteria are correlated: employees are good (performing) or bad (not performing) simultaneously on the three criteria. The arrow for *number of projects* is 180° the opposite of *work travel* and *absenteeism*, indicating that the employees who accomplish projects do not travel but have a high absenteeism rate and vice versa. These employees also have low initiative (arrow c7).
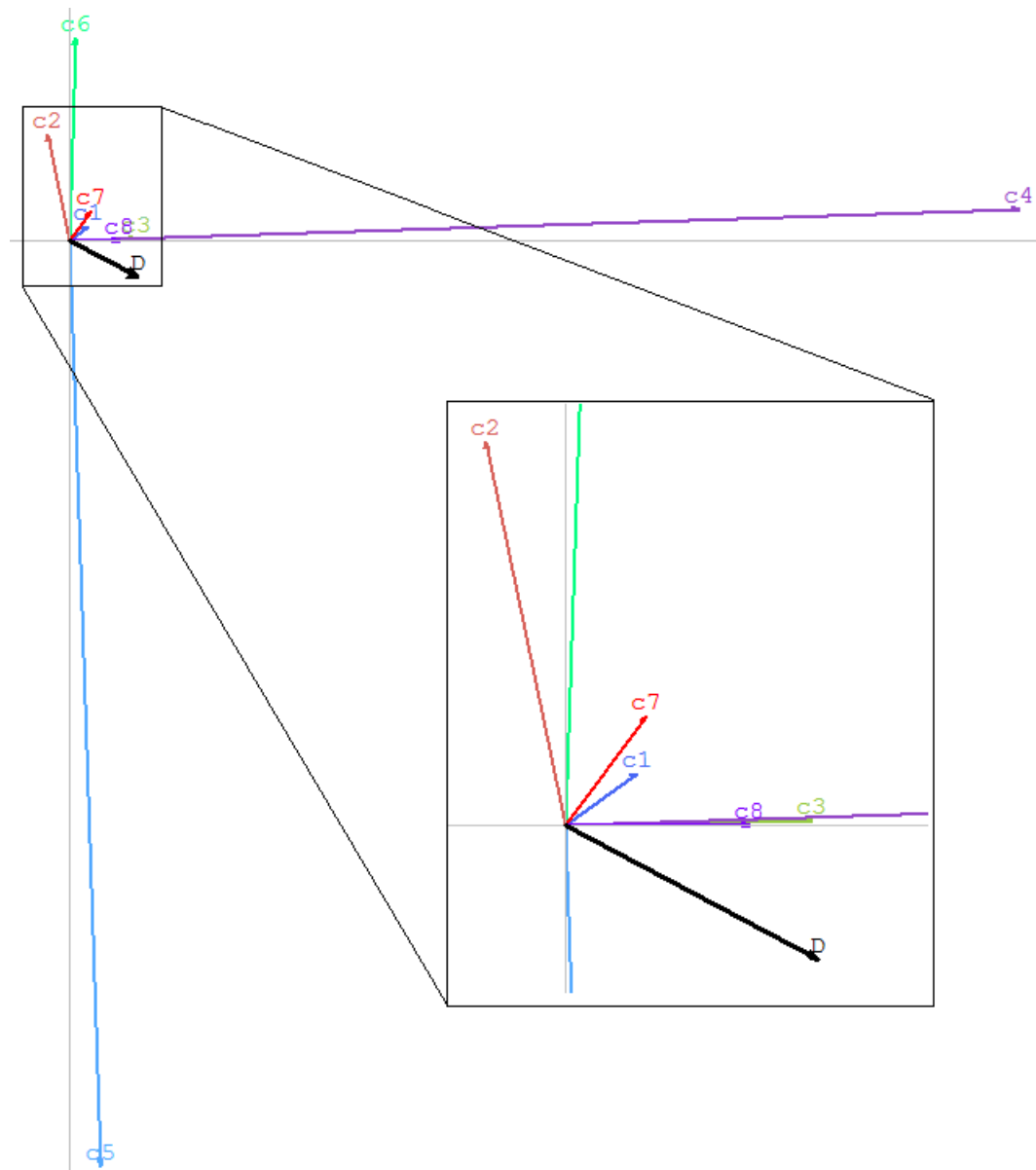
C1: Seniority   C2: Absenteism   C3: Working relationship   C4: Overtime

