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Selecting Subject Matter Experts in Job and Work Analysis Surveys: Advantages and Disadvantages

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Abstract

The present article aims at reviewing the present literature concerning the use of subject matter experts in job and work analysis surveys through the perspective of their proneness to different social and cognitive sources of inaccuracy, which in turn, have several important unwanted effects on job the analysis information provided by them. More specifically, we provide for each type of subject matter expert category (incumbents, supervisors, professional analysts, etc…) their advantages and disadvantages in terms of both their knowledge concerning the analyzed job and their susceptibility to different types of social and cognitive inaccuracy. Moreover we provide recommendations for diminishing the effects of these social and cognitive types of sources of inaccuracy in order to improve the quality of the job information gathered through the use of subject matter experts.

Keywords

Subject matter experts, job analysis, work analysis, job analysis accuracy

JEL Codes: J24, M12, M54, O15

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1. Introduction

Job analysis is a central aspect of human resource management, among its main objectives being personnel selection, identifying training needs for employees, performance appraisal (both task and contextual performance), succession planning, talent management, career planning, team designs, worker deployment, employee health and safety policies, etc… (Brannick et al., 2019a). However, due to the fast-paced working environment, ever-changing conditions and demands for both individuals and organizational, "job analysis" has become a somewhat too one-dimensional term to include all the requirements that it encompasses, so a more appropriate term would be instead "work analysis" (Morgeson & Dierdorff, 2011; Sanchez & Levine, 2012).

An important approach in the work analysis processes is the quantitative approach (García-Izquierdo et al., 2015), which is based on structured questionnaires that are administered to raters, usually people who have knowledge regarding a particular job known as Subject Matter Experts, either in direct contact or in an online environment (Landy & Conte, 2013; Van De Voort et al., 2017). Job and work analysis questionnaires or surveys usually include task statements (work-oriented approaches) or knowledge, skills, abilities and other characteristics (KSAOs or worker-oriented) in the form of general work behaviors or just relevant to a specific job in which SMEs provide numeric ratings based on either objective (frequency, time spent, necessity) or subjective (importance, difficulty) types of indicators (Landy & Conte, 2013; Peterson & Jeanneret, 2007).

2. Literature review

2.1. Subject matter experts as raters in job and work analysis processes

Quantitative job and work analysis methodologies imply collecting job-related data from other people, named subject matter experts (SMEs) through different instruments (Russel & Peterson, 2007). SMEs are persons who have some type of degree of knowledge about the analyzed job, because they either perform the job, (incumbents), supervise the job performing incumbent (supervisors), train the incumbent or provide technical expertise in performing the job (technical expert), analyze and manage the job form the human resource perspective (professional analysts), or are in any other type of direct contact with the incumbent and the job performed, such as other organizational members, or clients (Morgeson et al., 2007; Wilson et al., 2017). The most common involved SMEs in the process of job analysis are the job incumbents, the current job holders (Aamodt, 2016; Brannick *et al.,* 2019; Brannick et al*.,* 2017). Supervisors are other obvious choices, either immediate (Peterson & Jeanneret, 2007; Wilson, 2017) or second or upper-level managers (Aamodt, 2016; Brannick et al., 2017). Technical experts can also be reliable source of work analysis information since they are either people involved in

training the incumbent in performing his job, or in designing the work process for the analyzed job (Brannick et al., 2007; Brannick et al., 2017; Harvey et al., 2007; Peterson & Jeanneret, 2007). Professional analysts or human resource specialists are also regarded as reliable sources of work information due to their more objective perspective and training in using work analysis methodologies (Brannick et al., 2017; Borden & Sharf, 2007; Foster et al., 2017; Gibson, 2012; Guder, 2012; Voskuijl, 2017). Other organizational members that can be eligible as SMEs include former incumbents (Foster et al., 2017), coworkers either in-person (Foster et al., 2017; Wilson, 2017) or virtual team-members (Brannick et al., 2017) and other specialists in business planning or organizational strategy (Brannick et al., 2017). Also, in recent years, due to the changes in working conditions, the broadening diversity of activities on the job and the emergence of new types of jobs, it is now common to include other SMEs who are not part of the organization, such as internal customers or clients from other organizations (Aamodt, 2016; Guder, 2012; Harvey et al., 2007; Brannick et al., 2007; Brannick et al., 2017; Foster et al., 2017). Each type of SME category has potential advantages and disadvantages, namely proneness to social or cognitive biases (Morgeson & Campion, 1997, 2017), but at the same time, they each have unique information about the job in question that another SME category may not have access to (Wilson, 2017).

