‘Predicting the predictive validity of managerial selection methods’

A study to examine the influence of different (organizational) variables on the predictive validity of an organization’s most influential managerial selection method.

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Abstract

Research depicts that organisations that use the selection methods with the highest predictive validity, as prescribed by the academic literature, will reach greater utility of their selection method process as measured by the productiveness of their employees. The current research investigated the relation between different (organizational) variables and the predictive validity of an organization' most influential managerial selection method. Data was collected using an online questionnaire and distributed through different sources. The questionnaire was targeted at the HR managers within organisations. The different antecedents of an organization's predictive validity selected for the research were: level of education of the HR manager, work experience of the HR manager, time spent reading academic literature, number of employees in the organisation, the managerial selection ratio, and the extent to which the personnel selection process was outsourced.

The questionnaire returned a sample of 53 respondents. The analysis of the data showed that the sample was insufficient to find support for the hypotheses. The only significant relation was found between the level of education of the HR manager and the predictive validity of the most influential managerial selection method used; the data analysis showed a small effect size. Further research and more extensive data collection is required and encouraged to investigate the relationship between the different organizational variables and their influence on the organization' managerial selection process predictive validity.

1. Introduction

More and more companies are realizing the importance of successful human resource management and the need for a review of the current recruitment and selection tools in order to compete for talented employees in this highly competitive labour market (Cooper & Locke, 2000). Human resource management practices can help to create a source of sustained competitive advantage, especially when they are aligned with a firm's competitive strategy (Huselid, 1995; Barney and Wright, 1998). This is in line with Gould-Williams (2003) whose research also shows the importance of HR practices in achieving superior performance. Within the different HR practices that can be distinguished, recruitment and selection have become important tools in terms of a competitive advantage and the survival of a business (Huselid, 1995; Beck and Walmsley, 2012). Barney and Wright (1998) highlight the strategic importance of effective staffing practices by showing that organizations that focus attention on selecting, attracting, and retaining talented employees outperform others that do not.

Research has shown that many companies face difficulties in finding suitable employees (Cooper & Locke, 2000). According to the Dutch statistics bureau, employers are having difficulties finding suitable candidates for one in three vacancies (Workpermit, 2007). Axelrod, Handfield-Jones, and Welsh (2001) found that 90% of 7,000 managers indicated that recruiting, selecting and retaining highly educated personnel has become more of a challenge than three years ago.

Cooper and Robertson (1995) also recognize the need to change recruitment and selection procedures to cope with the changing nature of the workforce as a more diverse graduate workforce will be available for recruitment and selection. Selecting the right person for the job can make the difference between profit and loss (Cooper & Robertson, 1995). Personnel

selection is defined as '*... the process of choosing among individuals who have been recruited to fill existing or projected job openings'* (Dessler & Cole, 2010, p. 175).

The current paper focusses on selection, since having a selection method that predicts future job performance and retention will help in identifying the right talent for upcoming vacancies and can therewith influence the performance of the organization (Beck and Walmsley, 2012). The predictive validity of the selection method indicates how well a selection method predicts job performance; it is a correlation coefficient that indicates the level of predictive power of a particular selection method that predicts job performance (Taylor, 2005). The higher the predictive validity coefficient is, the better the selection method predicts job performance. Therefore, the need for changing selection practices as discussed above, indicates a need for selection methods with high predictive. Many studies have been conducted to identify selection context predictors, or combinations thereof, with the highest predictive validity (Bertua, Anderson and Salgado, 2005; Schmidt, Shaffer and Oh, 2008; Salgado, Anderson, Moscoso, Bertua and de Fruyt, 2003; Salgado and Anderson, 2002, Schmidt and Hunter, 1998).

Not only the predictive validity of a selection method is important, the utility of a selection method is important as is shown by the definition of utility (Noe, Hollenbeck, Gerhart & Wright, 2008, p. 236): '*Utility is the degree to which the information provided by selection methods enhances the bottom-line effectiveness of the organization'.* The link between validity and utility is directly proportional: increasing the predictive validity coefficient will also increase the utility of the selection process and will thus be able to increase a firm's performance (Schmidt and Hunter, 1998).

As shown above, there is a great need for reliable and valid selection methods. Schmidt and Hunter (1998) conducted a meta-analysis of different selection methods. Their meta-analysis

showed that general mental ability (GMA) has the highest predictive validity (.51). Increasing the predictive validity of a selection procedure beyond this value can be achieved by using GMA in combination with another method, one that has a low correlation with GMA and is highly correlated with job performance. One example of such a combination is GMA combined with an integrity test; it yields the highest predictive validity of .65 in the study conducted by Schmidt and Hunter (1998). GMA combined with a work sample test or a structured interview yields a coefficient of .63. Other researchers also found that GMA yields the highest predictive validity coefficient (Bertua, Anderson and Salgado, 2005; Schmidt, Shaffer and Oh, 2008; Salgado, Anderson, Moscoso, Bertua and de Fruyt, 2003; Salgado and Anderson, 2002).

One would expect practitioners to adapt the most valid selection methods from the findings presented above; however the scientist-practitioner gap is large in this research field (König, Klehe, Berchtold and Kleinmann, 2010). The original aim of the research was to predict the predictive validity of selection methods used at organizations. The research design was set up to calculate the overall predictive validity of all selection methods used within an organization. The inter-correlations of the selection methods used by an organization would be used for the calculation of the overall predictive validity quotient. An extensive literature review showed however that not all relevant inter-correlations were available in the academic literature. Therefore, the research has been amended to focus on the most influential selection method in use at organizations today.

The current aim of the research is to predict the predictive validity of the most influential selection method in use at organizations not by analyzing the correlation between the selection method and job performance, but by identifying those variables that might influence the choice

of the selection method, and that therewith influence the predictive validity of the most influential selection method in use at organizations.

By looking at six variables that have been shown to influence the choice of the selection method used (König et al, 2010; Klehe, 2004), a contribution is made to the existing literature on the science-practice gap by providing a possible explanation for the adaption of certain selection methods by organizations. The variables used to predict the predictive validity are: the level of (HR) education of the HR manager, the years of work experience of the HR manager, the time HR managers spend reading academic literature, the number of employees (FTE) within the organization, the HR budget available for personnel selection, the selection ratio, and the level of outsourced personnel selection activities.

This paper is structured as follows. First a review of the related literature will be provided, after which a description of the current research will be given by developing hypotheses that will guide the remainder of this research. The methodology used will be explained and the results will be presented. The results section will be followed by a discussion of the main findings, after which a conclusion will be made with regard to the hypotheses. The discussion will also discuss the limitations of this research and suggestions for future research.

2. Literature review

Cooper and Robertson (1995) describe selection as a matchmaking process between the qualities of an applicant and the requirements of the job. There is a great number of different selection methods to choose from to enhance this matchmaking process. The first selection process (pre-selection) is usually done with the screening of the cover letter, the application form and the applicant's resume (Bartram, Lindley, Marshall and Foster, 1995; Keenan, 1995). The most common and frequently used selection method used is the interview (Cooper & Robertson, 1995; Taylor, 2005). The manner in which the interview is conducted can either be structured or unstructured (Yin, 2009; Noe, Hollenbeck, Gerhart & Wright, 2008; Taylor, 2005). The (unstructured) interview is commonly used as it is low in cost. Also, applicants expect the interview to be part of the selection procedure (Taylor, 2005). The interview is also seen as versatile, as it gives candidates an opportunity to ask questions about the organization and the applicant's level of fit with the organization can be evaluated by examining the applicant's personality (Shackleton and Newell, 1991; Judge and Ferres, 1992). For these reasons it is expected that most organizations in the current research will use the unstructured interview as part of their selection process.

Other examples of selection methods and tools that are commonly used are: integrity tests, GMA tests, assessment centers, work sample tests, job knowledge tests and job tryouts (Schmidt and Hunter, 1998). Since it is beyond the scope of the current investigation to specify what these types of selection methods entail, these with not be further discussed here. For elaborate reviews of a large number selection methods, please refer to Noe et al. (2008) or Taylor (2005).

Deciding which selection method(s) to use starts with analyzing what the job requirements are (Robertson and Smith, 2001). This process, called job analysis, is the gathering

of information about a specific job. Job analysis should clearly outline the requirements needed in an applicant and give a clear description of the job itself. Job analysis is an important part of the selection process (Robertson and Smith, 2001). Binning and Barrett (1989) give a model for personnel decision research and refer to the job analysis process with inference 10 and 11 (see figure 1, section 2.1.1), showing that with the job analysis, the characteristics by which the utility and validity of the selection method is judged, are set (Cooper & Robertson, 1995).

The job analysis process is what Roe and Grueter (1991) describe as the first function of the overall selection procedure. There are four main functions of a selection procedure. These four functions are (i) information gathering, (ii) prediction, (iii) decision-making, and (iv) information supply. The first function, information gathering, is mostly about setting the scene for the job to be filled. It mostly entails the job analysis as described above, but also includes (but is not limited to), the working hours, the contract and the career path. The second function is one that has been widely discussed in the literature; the predictive power of a selection method. In this phase the appropriate selection method has to be determined. An organization can have different reasons for selecting a test. According to Le, Oh, Shaffer and Schmidt (2007), the main reason for using a selection test is to predict job performance (see section 2.1.1).

In the third phase the decision about who to hire is made, based on candidates' score on the selection method(s). This decision is made based on the statistical method (objective combination of test scores) or the clinical method (subjective combination of test scores, resulting in personal biases and stereotypes), or a combination of the two (Petrovic-Lazarevic, 2001; Dawes, Faust and Meehl 1989). The fourth phase is the evaluation or feedback phase. In the evaluation phase, the process of selection is reviewed and the selection method is judged

based on its practicality, reliability and validity (Cooper and Robertson, 1995). The next section will discuss the evaluation phase in more detail.