C5: Number of projects   C6: Work travel   C7: Initiative   C8: Self-develpment

Figure 8. Discriminating power of criteria

On the Figure 9, employees are ranked in a decreasing order according to their net score (sum of positive and negative). This ranking is the same than on Table **9**. Moreover, Figure 9 shows a stacked bar

chart of the contribution of each evaluation criterion to the global score. Gamma's management can now identify the strengths (that could be used for promotion) and weaknesses (that can be used for training and development) of each employee. A negative score means that they are below average. For example, employees A8 would be the best employee if they could improve on the number of projects they complete. As already seen on the GAIA plane, Employees A94, A95, A96, A107, A108, A110 and A111 are low in the number of projects they take, which ranks them at the bottom of the evaluation scale. Several employees have a very small bar, which indicates that they need to improve on all six evaluation criteria.
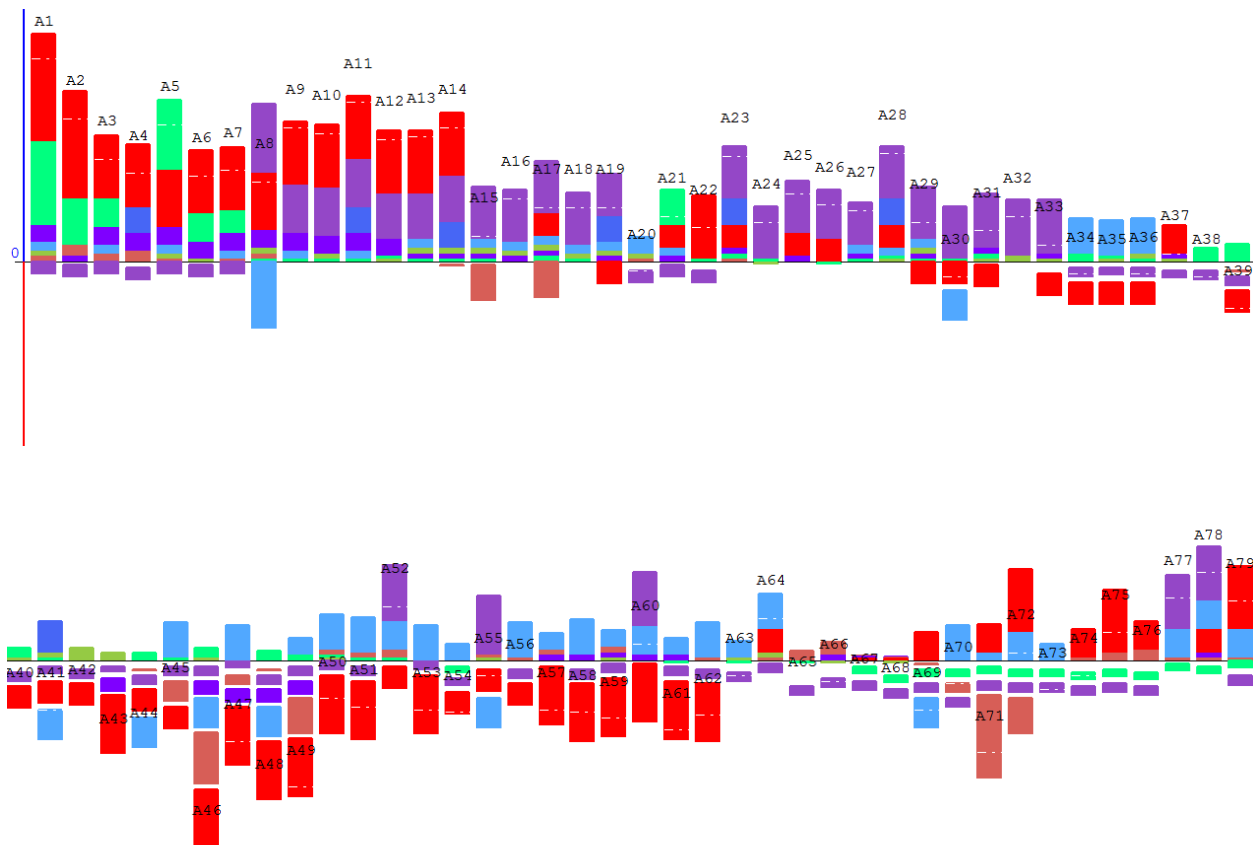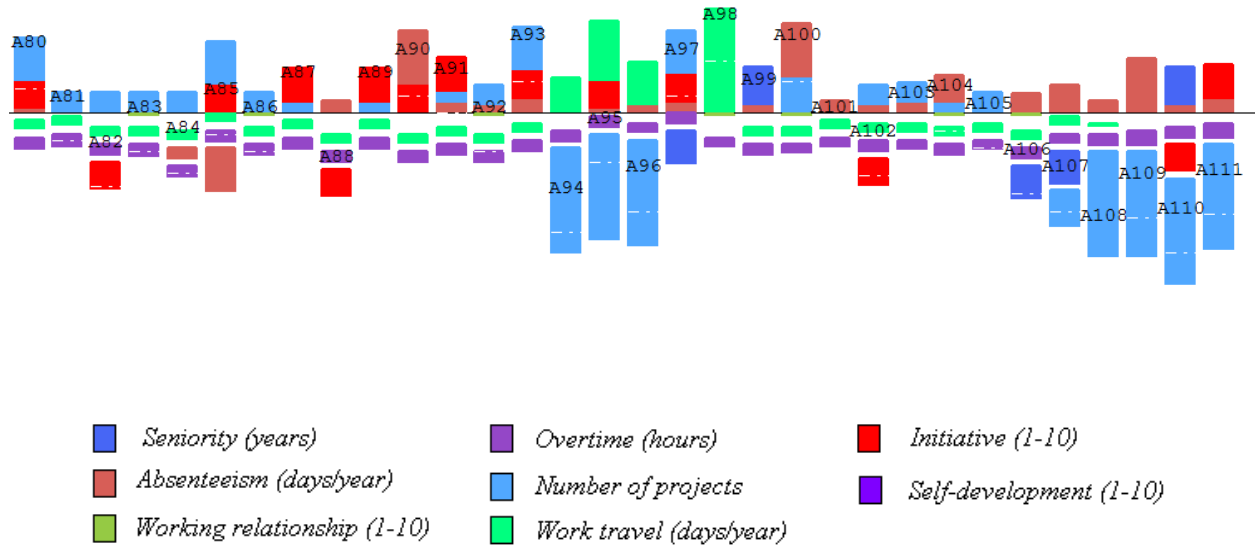
Figure 9. Stacked bar chart of employee performance