2.2. Selecting subject matter experts based on job knowledge and experience

Job experience is important, since SMEs need to have a high degree of familiarity with the job in question (Gibson, 2012) and it is recommended that they have at least 6 months of experience as incumbents (Borden & Sharf, 2007; Harvey et al., 2007) and also as supervisors (Guder, 2017) in order to be included in the job analysis process. Also, it should be noted that high-performing incumbents tend to generate different job analysis information from low-performing ones (Mullins & Kimbrough, 1988; Sanchez et al., 1998) and some authors advocate to have only high performing incumbents as SMEs (Aamodt, 2016; Campion et al., 2020; Foster et al., 2017; Reiter-Palmon et al., 2006), but Sanchez (2000) warns that because an incumbent has earned a high level of performance (procedural knowledge) it does not mean that he will be as competent in describing the work that he is performing (declarative knowledge). Also, obtaining work information just from top-performing incumbents can result in overstating the requirements needed for the job which can create problems for future selected incumbents (Conte et al., 2005). However, we should note that the meta-analysis of DuVernet et al. (2015) has revealed that no demographic variable could improve job analysis accuracy, and actually job tenure was associated with a higher inflation of mean ratings. Also, Weekley et al. (2019), in their study, noted that the most accurate ratings were provided by both incumbents and supervisors who reported that they knew the job “extremely well”, regardless of their job tenure or industry experience.

Also, when non-incumbents are involved as potential SMEs in providing work analysis ratings, it is important that they have real familiarity with the analyzed job (job observations or interviews) and not rely just on basic reviews or descriptions of the job, such as lists of tasks, duties and responsibilities, especially when they need to provide information about the KSAO requirements (Brannick et al., 2017). Regarding the actual selection of SMEs included in the job analysis process, the group should be homogenous and representative, with enough incumbents, supervisors (Bobko et al., 2004) and although there is no clear universal number, the number usually is considered 20 to be enough for satisfactory statistical accuracy (Aamodt, 2016). We should note that the agreement between incumbents and non-incumbents regarding the information for a certain job is moderated by job complexity and job satisfaction, the agreement being highest when the incumbents are perceiving a lower level of job satisfaction (Sanchez et al., 1997) and when the job is not complex, when the process is oriented and designed to capture general, rather than specific, type of job information and when there are also included professional analysts in the group of selected SMEs (Sanchez, 2000).

3. Methodology of search

3.1. Job analysis accuracy

The real difficulty of assessing the accuracy of information gathered through job analysis processes is caused by the fact that no real standards or “true scores” exsit about either tasks or KSAOs needed for a particular job (Voskuijl, 2017). Also, due to lack of a large size of SME sample for establishing a criterion-oriented validity, the process for analyzing a job from a particular organization may need a content-oriented type of validity, in which a small but representative sample of SMEs are used as sources for job analysis information regarding certain tasks or characteristics needed for a particular job (Gowan & Gatewood, 2013; Tippins et al., 2010). Morgeson & Campion (1997) have outlined a number of potential sources of cognitive and social inaccuracy that can distort the accuracy of job and work analysis data when they are gathered through specially designed questionnaires:

1) conformity pressures – social conformation attitudes displayed especially by the lower tier employees in the organization (incumbents) in relationship with other higher status members when making judgments about the characteristics of a certain job (Benson & Hornsby, 1988; Sackett & Wilson, 1982; Schwab & Heneman, 1986).

2) motivation loss – the lack of motivation experienced by raters, especially of incumbents, when they perceive that the job analysis process has either no direct benefits for them or that their judgments will not be taken into account in the final result of the analysis (Cecil, 2015).

3) impression management – the tendency of raters to manipulate job analysis information through over-estimating certain job aspects, in order to promote their personal interests (Bolino et al., 2008), either for a better salary, or to create a positive self-image for themselves inside the company (Cronin, 2005; Morgeson et al., 2004; Li et al., 2011; Truxillo et al., 2004).

4) social desirability – the incumbents' tendency to make judgments concerning their job that seek approval from higher socially validated people in the organization (Cronin, 2005; Morgeson et al., 2004).