2.1 Evaluating selection methods

Smith (1991) gives four basic requirements for the evaluation of a particular selection method. These four principles are the ways to test and judge a method. The first requirement is practicality. Within this requirement a company must assess if they can afford the selection method and if it is convenient to use the method (e.g. in terms of administration time). Candidates' perception and attitudes might also be taken into consideration. The second requirement is called sensitivity; a selection method must be able to discriminate between suitable and unsuitable candidates. The third requirement is reliability. Reliability is defined as '*the degree to which a measure is free from random error'* (Dessler & Cole, 2011, p. 179). Reliability has several different forms. One of these topics is time related (test-retest reliability); if the same test is done at different points in time, it should yield the same results (Dessler & Cole, 2011). A selection test should also be reliable in the sense of being internally consistent; if a test has two or more items testing the same variable, these items should generate the same results (Smith, 1991). Another form of reliability is inter-rater reliability; a test should generate the same results when executed by different assessors (Smith, 1991). Reliability is a necessary prerequisite (but not the only one) for the fourth basic requirement or standard for a selection method, namely validity. As validity is one of the main topics within personnel selection research, it will be discussed in the next section.

2.1.1 Validity

Validity is defined as how well a measuring instrument '*measures what it purports to measure'* (Nunnally and Bernstein, 1994, p. 83). Looking at the definition of a selection method by Armstrong (2009, p. 529): '*The aim of selection is to assess the suitability of candidates by predicting the extent to which they will be able to carry out a role successfully',* one could say that the validity of a selection method is the key component or the main function of a selection method.

There are several different kinds of validity. Face validity is concerned with if the method measures what it is supposed to measure, in the eyes of the applicant. If a selection method contains questions or items that do not relate to job performance, an applicant might develop negative feelings towards the job, the test and the company (Robertson and Smith, 2001). Therefore face validity is mainly concerned with user acceptability.

Binning and Barrett (1989) give an overview of three different kinds of validity (construct, content and criterion) within the personnel selection decisions (see figure 1). Binning and Barrett (1989) indicate that inference 9 is the most important, that between the performance domain (desired job behavior or job outcome obtained through job analysis) and the predictor measure (the selection method). Binning and Barrett state that is this the most important inference, because the decision maker within a company is mostly concerned to what extent the selection method accurately measures or predicts job performance (as defined in the performance domain). An example of such a selection method (that is high in content validity) is the work sample test. For inference 9 to be high in validity, all three types of validity are important.

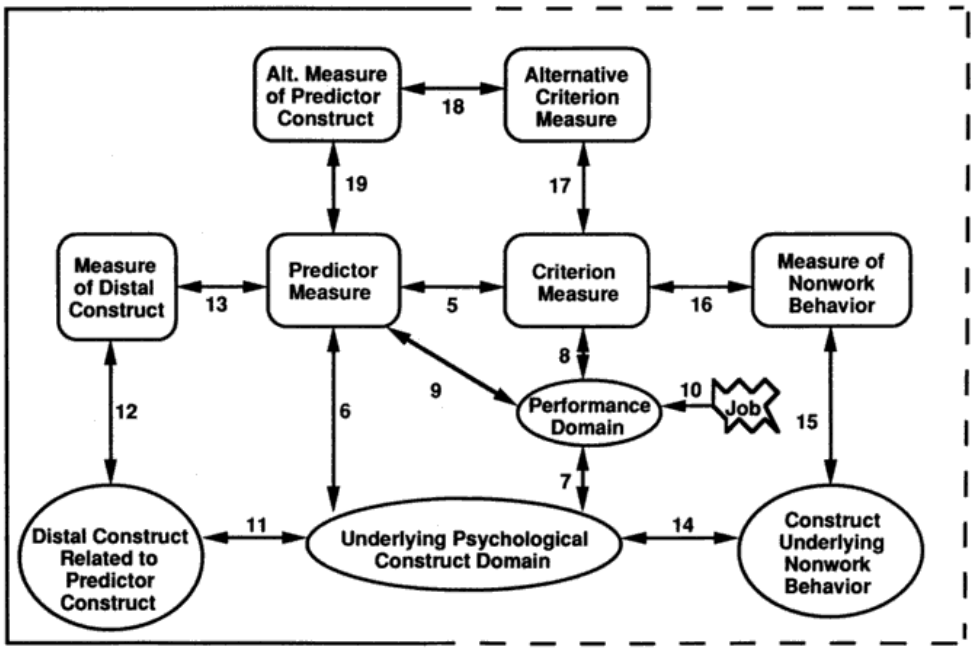

Figure 1: Model for personnel decision research (Binning and Barrett, 1989, p. 485).

For construct related validity, inference 6 and 7 are important. The selection method (predictor measure) measures an underlying psychological construct (inference 6) needed for job performance (inference 7). For criterion validity, inferences 5 and 8 have to be validated. The criterion measures are the measures used to evaluate (or sample) job performance as defined in the performance domain (inference 8), and a selection method must predict these criteria (inference 5).

For criterion-related validity, a distinction can be made into two varieties: concurrent validity and predictive validity. Concurrent validity is assessed by administering the same test to people already on the job, as a way to evaluate each person's performance. If the best performing employees do better on the test than the lesser performing employees, the test has concurrent validity as it can be used to assess the level of performance (good versus bad) of the applicants taking the test (see figure 2).

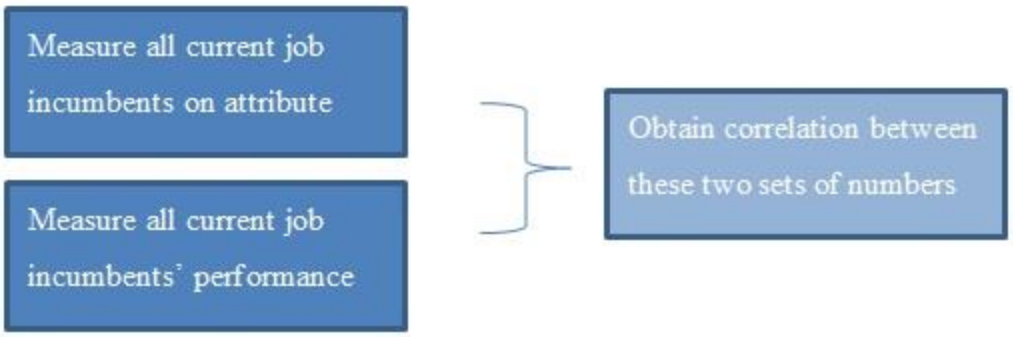

Figure 2: Graphic depiction of concurrent validation design (Noe et al, 2008, p. 233)

Predictive validity is different from concurrent validity as it is a correlation between test scores obtained prior to being hired and subsequent job performance. Comparing figure 1 and figure 2 clearly demonstrates the difference between concurrent validity and predictive validity (Noe et al, 2008).

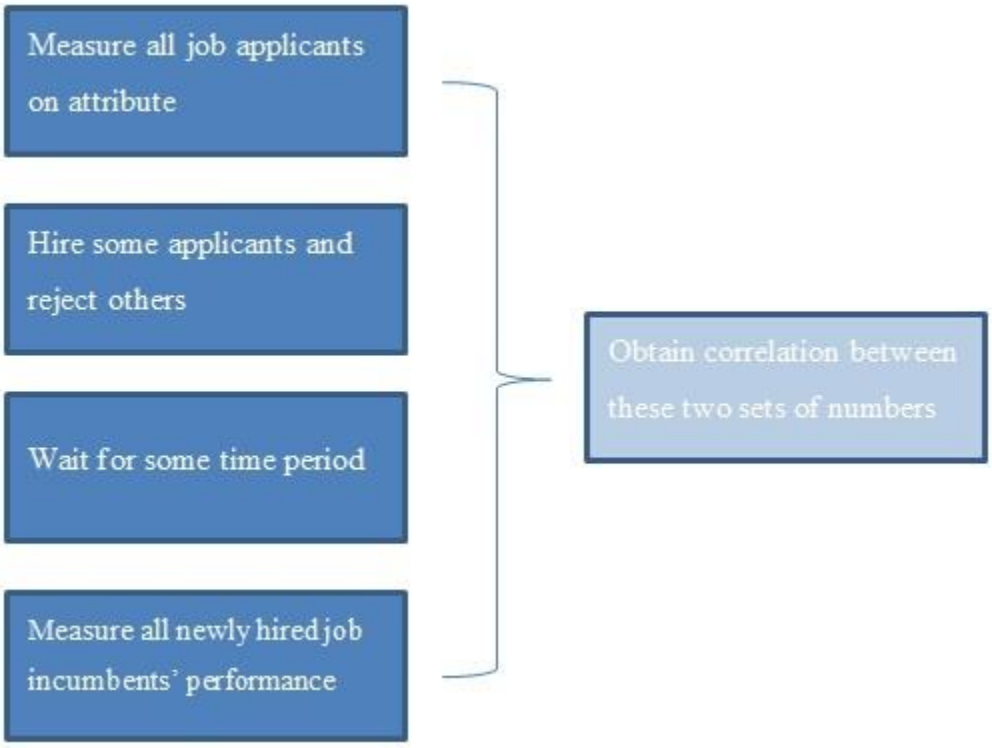

Figure 3: Graphic depiction of predictive validation design (Noe et al, 2008, p. 233)

Predictive validity will require more work, time and effort than needed for the calculation of concurrent validity; however Noe et al. (2008) argue that predictive validity is superior to

concurrent validity. Reasons for this are that actual job applicants are more motivated to perform well on tests than current employees; current employees may have gained on the job knowledge that job applicants might not have obtained yet and the third reason is that many employees tend to be homogeneous when it comes to certain characteristics. Most of the research literature on personnel selection focuses on predictive validity, as it is central to the general purpose of personnel selection (Robertson and Smith, 2001; Le et al, 2007).

Predictive validity is measured using a correlation coefficient; *'a measure of how closely scores at the selection stage correlate with those awarded for later performance'* (Taylor, 2005, p. 200). A correlation coefficient of 1 for a selection method indicates that this method predicts future job performance perfectly and a coefficient of 0 indicates that there is no predictive power. Cohen (1992) provides cut-offs as a 'rule of thumb guide' for the interpretation of correlation coefficients. With a coefficient of .10, the effect size is considered small, a coefficient of .30 is considered a medium effect size and a correlation of .50 represents a large effect size.