6. Conclusions

Every organisation assesses the performance of its employees. However, when appraisal is perceived as an ineffective and complex formality comprising form filling, its benefits diminish. This paper has introduced trans-disciplinary methods from operational research in the form of multi-criteria decision analysis (MCDA) and visual techniques to develop a transparent, structured, and honest employee performance management method. The multi-criteria analysis transparently combines qualitative and quantitative decision criteria into a holistic evaluation. The visual techniques allow the organisation to gain a deep insight into their employees' skills profiles structures and captures finer details in relation to where individuals are performing or underperforming. For the manager, this evaluation is easier to communicate because visual tools are conceptually easier to understand than a set of scores. The feedback on improvement measures can be precisely formulated. They may include developmental activities (e.g. training) to rectify performance deficiencies. The evaluation method can also be used for promotion or

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rewards. The evaluations are fully retraceable and therefore justifiable, which ensures the fairness of the decision, enhancing the trust and potentially the productivity of the employees.

PROMETHEE is a partial compensatory method, which means that bad scores cannot be compensated by good scores. Indifference thresholds define the minimum necessary for each criterion to be achieved in order to start to accumulate a positive flow. The preference threshold is on the other end the maximum allowed to be accumulated in the positive flow. This permits to avoid employee to strategically concentrate on only the measured criteria. However, it is to note that there is not an overall fitting model. The criteria and their weighting depend on the vision and strategy of the management, which are by definition subjective. Visual techniques provide more information than a simple ranking. For example, in our case study, we have identified three different categories of employees on the GAIA plane. As an example, a correlation between work travel and absenteeism is highlighted. Moreover the stacked bar chart indicates where poor performance on one criterion can be totally compensated and masked by others.

In terms of future research, a further development of this work would be to develop an interactive visualisation tool to assess the sensitivity of an action when performances are varied. For example, we can test if an employee would improve the criterion XX by 10%, then he will be among the top 20 employees and he will receive a higher reward. This will motivate an employee to know in advance the benefits of an improvement. Another research direction would be to apply the MCDA and visual techniques to other areas, such as environmental or quality analysis.

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