5) demand effects – the positive attitude of the incumbents towards the researcher or professional analyst to confirm his empirical expectations and also the indications and policies of his current organization (Cronin, 2005; Truxillo et al., 2004).

6) information overload – the effect caused by multidimensional and lengthy job analysis questionnaires, which can make raters, especially incumbents and supervisors, to access mental shortcuts in making their judgments regarding the job characteristics (Morgeson & Campion, 2017).

7) heuristics – mental shortcuts that manifest themselves through representativeness (Nisbet & Ross, 1980), availability (Yammarino & Waldman, 1993) and anchoring and adjustment (Epley & Gilovich, 2001; Epley & Gilovich, 2006) when professional analysts assess job requirements.

8) categorization – another mental process in which professional analysts unconsciously organize information regarding certain aspects of the job characteristics in categories in order to help them in making judgments about the analyzed job (Fiske & Pavelchak, 1986).

9) carelessness – the tendency of incumbents to make inattentive judgments (Morgeson, Spitzmuller, Garza & Campion, 2016) when filling the job analysis questionnaires, due to either lengthy questionnaires and irrelevant or difficult to distinguish items (Morgeson & Campion, 2017) or when they perceive high role ambiguity regarding their job (Dierdorff & Rubin, 2007) or when they are focusing on broader role expectations (Stetz et al., 2012).

10) extraneous information – irrelevant information contained by the job analysis questionnaire that do not have any relevance for the job in question and that can negatively influence the job information gathered from professional analysts (Morgeson & Campion, 2017).

11) halo – the tendency of all types of raters to make judgments relying just on global or overall impressions about the job and not on its particular specifications (Arnold, 2015; Jackson & Furnham, 2001).

12) leniency – the tendency of incumbents and supervisors to rate very high most of the job characteristics, regardless of their "real" importance needed for job performance, in order to not under-appreciate or to avoid being too critical to the job in question (Morgeson & Campion, 2017)

13) method effects – caused by using just one rater (incumbents, supervisors, professional analysts, etc…), or by just one category of SME, the same type of answering format ,the same job analysis questionnaire, especially when it also lengthy and complex (Morgeson & Campion, 2017; Podsakoff et al., 2003).

14) self-serving bias – although not proposed by Morgeson & Campion (1997), this type of bias can manifest in incumbents' judgments when they consider their own perceived level of characteristics such as personality traits (Cucina et al., 2005) and competencies (Cucina et al., 2012) as being important to the job in question.

Regarding data quality, we will focus on five different effects that the aforementioned social and cognitive sources of inaccuracy can have on the information collected through job and work analysis questionnaires as proposed by Morgeson & Campion (1997) and updated by DuVernet et al. (2015):

a) interrater reliability - the consistency index of ratings across all raters and also the rater covariation.

b) interrater agreement - the absolute agreement index across all raters and indicates the level of which raters make similar judgements across the items.

c) discriminabilty between jobs – the variance index between jobs, an indicator of the level ito which raters distinguish between jobs when filling job analysis questionnaires .

d) dimensionality of factor structures – the level to which the complexity of the factor structures predicted to be part of the job analysis questionnaire can be observed in the collected job analysis information.

e) mean ratings – the degree in which the ratings provided by raters are inadequately either inflated or deflated.

By reviewing the existent literature on job and work analysis accuracy regarding different types of SMEs, we will present through the lens of social and cognitive sources of inaccuracies outlined by Morgeson & Campion (1997) the potential effects of these sources on different types of rater categories, or SMEs, and also proposals for diminishing both social and cognitive sources of inaccuracy in order to mitigate these unwanted effects.

4. Results and discussions

In terms of general social and cognitive biases, Morgeson & Campion (1997) stated that all rater categories (incumbents, supervisors and professional analysts, and by our extension, all other types of raters) can be subject to halo and method effects biases.

Regarding halo biases, incumbents may be susceptible to halo biases due to their higher level of interrater agreement in comparison with professional analysts but at the same time, they also have a higher chance of confirming factor structures in comparison with professional analysts (DuVernet et al., 2015) which can attenuate this tendency. In the case of supervisors, although it was proposed that they may be subject to this type of bias (Arnold, 2015; Jackson & Furnham, 2001), it seems that they might be less affected by halo biases due to their lower tendency to provide inflated ratings in comparison with incumbents but also with professional analysts (DuVernet et al., 2015). Professional analysts can manifest halo biases due to their lower chance to confirm factor structures in comparison with incumbents and to their higher tendency to inflate mean ratings in comparison with supervisors, but not as much as does provided by incumbents (DuVernet et al., 2015). A useful recommendation in reducing halo biases in job analysis surveys is by introducing Rater Error Training (Cellar et al., 1989), by instructing the raters about the job specifications rather than providing just the simple job description of the analyzed job (Cellar et al., 1989) and by excluding non-specific behaviors associated with the job in question (Werner, 1994).