2.1.2 Range restriction

Range restriction occurs when there is a reduced variance on a variable in a sample. Range restriction can occur on the predictor variable and on the criterion variable (Sackett and Yang, 2000; Wiberg and Sundström, 2009). For example, the process for calculating predictive validity as shown in figure 3 will result in range restriction, as the highest scoring applicants are hired and the low scoring applicants are not (as opposed to all applicants being hired), resulting in a restricted sample on the predictor, causing a downward bias in the predictive validity coefficient (Schmidt, Shaffer and Oh, 2008). For a test to have concurrent or predictive validity, it will need to have low and high scores on all variables. In the ideal situation, one would hire all applicants, so that the low scoring applicants can be compared to the high scoring applicants, creating an

unrestricted sample. Restriction in range can be direct (or explicit): when the range restriction of the variables in the sample have a direct influence on the correlation coefficient for the population. Another form of range restriction is indirect range restriction. With indirect range restriction a third variable (or more variables) has an influence on the correlation coefficient. This is usually the case in predicting job performance, as it is common that multiple predictors are used (e.g. using unstructured employment interviews and GMA tests). When these multiple variables (or selection methods) correlate among each other (e.g. unstructured employment interviews and GMA tests have an inter-correlations of .38 (Schmidt and Hunter, 1998)), or, more specifically, when a second predictor measure is used as a basis of selection and this second predictor correlates with the predictor measure one is trying to validate, an indirect restriction in range can occur on the predictor (Schmidt et al, 2008; Le and Schmidt, 2006; Sacket and Yang, 2000).

A restriction in range is applicable to almost all calculations of predictive validity coefficients, as researchers rarely have access to an unrestricted sample; most calculations for predictive validity therefore contain a correction for the restriction in range in the sample on the predictor (Schmidt and Hunter, 1998; Schmidt et al., 2008; Gatewood, Field and Barrick, 2010).

2.1.3 Predictive validity

As predictive validity is widely used to assess a selection method and central to the purpose of selection as mentioned above, it will also be used in the current research. The selection method(s) used by organizations in the sample of the current research will be linked with the corresponding predictive validity coefficient(s) reported in the academic literature. One example of an article that will be used to estimate the predictive validity of the selection methods found in the current research is the article by Schmidt and Hunter (1998). Schmidt and Hunter (1998)

conducted a meta-analysis of 85 years of research into selection methods and their predictive validity coefficients. The article by Schmidt and Hunter (1998) gives a range of 19 selection methods used by organizations worldwide. Their meta-analysis shows that GMA has the highest single predictive validity (.51). In other words, the best way to predict future job performance is by testing the general mental ability of applicants (Bertua, Anderson and Salgado, 2005). More recent studies have shown that the predictive validity correlation coefficient of GMA is even higher than thought before when corrected for indirect range restriction on the predictor. A re-estimation done by Schmidt, Shaffer and Oh (2008) shows that GMA can have a correlation of .734 with job performance.

According to Schmidt and Hunter (2003), HR managers expect that GMA will predict job performance up to or starting from a certain job level, but Schmidt and Hunter argue that higher GMA scores will lead to better job performance for every job level. Schmidt and Hunter (2003) conclude their article by stating that higher GMA scores will not only lead to better job performance; organizations that use GMA as part of their selection process will have better performance of the business overall. An explanation Schmidt and Hunter give for GMA and the high correlation coefficients found is given by Schmidt and Hunter (2004); GMA reflects the ability to obtain job knowledge faster and thus job performance is increased.

Even though Schmidt (2002) states that there cannot be a debate on the issue that GMA predicts job performance the best, there are some disadvantages associated with this particular selection method (Allen and Bosco, 2011). The primary concern with GMA as a selection tool is '*that tests of cognitive ability show large score differences across ethnic groups*' (Allen and Bosco, 2011, p. 4). When GMA is used as the sole basis for selection, it can have an adverse impact as it can exclude low scoring groups, groups which tend to be racial or ethnic minorities

(Alexender, 2007). One way to solve this issue is by combining GMA tests with other selection methods (Allen and Bosco, 2011).

Combining GMA with other selection methods will not only ameliorate the issue of discrimination, Schmidt and Hunter (1998; 2003) found that it will also generate better results in terms of the predictive validity coefficients. Schmidt and Hunter's 1998 meta-analysis shows that the best results are generated by combining different selection methods. Appendix A gives an overview of the results of the meta-analysis conducted by Schmidt and Hunter (1998) and is adapted from Robertson and Smith (2001, p. 443), as their overview provides a clearer overview. It must be noted that even though the use of an assessment center is an observed trend in personnel selection (an assessment center combines and integrates different methods in order to maximize validity and reliability), assessment centers designed for predicting job performance have a lower predictive validity (around .40) than that of GMA (.51). This is mainly because assessment centers combine different selection methods in a clinical way, such as GMA tests, with other selection methods resulting in a lower predictive validity (Pilbeam and Corbridge, 2006; Gaugler, Rosenthal, Thornton III and Bentson, 1987; Klimoski and Brickner, 1987, Schmidt and Hunter, 1998).

2.1.4 Utility

Not only the validity of a selection method is of great importance, the utility of a selection method also plays a vital role. Noe et al. (2008, p. 236) give the following definition of utility: '*Utility is the degree to which the information provided by selection methods enhances the bottom-line effectiveness of the organization'.* The utility of a selection method has to do with enhancing the productivity of the organization and the return on investment (Cooper and Robertson, 1995). Cronshaw and Alexander (1985) give a simple overview for the calculation of

the utility of a selection method: utility is the return of a selection method minus the costs of the selection method.

Cooper and Robertson (1995) describe that the basic utility model can be defined in three basic principles: quantity, quality and costs. The return on investment is the product of quantity and quality minus the costs. Quantity is related to the number of staff to be recruited with a particular selection method. The more the selection method is used, the greater the cost-benefit ratio. To calculate the financial gains from a selection method, the value of one standard deviation in performance must first be estimated (Cooper and Robertson, 1995; Guion and Gibson, 1988). Hunter and Schmidt (1982) show that the value of one standard deviation is between 40% and 70% of the average salary related to the job in question.

The more people there are available for selection, the better the chances are that the right candidate will be found. This is called the selection ratio: the ratio of the number of applicants hired to the total number of applicants (Dessler and Cole, 2010). The smaller the ratio, the bigger the pool of applicants will be for the job in question. The ratio gives a number between 0 and 1. When the selection ratio is close to 1, an organization would be forced to hire (almost) everyone that applied for the job, not giving much use for a selection tool, no matter how valid. In practice, selection ratios tend to vary between 0.30 and 0.70 (Schmidt and Hunter, 1998). Recent research also shows that the smaller the selection ratio the greater the return on investment (Beck and Walsmsley, 2012, Schmidt and Hunter, 2003). Beck and Walmsley (2012) point out that organizations can gain a competitive advantage when they focus on the selection ratio. Their research shows that the more selective an organization can be, the greater the return on investment and the longer employees will stay with the organization. The article by Le et al. (2007) shows that the utility of a selection method will increase as the selection ratio decreases.

The costs mentioned in the basic utility model by Cooper and Robertson (1995) can be either direct or indirect. Direct costs refer to all costs associated with the screening of the applicants and the selection method. Indirect costs refer to long-term interest rates, corporation tax and wage inflation.

2.2 Gap

As these research outcomes have been around for several years, one might expect that most companies would have simply adapted these results (e.g. selecting on GMA in combination with an integrity test) and thus gain more economic value by selecting the applicant that has the best test results. Especially as research has shown that '*the use of reliable and valid selection procedures leads to considerable financial benefits for organizations'* (Klehe, 2004, p. 6).

However, the gap between science and practice in human resource management is large and an '*ongoing concern'* (Klehe, 2004, p. 2). The gap is especially present in the personnel selection area. Human resources managers are reluctant to adapt selection methods with the highest predictive validity, as for some reason they favor their old, less valid selection methods (Le, Oh, Shaffer and Schmidt, 2007). An example of a method that is still widely used, as mentioned above (see section 2), even though it is low in validity, is the unstructured interview (Klehe, 2004).

Reasons for this 'troubling' gap are diverse and numerous (Le et al, 2007). HR practitioners do not have time to read academic journals or may not have had sufficient training to understand them. Other explanations are that the topics in the academic literature do not reflect the problems faced by companies and that problems are believed to be organization specific, and thus cannot be solved by seemingly generalizable results as provided in the academic literature (Le et al., 2007). König et al. (2010) also researched the question why

practitioners adapt certain selection method, and found three main predictors; applicant reactions to the selection methods, the costs involved, and the extent of diffusion in the field (diffusion refers to the imitation of the behavior of other organizations). Klehe (2004) also found costs or short-term economic considerations to be a factor in the decision making process when deciding which selection method(s) to use. Selection procedures advised throughout the literature often involve high initial costs and take up a lot of time for development. An example of a costly selection method is the assessment center (Klehe, 2004; Ekuma, 2012, Taylor, 2005).

2.3 Current research

From the literature review above one can draw some conclusions when it comes to selection methods and predictive validity. Organizations make choices when it comes to deciding which selection methods to use. That is, there are reasons that lead up to the choice of the selection method used. These reasons and choices influence the predictive validity of the selection methods of an organization and therewith its performance. For example, if a human resource manager is highly educated, this person would be aware of the academic literature and would be able to understand the literature. Furthermore, if an organization has sufficient funds available for the use of a selection tool, this can also be expected to lead to higher predictive validity coefficients.

The impact or utility of a selection method of an organization increases as the importance (and salary) of a job is higher (Cooper and Robertson, 1995). This is because the utility of a selection method is calculated using one standard deviation of the salary of the job in question: the higher the salary, the higher the standard deviation will be (as explained in section 2.2). Therefore focusing attention to selection procedures for higher paid and more important jobs are of greater importance and can yield higher returns on investment than focusing on lower level

jobs. For these reason the current research will focus solely on managerial selection procedures (Schmidt and Hunter, 2003). For the same reasons as mentioned above, much of the previous research on selection methods has also focused on managerial selection (Robertson and Makin, 1986; Shackleton and Newell, 1991; Billsberry, 2005).

The original aim of the research was to predict the predictive validity of selection methods used at organizations. The research design was set up to calculate the overall predictive validity of all selection methods used within an organization. The inter-correlations of the selection methods used by an organization would be used for the calculation of the overall predictive validity quotient. An extensive literature review showed however that not all relevant inter-correlations were available in the academic literature. Therefore, the research has been amended to focus on the most influential selection method in use at organizations today.