Concerning method effects, from the existing evidence, incumbents seem the least likely to manifest this type of bias due to their lowest level of interrater reliability in comparison with professional analysts (Dierdorff & Wilson, 2003; Voskuijl & van Sliedregt, 2002) and especially with technical experts and supervisors (DuVernet et al., 2015) and also because of their higher chance of confirming factor structures in comparison with professional analysts (DuVernet et al., 2015). On the other hand, supervisors present the higher level of interrater reliability in comparison with technical experts and especially with professional analysts and incumbents (DuVernet et al., 2015), which can increase the artificial internal consistency reliability caused by method effects (Morgeson & Campion, 1997). Finally, professional analysts present a lower interrater reliability in comparison with supervisors and technical experts but significantly higher in comparison with incumbents (Dierdorff & Wilson, 2003; DuVernet et al., 2015; Voskuijl & van Sliedregt; 2002) and also a lower chance to confirm factor structures in comparison with incumbents (DuVernet et al., 2015) which can also contribute to their proneness to method effects. Recommendations in reducing method effects experienced by raters include approaches like using short or medium sized job analysis questionnaires (Morgeson & Campion, 2017), and using direct, clear linguistically formulated items that have either a random placing or at least a considerable distance between highly correlated items within the survey (Podsakoff et al., 2003; Podsakoff, et al., 2012).

4.1. Incumbents

Incumbents are the most common source for collecting work information in the role of SMEs (Sanchez & Levine, 2001), because they perform the job daily and they are more knowledgeable about the content of the job (Bobko et al., 2004; Voskuijl, 2017), especially in terms of tasks and activities (Guder, 2017) in comparison with supervisors, technical experts (Fine & Cronshaw, 1999) or with professional analysts or clients (Guder, 2017). In general incumbents rarely think about worker requirements or traits necessary for job performance as supervisors, but they understand better the task requirements than the latter (Brannick & Levine, 2019). On the other hand, they may perceive their current level of job knowledge as a competitive advantage, and may be reluctant to share it due to concerns regarding their possible replacement in the current job (Wilson, 2017).

Morgeson & Campion (1997) proposed that incumbents may experience a possible motivation loss experienced during the job analysis process, and indeed incumbents have a lower tendency of discriminability between jobs in comparison with supervisors and especially with professional analysts (DuVernet et al., 2015) which can be a contributing factor. However, incumbents also have a higher chance to confirm factor structures in comparison with professional analysts (DuVernet et al., 2015). This latter aspect may decrease the possible experienced motivation loss, especially when the job analysis process is oriented towards compensation rather than performance evaluation or identification of training needs (Cecil, 2015) and also when it has some sorts of personal relevance (DuVernet et al., 2015) or both personal and organizational

benefits (Ispas, 2010). Another aspect proposed by Morgeson & Campion (1997) is related to information overload caused by long and complex questionnaires (DuVernet et al., 2015: Morgeson et al., 2017). However, research has revealed that incumbents have a higher chance of confirming factor structures in comparison with professional (DuVernet et al., 2015). The latter rating tendency can thus decrease the negative effects caused by information overload (Morgeson & Campion, 1997).

As proposed by Morgeson & Campion (1997), carelessness may be present in incumbents' job analysis ratings (Morgeson et al., 2016; Muenzen, 2019), especially when they also perceive higher role ambiguity regarding their job (Dierdorff & Rubin, 2007), or when they may be focusing on broader role expectations (Stetz et al., 2012). Careless responding might be also supported by the incumbents' lowest level of interrater reliability in comparison with professional analysts (Dierdorff & Wilson, 2003; Voskuijl & van Sliedregt, 2002) and especially with technical experts and supervisors (DuVernet et al., 2015). Also, there might be an advantage regarding the decrease of careless responding, because, at the same time, incumbents also present a higher chance of confirming factor structures in comparison with professional analysts (DuVernet et al., 2015). This last remark can be an advantage in reducing careless responding especially when they are selected on the basis of their level of job knowledge (Weekley et al., 2019) and not solely on their level of experience on the analyzed job (Morgeson et al., 2016). Incumbents are also prone to socially desirable responding (Brannick et al., 2017; Morgeson et al., 2004), this may be prevalent due to their higher tendency to inflate ratings in comparison with professional analysts and especially with supervisors (DuVernet et al., 2015). Although, Sackett et al. (2012) have proposed that this tendency to inflate job requirements may be prevalent because incumbents have a unique perspective and it might represent a true variance. A proposal that can help in reducing socially desirable responding would be to inform incumbents that neither they nor other members of the organization will be affected by the results of the job analysis (Cronin, 2006).

Conformity pressures represent another type of social bias that can influence the ratings of incumbents (Morgeson & Campion, 1997). This aspect might exist due to their high level of interrater agreement in comparison with professional analysts (DuVernet et al., 2015) and to their higher tendency to inflate ratings in comparison with professional analysts and especially with supervisors (DuVernet et al., 2015). However, they also present the lowest level of interrater reliability in comparison with professional analysts (Dierdorff & Wilson, 2003; Voskuijl & van Sliedregt, 2002) and especially with technical experts and supervisors (DuVernet et al., 2015), which may mitigate their proneness to conformity pressures as proposed by Morgeson & Campion (1997). Following the recommendation of Herriot (2003), conformity pressures may be further diminished by having each SME and by extension, each incumbent, to individually rate the job analysis questionnaire, because it would result a similar level of accuracy as it would be rated in a group session (Chung-Yan et al., 2019). Incumbents are also prone to demand effects (Cronin, 2006; Morgeson et al., 2004, Truxillo et al., 2004), due to their high interrater agreement in comparison with professional analysts and to their higher tendency to inflate ratings in comparison with professional analysts and especially with supervisors (DuVernet et al., 2015). A possible solution can be implemented by informing them that neither they nor other members of the organization will be affected by the results of the job analysis (Cronin, 2006). Incumbents can also be subject to impression management processes (Cronin, 2006; Morgeson et al., 2004, Truxillo et al., 2004), due to their higher tendency to inflate ratings in comparison with professional analysts and especially with supervisors (DuVernet et al., 2015). However, the impression management tendency manifested by incumbents may be diminished by offering them a short instructional introductory section in which all the objectives of the job analysis are explained and all possible benefits are presented (Cronin, 2006).

Morgeson & Campion (1997) proposed that incumbents can be susceptible to leniency. This aspect can be present due to their higher tendency to inflate ratings in comparison with professional analysts and especially with supervisors (DuVernet et al., 2015), although this might be mitigated by their higher chance of confirming factor structures in comparison with professional analysts (DuVernet et al., 2015). As we can see, there is some debate here regarding this aspect, but an efficient way to reduce the leniency processes in incumbents' ratings is by attaching the job description alongside the job title when there are used task oriented job analysis surveys (Harvey & Lozada-Larsen, 1988), by introducing a Rater Error Training (Cellar et al., 1989a) and also by using job specifications and not just a short description of the focal job (Cellar et al., 1989b). Another important bias of incumbents is the self-serving bias, which can manifest when incumbents unconsciously evaluate their job though their own perceived level of knowledge, skills, abilities and other characteristics (KSAOs) as being important to the job they perform (Cucina et al., 2005). This tendency can manifest especially in job analysis work surveys based either on competency models (Cucina et al., 2012) or on personality descriptors (Cucina et al., 2005). This can result either on a deflation or inflation of mean ratings of on certain KSAOs, which instead are not reflecting the real aspects important for job performance in the job in question. A good solution in overcoming self-serving bias can be a specially designed frame-of-reference training such as the one provided by Aguinis, Mazurkiewicz & Heggestad (2009).

4.2. Supervisors

Supervisors lack the direct task experience of the incumbents' work due to their own managerial role (Brannick et al., 2019b; Wilson, 2017) but at the same time they understand better how the job fit into the greater picture of the organizational context (Bobko et al., 2004). On the other hand, supervisors have more awareness about worker-oriented information, namely the KSAOs, than the actual tasks, required for job performance, especially when they are also responsible in the selection and training processes of their incumbents (Brannick et al., 2019b, Guder, 2017) and also they may have a more developed verbal ability to describe the supervised job (Guder, 2017). Regarding the lenient attitude of supervisors, although it was proposed by Morgeson & Campion (1997) that they can also be susceptible to this type of bias, the evidence we have so far is that they have a lower inflated rating tendency in comparison with incumbents but also with professional analysts (DuVernet et al., 2015) which can in turn, mitigate this tendency.