The current aim of the research is to predict the predictive validity of the most influential selection method not by looking at the selection method used, but by investigating variables that might influence the choice of the selection method, and therewith the predictive validity. By looking at the variables that influence the choice of the selection method, one can make assumption of the choices made and therewith make predictions of the selection methods used and consequently of the predictive validity of these selection methods. From this perspective, six hypotheses are developed below.

Hypothesis 1 relates to the science-practitioner gap in the personnel selection field. Hypothesis 1 will test the influence of the level of education of the HR manager. The expectation is that the higher the level of education of the HR managers (who are in charge of deciding which selection method(s) will be used) the higher the predictive validity will be. HR managers with an academic education are more likely to be aware of the recent academic research on

personnel selection methods and are more likely to have the skills to understand the literature (Le, Oh, Shaffer and Schmidt, 2007; Rynes, Brown and Colbert, 2002; Terpstra and Rozell, 1997). It is expected that HR managers with an educational background in HR will have more knowledge of the academic literature related to personnel selection which is likely to result in a higher predictive validity.

H1: The level of education of the HR manager is positively related to the predictive validity of the most influential managerial selection method of the organization, this effect will be moderated by level of education in the human resource management sphere.

In addition, it is expected that years of experience in the HR sphere will also influence the predictive validity coefficient. Schmidt and Hunter (2004) state that job experience is related to job knowledge, as experience is a medium for learning, and can thus generate an increase in job performance. The expectation is that job experience will lead to higher levels of job knowledge, and it is therefore expected that HR managers with more job experience in the human resources management field will have more knowledge on the managerial selection method(s) with the highest predictive validity coefficient (Schmidt, Hunter and Outerbridge, 1986). Hypothesis 2 is set up to test this relationship (Terpstra and Rozell, 1997).

H2: The years of job experience the HR manager has in the human resource management field is positively related to the predictive validity of the most influential managerial selection method of the organization.

Hypothesis 3 also relates to the science-practitioner gap in the personnel selection field. As discussed above, one reason for this gap may be the lack of knowledge among practitioners of the relevant literature on personnel selection. Rousseau (2006) points out that less than one percent of HR managers read the academic literature regularly. Terpstra and Rozell (1993; 1997) found that organizations that adapted recommendations from the academic literature on personnel selection had higher financial performance. Research conducted by Nowicki and Rosse (2002) found that managers are not aware of research and theory that might be helpful to their organization. An HR manager who reads the academic literature regularly can thus influence the financial performance of the organization and therefore the following hypothesis is proposed (Rynes, Brown and Colbert, 2002).

> *H3: The more time spent on reading academic journals and periodicals by the HR manager, the higher the predictive validity of the most influential managerial selection method of the organization*

Hypothesis 4 has been set up as the literature review has shown that the costs involved with selection methods is a factor in the decision making process for organizations when deciding which selection method will be used. Therefore, it is expected that the higher the HR budget an organization has, the higher the predictive validity of the most influential selection method will be (Klehe, 2004; Ekuma, 2012, Taylor, 2005). As research has shown that there is a relationship between the number of employees in an organization and the number of managers recruited, it is expected that the HR budget will be positively related to the number of employees (Ordani and Silverstri, 2008; Robertson and Makin, 1986). As firm size is expected to influence the HR

budget, and not the other way around, HR budget is expected to mediate the effect between firm size and the predictive validity of the most influential managerial selection method.

> *H4: The number of employees an organization has is positively related to the predictive validity of the most influential managerial selection method of the organization, this effect is mediated by the annual HR budget of an organization.*

Hypothesis 5 will test the influence of the selection ratio on the predictive validity of the most influential managerial selection method in use at the organization. As discussed in section 2.2, the selection ratio influences the return on investment, and the larger the pool of applicants the more effectively companies are likely to select their future employees (Beck and Walmsley, 2012). Therefore it is expected that the selection ratio will influence the predictive validity of the most influential selection method used (Lievens, Van Dam and Anderson, 2002). It is hypothesized that when an organization has a larger pool of applicants the predictive validity of the organization's most influential selection method will be higher than when the pool of applicants is smaller. Having more people to choose from should lead to a perceived need for better selection methods and therewith high validity coefficients, as a selection ratio of 1 (or close to 1) makes the need for any selection method, however valid, redundant. Or, as Ployhart (2006, p. 870) states: '*Selection will only be effective and financially defensible if a sufficient quantity of applicants apply to the organization'*.

H5: The managerial selection ratio of an organization is negatively related to the predictive validity of the most influential managerial selection method of the organization.

An observed trend is that most HR practices, including recruitment and selection, are outsourced in order to reduce costs and gain efficiency (Ordanini and Silvestri, 2008). Training personnel to assess applicants is expensive and time consuming. Outsourcing some HR functions might help organizations in responding faster to their changing environment, increasing their flexibility and responsiveness (Kwiatkowski, 2003; Robertson and Smith, 2001; Ordanini and Silvestri, 2008). As most external recruitment and selection agencies have more specialized expertise and market knowledge than internal HR departments (Ordanini and Silvestri, 2008), it is expected that the predictive validity of the most influential selection method of an organization that outsources personnel selection in whole or in part will increase as compared to in-house selection processes. With this in mind, hypothesis 6 has been set up. See the conceptual model (figure 4) for an overview of the hypotheses.

H6: The more managerial personnel selection activities an organization outsources, the higher the predictive validity of the most influential managerial selection method of the organization will be.

As selection methods can have value for any organization, the current research can help organizations with detailed insight into their current or future selection process and can provide organizations insight as to how to improve the predictive validity of the managerial selection

process. Using the selection methods with the highest predictive validity will also influence the utility of the method used, and can positively influence to the overall performance on the organization. The current research also further investigates the possible reasons for organizations to adapt a certain selection method. The hypotheses can help explain and close the scientist-practitioner gap further, as level of education of the HR manager, years of experience of the HR manager in the HR sphere, the organization's HR budget, the managerial selection ratio and degree to which the managerial selection process is outsourced are expected to influence the choice of the selection method used.

The current research can be an addition to the already existing literature on the scientist-practitioner gap. This gap has troubled researchers and it calls for the need for evidence-based management (Rynes, Giluk and Brown, 2007). Even though evidence-based is a self-explaining term (management decisions based on evidence), it can best be clarified by the following statement: '*Evidence-based management means translating principles based on best evidence into organizational practices'* (Rousseau, 2006, p. 256). Practitioners can use recent academic literature as evidence; every time a change is proposed within a company, one should ask for evidence to support this change (Pfeffer and Sutton, 2006).

The current investigation will give insight into the scientist-practitioner gap present within the personnel selection field. On top of that, it will give insight into the selection methods used by companies nowadays, and their reasons for doing so.

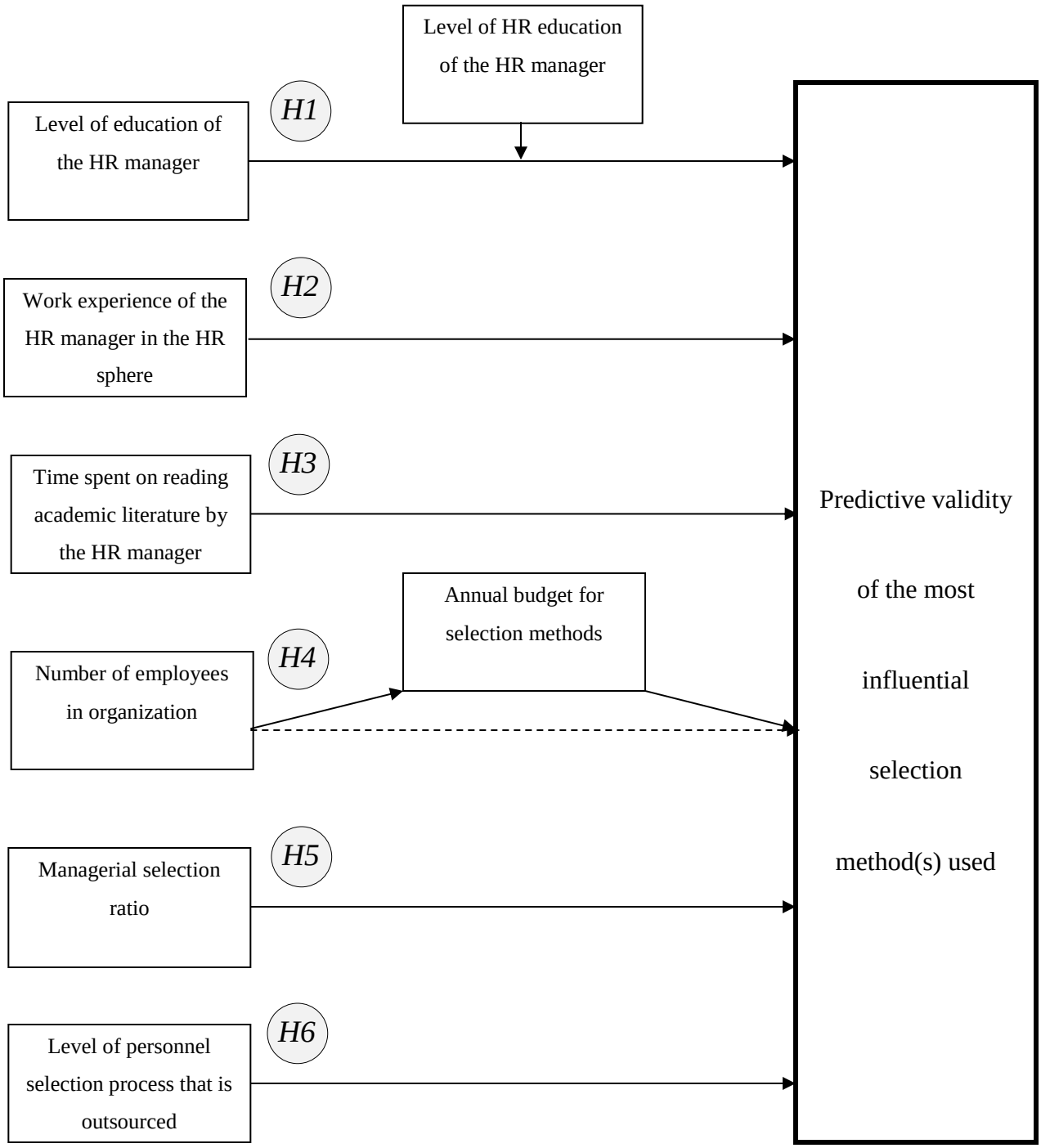

Figure 4: Conceptual model

3. Methodology

In this chapter an overview will be given of the methodology used to gather the data for the research hypotheses as described above. First, a description of the questionnaire and the data collection channels will be given, after which the individual variables will be explained.

3.1 Data Collection

Data has been collected with the use of an online questionnaire administered to the HR departments of different companies in the Netherlands, Europe and worldwide. The questionnaire was addressed to the human resource directors or managers in charge of deciding which selection methods are being used within his or her organization (Piotrowski and Armstrong, 2006). As it is always desirable to generate the largest sample size to reduce margins of error, different channels of data collection were used. An online tool (Qualtrics.com) was used where respondents were asked to answer the questions. The questions were kept short and limited to help increase the response rate. For a complete overview of the questionnaire, see appendix A.

A test phase was set up in order make sure the questionnaire was suitable for distribution. A total of nine different respondents pilot tested the questionnaire, of which five were within the target audience (HR managers). The feedback provided by the test respondents was mainly positive, only small adjustments were made to the questionnaire (e.g. improving sentence structure).

The questionnaire was sent to the professional HR organisation European Association for People Management (EAPM), to ask for their help with administering the questionnaire among their member organisations. The EAPM did not reply to our requests. As all individual members were listed on the EAPM website, the member organisations of the EAPM were addressed

individually. From the 25 member organisations of the EAPM, two replied and were willing to post our call for participation in our research (CyHRMA from Cyprus and HENRY from Finland). The organisations were asked to add a small description of this research and the link to the online questionnaire in their digital newsletter.

Dutch HR organisations were also addressed to help with the call for participation. Of the five organisations, IntermediairPW and HRbase.info were willing to help. A call was posted on the websites of IntermediairPW and HRbase.info as well as in their weekly newsletters.

As a final method of collection, the online HR group of LinkedIn was addressed (Linked:HR, 800,000 members worldwide). After granting us permission to use their online platform, the call for participation was posted online weekly for a several weeks.

3.2 Descriptive statistics

Despite the numerous data collection channels and efforts, the questionnaire has only been fully completed *57* times. After cleaning the data files of outliers, illogical and missing data, (to complete missing date, the Hotdeck imputation was used as described by Meyers (2011), the sample size decreased to *n=53*. Out of these *53* respondents, *22* were male (*41.51%*) and 31 were female (*58.49%*). Of the sample size, *45* respondents (*84.91%*) indicated to have a university Master's degree of higher, of which *4* (7.*55%*) indicated to have a Doctor of Philosophy (Ph.D.) degree. From the highest level of education completed, *16* respondents (*30.19%*) indicated that their degree was not related to the HR field, *25* respondents (*47.17%*) indicated that their degree was somewhat related to the HR field and *12* respondents (*22.64%*) indicated that their degree was completely related to the HR field. The geographical distribution of the respondents company's was as follows: *18* respondents (33.96*%*) had their company located in Cyprus, *18* respondents (*33.96%*) were located in Finland, 11 respondents (*20.75%*) were located in the

Netherlands, *3* (5.*66%*) in the United States of America and *1* (1.*89%*) from Greece, *1* from Spain and *1* from Switzerland.

The most used and most influential selection methods out of the 53 respondents were the unstructured interview (*16/53, 30.19%)* and the GMA test (*16/53, 30.19%).* The experience in years of the applicant was selected as the most influential selection method in 7 out of 53 cases (*13.21%)* and the knowledge test was selected 3 out of 53 cases (*5.66%).*

3.3 Variables

The variable 'the managerial selection method(s) used' was assessed by providing the respondent with sixteen out of the nineteen selection methods used by Schmidt and Hunter (1998), two selection method were taken out: Training and Experience (T&E) behavior consistency method and the T&E point method, as they are believed to be irrelevant for this research as no evidence that these two methods are still (widely) used was found in the literature. One method from Schmidt and Hunter (1998) has been taken out as it is only applicable to selection within an organization (peer ratings) e.g. for promotion purposes. Two selection methods were added, adapted from the research conducted by Ryan et al. (1999): the physical ability test and the foreign language test, totalling the number of selection methods to eighteen. Each selection method was accompanied by a brief explanation what it entails. See appendix B for an overview of the selection methods used by Schmidt and Hunter. Each selection method was evaluated using a dichotomous variable; respondents were asked to state whether they use the selection method (coded as 1) or not (coded as 0). If a respondent selected two or more selection methods, a follow-up question asked the respondent to indicate how much weight is given to each of the selection methods (using a slider appearance) in the final selection decision, where the total had to equal 100%.

Level of education was measured by asking respondents to state their highest level of education, by giving them seven levels of education to choose from: Elementary school (1), High school (2), Intermediate vocational education (3), Higher vocational education (4), University education - Bachelor (5), University education - Master (6) and Doctor of Philosophy (Ph.D.) (7). The respondents were also asked if their education is related to the field of HR using a three point scale (not at all related, somewhat related and completely related to HRM). Years of work experience was measured using a drop down menu, where respondents could select the years and months of work experience.

The variable 'time spent reading academic literature' was measured by asking respondents how much time they spent reading academic journals or periodicals by using a five point scale adapted from Rynes et al. (2002). The following scale was used (the time indications were added to give a clearer overview for the respondents): (1) never, (2) rarely – once a year, (3) sometimes – once every three months, (4) usually – once a month and (5) always - once every two weeks or more. A follow-up question asked respondents (those who had answered with rarely or more) which periodicals they read. A list was presented which contained most HR journals and periodicals, the list was adapted from Rynes et al. (2002).

Annual budget was measured using a semi-closed question where respondents could fill in the annual HR budget. Using an open question (numbers only), respondents were asked to state the approximate number of full time employee equivalents (FTE's) in the organisation as well as the number of FTE's in the HR department. The average selection ratio of the managerial selection procedure started with a brief explanation of the term selection ratio. The variable was measured using a slider, respondents could use the slider to indicate the selection ratio between 0 and 1.

The question whether or not the company outsources its personnel selection activities, was assessed using the five point scale adapted from Ordanini and Silvestri (2008, pp. 380-381): (1) – the personnel selection process is not outsourced; (2) – only the job seeking and advertising are outsourced, and the service provider acts as a mere collector of candidates; (3) – the service provider also handles the pre-screening phase and the management of curricula database by checking the level of fit between curricula and firms requirements; (4) – the firm also outsources the design of the selection procedure, and the service provider realizes the first step of candidate selection; (5) – the entire selection process is outsourced.

Several control variables were added to the questionnaire. These include questions on age, gender, job title, country and industry type. In line with the research done by Ordanini and Silvestri (2008), a dichotomous variable was added to assess if the company is part of a business group controlled by a parent company (coded as 1) or if the company is independent (coded as 0). Research has indicated that companies belonging to a business group tend to have less freedom in managing their HR activities. Therefore, if respondents indicated that they belong to a business group, a follow-up question was added that asked the respondent if the selection design is centrally organized by the parent organization or not. A question was added to check if the respondent is actually in charge of deciding which selection method(s) are being used within their organization. The final control variable was the size of the HR department in terms of the number of full-time employee equivalents (FTE). See Appendix C for a full overview of the questionnaire used.

In order to answer the hypotheses, the data on selection methods was used to obtain the predictive validity coefficients as found in meta-analyses (Schmidt and Hunter, 1998) on this topic. Research has shown that predictive validity of GMA coefficients tend to be the

generalizable over different countries (Bertua, Anderson and Salgado, 2005; Salgado, Anderson, Moscoso, Bertua and De Fruyt, 2003, Salgado and Anderson, 2003).

The questionnaire asked respondents to indicate to what extent each of the selection methods used contribute to the final decision making process. From the weights given to each selection method, the selection method with the highest contribution (the most influential selection method) was used for the data analysis. All questionnaire responses were anonymous. The data were analyzed using the data-analysis program SPSS.

4. Results

Using statistical analysis, the results retrieved from the data for the hypotheses are presented in this section. First some general statistics will be presented and then each of the hypotheses and their statistical results will be presented individually.

4.1 Hypotheses testing

All variables used to test the six hypotheses, are presented in the correlation matrix below (table 1). As can be seen in the table, only level of education has a significant correlation with the predictive validity of the most influential selection method used.

Table 1. Scale means, SD's and Intercorrelations

	Mean	SD	1	2	3	4	5	6	7	8
1. Predictive validity	0.38	0.13	(-)							
2. Number of FTE	1,178.94	2,713.32	.084	(-)						
3. HR Budget	6,961,641.51	23,157,096.03	.086	-.061	(-)					
4. Level of outsourced HR	1.40	0.88	-.225	-.159	-.030	(-)				
5. Selection ratio	0.17	0.18	.139	.103	.161	-.047	(-)			
6. Read academic journals	4.28	2.94	.011	-.069	-.013	-.066	-.074	(-)		
7. Work experience (in years)	146.02	108.31	.160	.189	-.118	.046	-.012	.095	(-)	
8. Level of education	5.81	0.81	.234	.049	-.045	.133	.273	.185	.291	(-)

Note: Correlations greater than r = (.23) are significant at p < .05 (one tailed)

For the first hypothesis (1a), the Pearson correlation test, as presented in table 1, was conducted to investigate the relation between the level of education (EDU) and the predictive validity of the most influential selection method used (PV). There was a statistically significant difference between the two variables at the $p < .05$ level; r = .234, n = 53, p = .046. Support was found for

hypothesis 1a, as a significant difference was present, the null hypothesis was rejected. However, the effect size of a correlation of .234 is considered small (Cohen, 1993).

A regression analysis (using 'Process' by Hayes, 2013) was also conducted to investigate the relation between EDU, with the level of HR education of the HR manager (EDUHR) as a moderator, and the predictive validity of the most influential selection method used (PV); hypothesis 1b. The total variance explained by the model was 7.64 %, F (3, 49) = 1.3505, p = .2689. The regression analysis, using EDUHR as a moderator, showed no support for hypothesis 1b, as no significant interaction was present; the null hypothesis was not rejected.