Although it was proposed that supervisors may be somewhat prone to impression management (Morgeson & Campion, 1997; Hambrick, Finkelstein, & Mooney, 2005) when they see certain benefits (Guder, 2017), respectively to under-rate the importance of certain characteristics for some jobs in order to elevate their own roles (Brannick et al., 2017) this aspect was not proven; instead, it was quite contradicted (Morgeson et al., 2004, Truxillo et al., 2004). Also, this possible tendency of manifested impression management by supervisors can be counterbalanced by their lower tendency to inflate their ratings in comparison with incumbents but also with professional analysts (DuVernet et al., 2015).

Regarding the negative effects of information overload caused by complex and excessively long questionnaires (Morgeson & Campion, 1997), this can be at the same time exaggerated by their lower level of discriminability in comparison with professional analysts and at the same time, mitigated by their higher level of interrater reliability in comparison with technical experts and especially with professional analysts and incumbents (DuVernet et al., 2015). In terms of careless responding when filling job analysis questionnaires, this may be an issue, because of their lower discriminability between jobs in comparison with professional analysts but significantly higher in comparison with incumbents (DuVernet et al., 2015). As in the case of incumbents, this might be caused by their focus on broader aspects of the role in question (Stetz et al., 2012).

4.3. Technical experts

More recently, other specialists advocate for the inclusion of various specialists, or "technical experts" in the SME sample as long as they have direct contact or familiarity with the analyzed job (Brannick et al., 2007, Brannick et al., 2017). For example, research has revealed that trainers and educational specialists may provide more accurate information regarding learning difficulties in comparison with incumbents (Sanchez & Levine, 1999) and also that psychology specialists may better asses stress tolerance than incumbents (Jones et al., 2001). Other examples of additional rating sources such as organizational strategists, business planners, job or work process designers, etc… (Brannick et al., 2017).

In terms of the data quality generated by technical experts, there is not much additional research. Because of their more objective status, in the job analysis process, we might think that, besides, halo and method bias, as an extension to Morgeson & Campion (1997) proposal that all raters can be susceptible to these; they may be less prone to other social or cognitive biases. However, we know that they have a slight lower interrater reliability in comparison with supervisors, but significantly higher in comparison with professional analysts and incumbents (Dierdorff & Wilson, 2003; DuVernet et al., 2015) which can help in mitigating the negative effects of information overload and careless responding (Morgeson & Campion, 1997) and also the other recommendations which were covered in the section regarding the incumbents.

4.4. Professional analysts

The primary advantages of professional analysts is that they are more familiar with job and work analysis methodologies (Voskuijl, 2017) and the fact that they are not prone to sources of social sources of inaccuracy such as social influence or self-presentation strategies due to their neutral or sometimes "outsider" (if they are contracted from a consulting company) status in the organization (Gibson, 2017; Morgeson, 1997, Pearlman & Sanchez, 2010). However, not being involved in the job itself neither as incumbent, supervisor or technical expert, they need the time to familiarize themselves with its characteristics and requirements (Gibson, 2017) such as observing incumbents in order to assess their required job attributes, interviewing them about their tasks and also providing supervisors with questionnaires regarding the importance of general job duties (Breaugh, 2017). Also, their presence during the work analysis process can cause alterations in the incumbents' behavior that they are trying to analyze and understand (Wilson, 2017).

Professional analysts may be less prone to social influence processes especially in regards to conformity pressures and demand effects due to their more "outside" perspective in assessing the job, but they could still be subject to the negative effects of cognitive biases (Morgeson & Campion, 1997). Their resistance to social biases can be explained by their lower

level of interrater agreement in comparison with incumbents (DuVernet et al., 2015), for an exception see Robinson–Morral et al. (2018). More so, they may also be prone to extraneous information, due to their higher tendency to inflate ratings in comparison with supervisors, but not as much as incumbents (DuVernet et al., 2015). Although a larger quantity of information included in the job analysis survey can seem interesting at first, this should be excluded, as it would lower the accuracy of the gathered data (Mayer & Moreno, 2003).