For hypothesis 2, the Pearson correlation test, as presented in table 1, was conducted to investigate the relation between the work experience of the HR manager in the HR sphere (EXP) and the predictive validity of the most influential selection method used (PV). There was no statistically significant difference between the two variables at the $p < .05$ level; r = .160, n = 53, p = .127. No support was found for hypothesis 2, as no significant interaction was present, the null hypothesis was not rejected.

Hypothesis 3 was tested using the Pearson correlation test, as presented in table 1, to investigate the Time spent on reading academic literature by the HR manager (RJ) and the predictive validity of the most influential selection method used (PV). There was no statistically significant difference between the two variables at the $p < .05$ level; r = .011, n = 53, p = .468. No support was found for hypothesis 3, as no significant interaction was present, the null hypothesis was not rejected.

For hypothesis 4 the Pearson correlation was conducted to investigate the relation between the number of employees (FTE) and the predictive validity of the most influential selection method used (PV). There was no statistically significant difference between the two

variables at the $p < .05$ level; r = .084, n = 53, p = .276. A regression analysis (using 'Process' by Hayes, 2013) was also conducted to investigate the relation between FTE, with the budget available for selection methods (BUDGET) as a mediator, and the predictive validity of the most influential selection method used (PV). The total variance explained by the model was 1.53 %, F (2, 50) = .3872, p = .6810. The Pearson correlation and the regression analysis showed no support for hypothesis 4, as no significant interaction was present; the null hypothesis was not rejected.

For hypothesis 5 the Pearson correlation test was conducted, to investigate at the managerial selection ratio (SR) and the predictive validity of the most influential selection method used (PV). There was no statistically significant difference between the two variables at the $p < .05$ level; r = .139, n = 45, p = .161. No support was found for hypothesis 5, as no significant interaction was present, the null hypothesis was not rejected.

The Pearson correlation, as presented in table 1, was conducted between the level of personnel selection process that was outsourced (OUTSOURCED) and the predictive validity of the most influential selection method used (PV) to find support for Hypothesis 6. There was no statistically significant difference between the two variables at the $p < .05$ level; r = -.225, n = 45, p = .052. No support was found for hypothesis 6, as no significant interaction was present, the null hypothesis was not rejected.

4.2 Regression

To further investigate the relations between the dependent variable (PV) and the independent variables as presented in figure 4, a regression analysis was used. The six variables were added to the regression model. The model did not reveal any significant results, F (6, 46) = 1.229, p = .309. By looking at the correlation quotations, a regression model was set up yielding a

significant result. The two variables EDU and OUTSOURCED were added to the model to predict the level of the predictive validity. The total variance explained by the model was 12.2%, F (2, 50), p = .039. Out of the two variables, the EDU variable showed a statically significant result (beta = .268, p = .50). The OUTSOURCED variable showed a marginally significant beta of -.261 with p = .057.

5. Discussion

This section will discuss the results as presented above and provide an overview of the supported hypotheses. Implications for theory and for the real-world practice are discussed and further research possibilities are presented.

Hypothesis 1a tested the relation between level of education and the predictive validity of the most influential selection method used (PVMISM). The analysis of the data showed support for hypothesis 1a. The correlation found for hypothesis 1a showed a small to medium effect size (r = *.234*) in the relation between the level of education and the predictive validity of the most influential selection method used. This is in line with research conducted by Le, Oh, Shaffer and Schmidt (2007), Rynes, Brown and Colbert (2002) and Terpstra and Rozell (1997).

When looking at the independent variable - the predictive validity of the most important selection method used - one could also argue that this can be seen as an indicator of job performance of the HR manager in charge. With this in mind, the result found for hypothesis 1a is in line with the research conducted by Schmidt and Hunter (1998). Their research showed a small effect size between level of education and job performance. The hypothesized moderator - the level of education related to HR – did not show a significant result.

Hypothesis 2 till 6 were set up to test the link between the following independent variables: years of work experience (H2), time spent reading academic literature (H3), number of employees in the organisation, the managerial selection ratio (H4) and the level of the personnel selection process that is outsourced (H5) and the dependent variable PVMISM. Hypothesis 2 till 6 had to be rejected.

In line with research done by Schmidt and Hunter (2004), Schmidt, Hunter and Outerbridge (1986) and Terpstra and Rozell (1997), a relationship was expected between years of work

experience and the PVMISM (Hypothesis 2). However the data analysis did not reveal any significant results.

In hypothesis 3 it was hypothesized that HR managers that spend more time reading academic journals will choose a selection method with a higher predictive validity than HR managers that spend less time reading academic literature. The analysis of the data showed no significant link between the two variables. The mean of 4.28 (out of five) for the variable time spend reading academic journals, shows that a large number of respondents do read academic literature. Out of the 53 respondents, twelve respondents (*22.6%)* indicated that they read academic journals (pertaining to HR) once a month (4/5) and twenty respondents (*37.7%*) indicated that they read academic journals every two weeks (5/5). This is in contradiction with the research conducted by Nowicki and Rosse (2002), who found that managers are not aware of research and theory that might be helpful to their organization, and with Rousseau (2006), who points out that less than one percent of HR managers read the academic literature regularly. Even though the majority of the respondents in the current sample do indicate to read the academic literature, this does not reflect in the predictive validity of the selection method chosen as the most influential within their organization. The presented finding could be attributed to the restricting in range in the sample. As the sample size is rather small, not a great diversity of respondents would have been likely to complete the questionnaire (as shown in the number of countries participating). It is most likely that similar respondents would have completed the questionnaire (e.g. respondents all reading similar journals). A wider range of respondents, resulting in a larger sample size, could attribute to more generalizable findings.

The number of employees (FTE) within an organization was expected to positively influence the predictive validity of the most influential selection method, as set out in hypothesis 4. With

the available budget as a mediator between the FTE and the PVMISM. As the correlation between the available budget and the number of FTE showed a value of -.061, the mediating effect was already expected not to be present. The data analysis showed that there was no significant correlation between the number of FTE and the PVMISM and no significant correlation between the available budget and PVMISM. As discussed in the results section, the regressions analysis using available budget as a mediator (using Process by Hayes, 2013) showed no significant results.

For hypothesis 5 a relation was expected between managerial selection ratio and the PVMISM. The data analysis showed no significant correlation between the two variables.

Hypothesis 6 was set up to explore the link between the level of the personnel selection process that was outsourced and the PVMISM. The data analysis showed only moderate significant results at $p = .052$ with a correlation of -.225. When we ignore the slight insignificance, the result would indicate that the more an organization outsources their selection process, the lower the predictive validity of the most influential selection method would be. This in contradiction to the expected relation between the two variables. As Ordanini and Silvestri, (2008) describe, outsourcing personnel selection functions should increase the predictive validity as most external recruitment and selection agencies have more specialized market expertise. The current finding could be due to a restricting in range in the sample. Given the small sample size, the results could be subject to range restriction.

Hypotheses 2 to 6 showed insignificant results. The insignificant results can mainly be attributed to the lack of a sufficient sample size. The sample size of 53 was not sufficient to generate generalizable results. Despite numerous efforts to gather a sufficient data sample size

and the different channels of collection used - nationally (the Netherlands) and internationally (Linked:HR, EAPM) - there was a disappointing return in the number of respondents. The lack of respondents could be due to the fact that the questionnaire was quite extensive. It required about fifteen minutes to complete the questionnaire fully.

Another possible reason for the disappointing return could be the fact that no incentive was given to complete the questionnaire. When realizing that the response rate was low, it was decided raffle an IPad in order to increase the response rate. However, the IPad raffle was hosted through Linked:HR who did not approve of any incentives given on any call for research participation hosted trough their channel.

A limitation to the current research is the research design in selection the most influential selection method. Respondents were asked to give weights to the different selection methods used, reflecting the percentage of influence of the particular selection method in the overall selection process. As it is hard to measure the level of weight of a selection method in the overall process, the first limitation comes from this. A second limitation to the current research is the fact that the research focusses just on one selection method, whereas most organizations nowadays use a more than one selection methods in the overall selection process. The initial research design was set up to look at the overall predictive validity of all selection methods used within an organisation. However, due to the lack of reported inter-correlations between the different selection methods used in the current research (as published in the current academic literature), the research design was amended to the predictive validity of the most influential selection method.

The implications of the current findings are that the results form a basis of a more in depth research into the possible relations between the different independent variables as presented in this research and the predictive validity of the selection methods used by organizations.

Hypothesis 1 showed significant results and a small to medium effect size between level of education and the PVMISM. This in line with research conducted on the relationship between level of education and knowledge (Le, Oh, Shaffer and Schmidt, 2007; Rynes, Brown and Colbert, 2002; Terpstra and Rozell, 1997). The current results show new insights into the direct relation between level of education and the predictive validity. As little to no research is available on this direct link, the current results could form an incentive for more elaborate research into the possible relation between these two variables. On top of that, the result for hypothesis 1 could also be seen as in line with research conducted by Schmidt and Hunter (2004), who argue that job knowledge is the key predictor for job performance. The higher the level of education, the more capable a person could be to understand the literature on selection methods (Terpstra and Rozell, 1997), the more knowledge this person has, the better the job performance, the higher the predictive validity of the selection methods used can be.

On a more practical side, the results found on hypothesis 1 could indicate that when hiring a new HR manager, the level of education of this applicant could be valuable information.

The slightly insignificant result found between the level of outsourced personnel selection processes and the PVMISM is not in line with the academic literature (Kwiatkowski, 2003; Robertson and Smith, 2001; Ordanini and Silvestri, 2008). This calls for a more elaborate and in depth research into the value of outsourcing personnel selection processes. The results found are, however, not generalizable due to the insignificance and the small sample size used. Therefore the need for more research on this link is deemed necessary.

As most hypotheses showed insignificant results, not much can be said about the theoretical of practical implications. More research on the possible relation between de dependent variable and the independent variables will be necessary, using a larger sample size. A larger sample size could perhaps be generated by providing a shorter questionnaire (a few respondents indicated that the questionnaire took a long time to complete) and by looking at new options for data collection channels. With an increased budget (the current investigation had limited to no budget available) the data collection could include (greater) incentives and possibly the use of professional data collection companies.

On top of that, future research could be expanded to include the overall predictive validity of all selection methods used by organizations. By looking at the weighed correlations of all selection methods used, more precise research outcomes can be generated that have a greater impact. As calculating the overall predictive validity does require all inter-correlations of the selection methods used, this research set-up could require more extensive research and would require a great deal of time. However, the results could have a greater generalizability, utility and validity. Most of the inter-correlations between the different selection methods have been found to be unavailable in the current academic literature. New research is needed to investigate the inter-correlations between the different selection methods, in order to calculate the overall predictive validity of combined selection methods. In line with Cucina, Gast and Su (2012) a call is made to increase the number of studies on this new, unexplored and apparently unfashionable topic. More research on inter-correlations between selection methods and on focussing attention to factors influencing the choice of the selection methods used in organisations is needed.

The research conducted also provides us with an insight into the selection methods used nowadays. The results show that the use of GMA is at the same level as the use of the unstructured interviews. Cooper and Robertson (1995) and Taylor (2005) argue that the unstructured interview is the most widely used selection method. The current result shows that the use of GMA is at the same level as the use of the unstructured interview, possibly implying a shift in the use of selection methods and GMA specifically. More research into the use of the different selection methods nowadays is suggested.

6. Conclusion

The current research was set up to explore the relation between six different independent variables: the level of education of the HR manager, work experience of the HR manager, time spent reading academic literature, number of employees in the organisation, the managerial selection ratio and the level of the personnel selection process that is outsourced and the depended variable: predictive validity of the most influential selection method used. Out of the six hypotheses that were set up, only the level of education proofed to have a significant (small) positive effect on the predictive validity of the most influential selection method used. The result on this hypothesis indicates that the higher the level of education of the HR manager, the higher the predictive validity of the most influential selection method can be. This could imply that hiring a HR manager with a higher level of education could proof to be beneficial for the predictive validity of the selection methods used.

The lack of support found for the hypotheses can be attributed to the small sample size. Despite numerous data collection effort, the sample size of 53 proved to be too small to generate generalizable results. Future research should focus on generating a larger sample size, which will lead more generalizable and utile results. With the review of the relevant literature in mind, the expectation remains that the hypotheses can find significant support.

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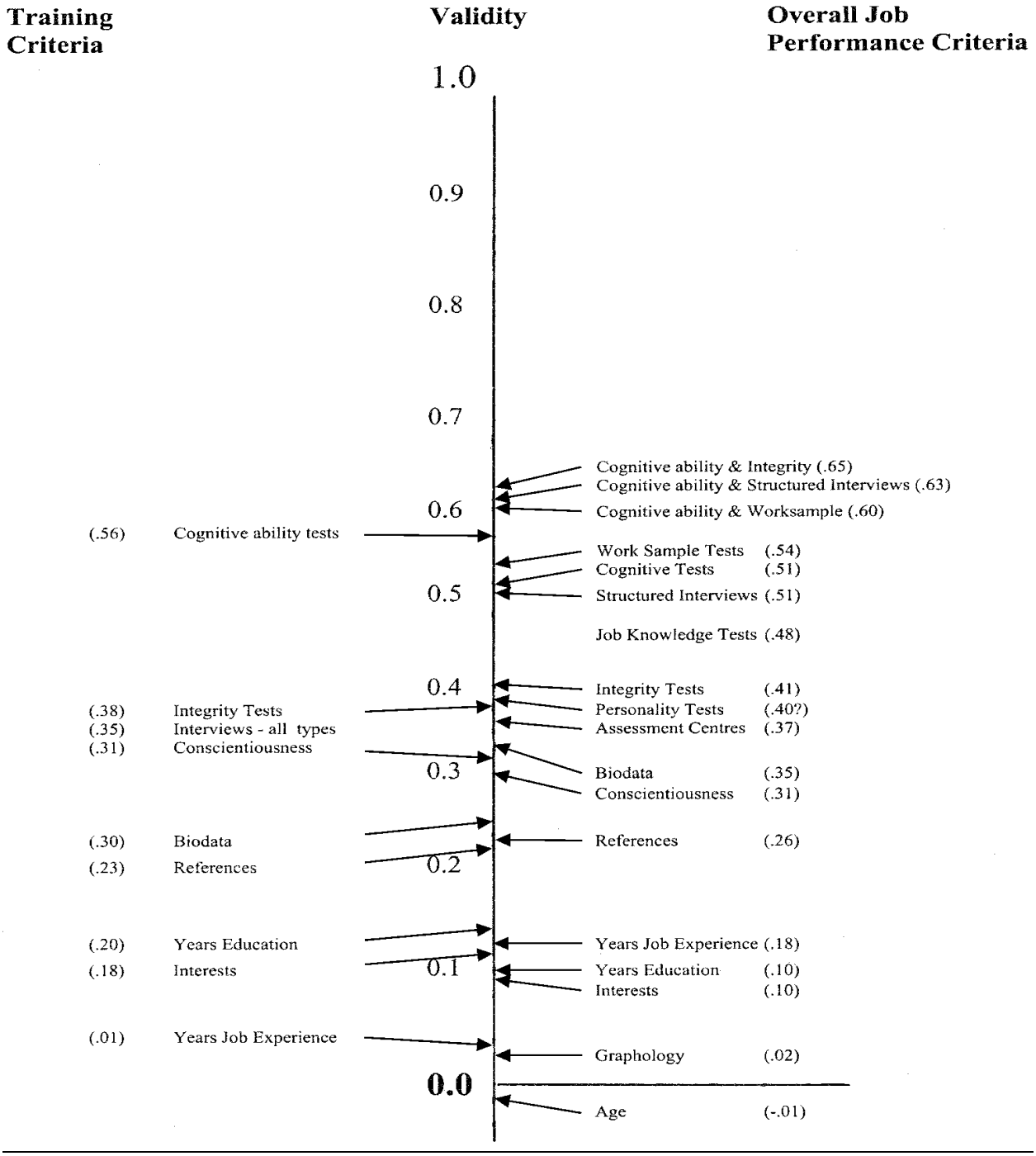
8. Appendices

8.1 Appendix A



Appendix A: Accuracy of selection methods (Robertson and Smith, 2001, p. 443)

8.2 Appendix B

Table 1

Predictive Validity for Overall Job Performance of General Mental Ability (GMA) Scores Combined With a Second Predictor Using (Standardized) Multiple Regression

Personnel measures	Validity (r)	Multiple R	Gain in validity from adding supplement	% increase in validity	Standardized regression weights	
					GMA	Supplement
GMA tests[a]	.51					
Work sample tests[b]	.54	.63	.12	24%	.36	.41
Integrity tests[c]	.41	.65	.14	27%	.51	.41
Conscientiousness tests[d]	.31	.60	.09	18%	.51	.31
Employment interviews (structured)[e]	.51	.63	.12	24%	.39	.39
Employment interviews (unstructured)[f]	.38	.55	.04	8%	.43	.22
Job knowledge tests[g]	.48	.58	.07	14%	.36	.31
Job tryout procedure[h]	.44	.58	.07	14%	.40	.20
Peer ratings[i]	.49	.58	.07	14%	.35	.31
T & E behavioral consistency method[j]	.45	.58	.07	14%	.39	.31
Reference checks[k]	.26	.57	.06	12%	.51	.26
Job experience (years)[l]	.18	.54	.03	6%	.51	.18
Biographical data measures[m]	.35	.52	.01	2%	.45	.13
Assessment centers[n]	.37	.53	.02	4%	.43	.15
T & E point method[o]	.11	.52	.01	2%	.39	.29
Years of education[p]	.10	.52	.01	2%	.51	.10
Interests[q]	.10	.52	.01	2%	.51	.10
Graphology[r]	.02	.51	.00	0%	.51	.02
Age[s]	−.01	.51	.00	0%	.51	−.01

Appendix B: Adapted from Schmidt and Hunter (1998, 265)

8.3 Appendix C: Questionnaire

Dear participant,

Welcome and thank you for participating in this large scale investigation on managerial personnel selection methods in Europe. This research is being conducted by a research team at the University of Amsterdam Business School consisting of Peter van der Linden and Dr. Stefan T. Mol. For both Peter this research project represents the final requirement to be met towards obtaining their Master's degree so we really appreciate your help!

Organizations make choices when it comes to deciding which method(s) to use for managerial personnel selection, and sometimes these choices appear to be at least somewhat at odds with the latest academic insights on this topic. The current project is aimed at investigating the real-world issues (such as for instance budgetary limitations, organizational politics, or local insight) that may form reason for selection decision makers to rely on selection methods other than those that would be prescribed by academics. In addition, this research is aimed at getting an overview of the managerial personnel selection methods used in organizations nowadays.

We highly appreciate your participation on this research and your willingness to fill in this questionnaire. In doing this research we are bound by the ethical guidelines set forth by NIP, the Dutch professional association of psychologists (Nederlands Instituut van Psychologen). These ethical principles determine to respect the dignity and worth of all people, and the rights of individuals to privacy, confidentiality, and self-determination. It would be greatly appreciated if you could complete the questionnaire within 7 days. We would like to kindly request you to read the questions carefully and answer by clicking on or filling in the right answer(s). If you are not sure about an answer to a question, or the required data is unavailable, please provide your best estimate of what the answer could be. All questions pertain to managerial selection, with which we mean the selection procedure used to select managers. We define 'manager' as an individual who is in charge of a certain group of tasks or a certain subset of a company and who is held accountable for and adds value to the work of his or her subordinates.

We are aware of the fact that we ask quite a few questions and are very grateful for your participation. Please do not hesitate to contact us using the e-mail address listed below in case you have any questions.