Also, in terms of heuristics, although the higher level of discriminability in comparison with supervisors and especially with incumbents (DuVernet et al., 2015) may help mitigate this type of bias, this can still be a problem due to their slightly higher tendency to inflate ratings in comparison with supervisors and their lower chance to confirm factor structures in comparison with incumbents (DuVernet et al., 2015). The reliance on representativeness and availability heuristics when filling the job analysis questionnaires can be further reduced by instructing the raters to focus their assessment on the job as a whole and not on just small sections of the activity and also not on vivid but unrepresentative events of the job (Sanchez & Levine, 1994). Also, in regards to anchoring and adjustment heuristics, these can be diminished by using a restructured frame-of-reference training, in which the correct methods for rating are first presented and followed by exercises and feedback (Tsai et al., 2019). Regarding categorization, although it may be less intense due to their higher discriminability in comparison with supervisors and especially with incumbents, it still might be a problem due to their lower chance to confirm factor structures in comparison with incumbents (DuVernet et al., 2015). Categorization can be further diminished by providing less complex and a more comprehensible set of instructions or a less number of jobs to evaluate consecutively (Fiske & Pavelchak, 1986; Kulik, 1989).

4.5. Other organizational members

Aside from technical experts (DuVernet et al., 2015), other organizational members have not received much attention as potential subject matter experts for collecting job analysis information (Guder, 2012). Due to more recent changes in the work environment, such as the increased level of interaction inside an organization between multiple individuals from different teams or separate departments (Sanchez & Levine, 1999), the work activity spans a higher level of connectivity, and other members of the organization may be capable of providing job analysis information, especially about how the focal job may fit into the overall organizational context (Brannick & Levine, 2002). For example, coworkers, just as incumbents, although they might be more suspicious about exposing their job knowledge, can also provide information regarding the requirements of the incumbents' job, but only regarding those aspects that they directly witness or are in contact with, while other characteristics might not be available to them (Wilson, 2017).

Other possible sources of job analysis that could provide valuable information about certain aspects of the job in question could be former incumbents (Foster et al., 2017) and other persons involved in the product design or in the service delivery chain such as knowledge workers, international workers, contract workers, life-of-project-workers, teleworkers, internal customers and virtual team members (Brannick et al., 2017).

4.6. Customers

Clients and customers, suppliers and vendors (Brannick et al., 2017) can provide a somewhat limited but unique perspective regarding certain important aspects of the focal job, especially regarding which of them are more essential and which of them are not that important (Bernardin, 1992; Brannick & Levine, 2019; Sanchez & Levine, 1999) and also can help in creating standards for job performance (Brannick et al., 2007). Although clients are the ones who can benefit from the improvements resulted from the job analysis process, because they can have insight regarding the end product or service received but at the same time, not so much information concerning how either the product is made or how the service is created, so they should be included as SMEs only when they have enough information about the job in question or just regarding certain specific requirements that they are familiar with (Guder, 2017).

5. Conclusions

As we can see, all SME categories have unique advantages and disadvantages in providing job information, in regards to both social and cognitive sources of inaccuracy but also in terms of relevant job information concerning the focal job.

In order to ensure a high level of accuracy, we can recommend 360 degree type of approach, so that all relevant raters are included as subject matter experts in order to provide all the important job information (Sanchez & Levine, 2001). Also, another recommendation would be to include independent raters, such as multiple trained analysts, especially when already using incumbents and supervisors as SMEs (Harvey, 2017) since we already know that they might be prone to more social sources of inaccuracy (Morgeson & Campion, 1997), but also selecting other organizational members or outside people who have relevant information regarding the job such as customers or clients (Guder, 2017). Also, as stated before, the job analysis process cannot rely just on a single source of information when assessing a certain job, it should be

noted that one problem may appear in using multiple sources of raters, respectively a disagreement regarding the collected information (Wilson, 2017). This might indicate the fact that the taxonomy of the job should be re-examined and revised if necessary in order to generate more homogenous results (Harvey, 2019). Other recommendations to reduce the negative effects of social and cognitive sources of inaccuracy would be to have the job analysis survey in a web-based format (Reiter-Palmon et al., 2006), including a frame of reference training to diminish the incumbents' self-serving bias (Aguinis et al., 2009) and also to improve the overall accuracy of the information (Roch et al., 2012) and if possible, a restructured type of frame of reference (Tsai et al., 2019).

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