With kind regards,

Peter van der Linden
Nihan Kutahnecioglu
Dr. Stefan T. Mol
Email address: OB-Research-ABS@uva.nl

1. Which of the following personnel selection methods do you use for managerial selection?

- ❑ General Mental Ability Tests: assessing an applicant's level of intelligence.
- ❑ Work Sample Tests: testing ability by giving the applicant a sample of typical work to do and evaluating their performance.
- ❑ Integrity Tests: assessing whether the honesty of the potential candidate is acceptable with respect to issues as theft and counterproductive behavior.
- ❑ Conscientiousness Tests: : A personality characteristic that includes such elements as self-discipline, carefulness, thoroughness, self-organization, deliberation (the tendency to think carefully before acting), and need for achievement.
- ❑ Level of Education: selection on the basis of the applicant's level of education.
- ❑ Structured Employment Interview: a standardized interview that ensures that each interviewee is presented with exactly the same questions in the same order.
- ❑ Unstructured Employment Interview: an employment interview with an open format, in which questions are asked as they arise during the course of the interview.
- ❑ Job Knowledge Tests: measuring one's mastery of the concepts needed to perform the job in question.
- ❑ Years of Education: selection on the basis of years of education.
- ❑ Job tryout Procedure: applicants are hired with minimal screening and their performance on the job is observed and evaluated for a certain period of time.
- ❑ Reference Checks: evaluations of performance or potential made by the applicant's previous employer.
- ❑ Job Experience (years): the number of years of previous experience on the same or similar job.
- ❑ Interest: selection on the basis of an applicant's interests or hobbies.
- ❑ Biographical Data Measures: Biographical data measures contain questions about past life experiences, such as early life experiences in one's family, in high school, and other pursuits. For example, there may be questions on offices held in student organizations, or on sports one participated in.
- ❑ Physical Ability Test: testing the applicant's level of physical ability.
- ❑ Assessment Centers: An assessment center employs a variety of techniques and multiple observers in a closed setting to evaluate candidates in such exercises as leaderless group discussions and business games.
- ❑ Graphology: handwriting analysis.
- ❑ Foreign Language Test: testing the applicant's mastery of a foreign language.

2. Please indicate to what extent each of these selection methods contribute to the final decision making process. For instance in case your selection process consists of a general mental ability test and a conscientiousness test that are weighed equally in reaching the final decision you can

select 50% for each method. You can provide your answer by using the slider to indicate the weight of each selection method in the final decision. The total must be 100 per cent.

-

3. Does your firm belong to a business group or can it be considered to be an independent entity? (With business group, we refer to a constellation of subsidiaries under the control of a parent organization)

- ❍ Business group
- ❍ Independent entity

4. You have indicated that your firm belongs to a business group. Is the managerial selection process design centrally organized within the business group or do you design your own personnel selection process (the personnel selection design is organized on organization level)?

- ❍ Personnel selection design centrally organized within the business group
- ❍ Personnel selection design organized on organization level

5. Please indicate which is at present the number of full-time employee equivalents (FTE's) in your firm (If the firm belongs to a business group, please refer to the employees in the subsidiary only). If you are not sure about the answer to this question, or the required data is unavailable, please provide your best estimate of the number of FTE's.

-

6. Please indicate which is at present the number of full-time employee equivalents (FTE's) within the HR department of your firm. If you are not sure about the answer to this question, or the required data is unavailable, please provide your best estimate of the number of FTE's.

-

7. Please indicate the annual human resources budget available within your organization (in rounded Euros). If you are not sure about the answer to this question, or the required data is unavailable, please provide your best estimate of the annual human resources budget.

-

8. Is the managerial personnel selection process outsourced to an external service provider?

- ❍ The personnel selection process is not outsourced
- ❍ Only the job seeking and advertising are outsourced, and the service provider acts as a mere collector of candidates
- ❍ The service provider also handles the pre-screening phase and the management of the curricula database by checking the level of fit between curricula and firm requirements
- ❍ The firm also outsources the design of the selection procedure, and the service provider realizes the first step of candidate selection
- ❍ The entire selection process is outsourced

9. What is the average managerial selection ratio? - The selection ratio is the number of applicants hired divided by the total number of applicants per vacancy. For example, if 100 people apply to a vacancy and only 1 is hired, the selection ratio is 1/100= 0.01. If 5 people apply to a vacancy and 4 people are hired the selection ratio is 4/5= 0.8.

_____ Managerial selection ratio

10. Do you attend human resources lectures, conferences, master classes or conventions?

- ❍ Never
- ❍ Rarely (once a year)
- ❍ Sometimes (once every 3 months)
- ❍ Often (once a month)
- ❍ All of the Time (every 2 weeks)

11. Do you read academic journals or periodicals pertaining to Human Resource Management?

- ❍ Never
- ❍ Rarely (once a year)
- ❍ Sometimes (once every 3 months)
- ❍ Usually (once a month)
- ❍ Always (once every 2 weeks or more)

12. You have indicated that you read academic journals or periodicals. Which periodicals do you read?

	Rarely (once a year)	Sometimes (once every 3 months)	Usually (once a month)	Always
Human Resource Magazine	❍	❍	❍	❍
Wall Street Journal	❍	❍	❍	❍
HR Focus	❍	❍	❍	❍
Human Resource Executive	❍	❍	❍	❍
Human Resource Management Journal	❍	❍	❍	❍
Workforce	❍	❍	❍	❍
Business Week	❍	❍	❍	❍
Fortune	❍	❍	❍	❍
Forbes	❍	❍	❍	❍
Harvard Business Review	❍	❍	❍	❍
Human Resource Planning Journal	❍	❍	❍	❍
Inc.	❍	❍	❍	❍
Fast Company	❍	❍	❍	❍
Personnel Psychology	❍	❍	❍	❍
Journal of Applied Psychology	❍	❍	❍	❍
Academy of Management	❍	❍	❍	❍

Executive Academy of Management Journal	❍	❍	❍	❍
Other (please specify)	❍	❍	❍	❍

13. What methods do you use to solve the HR problems that your company faces?

	Rarely or never	A few times per year	About once a month	Several times per month	Almost daily
Consulting other HR professionals in my organization	❍	❍	❍	❍	❍
Consulting the SHRM Web site	❍	❍	❍	❍	❍
Consulting other Web sites	❍	❍	❍	❍	❍
Consulting HR research literature	❍	❍	❍	❍	❍
Consulting HR professionals in other organizations	❍	❍	❍	❍	❍
Consulting consultants	❍	❍	❍	❍	❍
Consulting academics	❍	❍	❍	❍	❍

14. Please answer the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
I wish I had more time to read about academic HR research findings.	❍	❍	❍	❍	❍	❍
Most research findings make sense in theory, but don't work well in practice.	❍	❍	❍	❍	❍	❍
I would like to spend more time talking with academics about HR problems.	❍	❍	❍	❍	❍	❍
I generally don't find academic HR research to be very useful.	❍	❍	❍	❍	❍	❍
I often wish I could call an academic to help me solve HR problems.	❍	❍	❍	❍	❍	❍

15. In this company...

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
...there needs to be a hierarchy of authority in our society.	❍	❍	❍	❍	❍	❍
...inequality of status among individuals is not acceptable in our society.	❍	❍	❍	❍	❍	❍
...one should always obey the person in authority.	❍	❍	❍	❍	❍	❍
...people having authority should be respected because of their position.	❍	❍	❍	❍	❍	❍
...there is no difference among managers and employees in this company.	❍	❍	❍	❍	❍	❍
...except for the legal obligations (salary, office, etc.) employees see themselves as equals with managers.	❍	❍	❍	❍	❍	❍
...managers make decisions according to their superiors' preferences.	❍	❍	❍	❍	❍	❍
...employees can easily enter their managers' rooms.	❍	❍	❍	❍	❍	❍
...it is really important to show respect for managers.	❍	❍	❍	❍	❍	❍
...correspondence comes before face to face meetings.	❍	❍	❍	❍	❍	❍

16. Please answer the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Radical changes are not preferred in this company.	❍	❍	❍	❍	❍	❍
In this company, rules assure employees.	❍	❍	❍	❍	❍	❍
In this company, there are more rules than necessary.	❍	❍	❍	❍	❍	❍
In this company, almost everything depends on the rules.	❍	❍	❍	❍	❍	❍

17. Please answer the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
In this company, employees see interests of the group superior than their individual interests.	❍	❍	❍	❍	❍	❍
In this company, employees see themselves as autonomous individuals in the workplace.	❍	❍	❍	❍	❍	❍

18. In our culture...

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
...even when the demands of one's in-group (family, relatives, close friends) are costly, one has to stay with it.	❍	❍	❍	❍	❍	❍
...one is expected to be loyal to his or her community even if one is inconvenienced by the demands of the community.	❍	❍	❍	❍	❍	❍
...one has to be loyal to his/her community if one seeks their support and protection.	❍	❍	❍	❍	❍	❍
...group interests take precedence over personal interests.	❍	❍	❍	❍	❍	❍

19. What is your job title?

- ❍ Human Resources Manager
- ❍ Director of Human Resources
- ❍ Human Resources Director
- ❍ Employee Benefits Manager
- ❍ Human Resources Vice President
- ❍ Employee Relations Manager
- ❍ Human Resources Assistant
- ❍ Human Resources Specialist
- ❍ Human Resources Coordinator
- ❍ Human Resources Associate
- ❍ Human Resources Consultant
- ❍ Other (please specify): _____

20. Are you in charge of deciding which managerial selection methods are used within your organization?

- ❍ No
- ❍ Yes

21. How many years of work experience do you have in the human resource management field?

- Number of years
- Number of months

22. What is the highest level of education that you have completed?

- ❍ Elementary school
- ❍ High school
- ❍ Intermediate vocational education
- ❍ Higher vocational education
- ❍ University education - Bachelor
- ❍ University education - Master
- ❍ Doctor of Philosophy (Ph.D)

23. Is the highest level of education you have completed in the human resource management (HRM) field?

- ❍ Not all related to HRM
- ❍ Somewhat related to HRM
- ❍ Completely related to HRM

24. What year were you born?

-

25. What is your gender?

- ❍ Male
- ❍ Female

26. In which country is the company you work at located?

-

27. In which industry is the organization your work for active?

- ❍ Forestry, fishing, hunting or agriculture support
- ❍ Mining
- ❍ Utilities
- ❍ Construction
- ❍ Manufacturing
- ❍ Wholesale trade
- ❍ Retail trade
- ❍ Transportation or warehousing
- ❍ Information
- ❍ Finance or insurance
- ❍ Real estate or rental and leasing
- ❍ Professional, scientific or technical services
- ❍ Management of companies or enterprises
- ❍ Admin, support, waste management or remediation services
- ❍ Educational services
- ❍ Health care or social assistance
- ❍ Arts, entertainment or recreation
- ❍ Accommodation or food services
- ❍ Other services (except public administration)
- ❍ Unclassified establishments
- ❍ Public sector

This is the end of the survey. Thank you for taking the time to complete this survey. We really appreciate your help. If you would like more information on this research, you can contact us via email: OB-Research-ABS@uva.nl

Peter van der Linden

Dr. Stefan Mol