Decision making in personnel selection: A policy-capturing analysis in emerging German IT-firms

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List of acronyms and abbreviations

AC	Assessment Centre
AG	Aktiengesellschaft (German public limited company)
AGG	Allgemeines Gleichbehandlungsgesetz (German General Equal Treatment Act)
ANOVA	Analysis of Variance
ASA	Attraction-Selection-Attrition
AT&T	American Telephone and Telegraph Company
BEI	Behavioural Event Interview
BITKOM	Bundesverband Informationswirtschaft, Telekommunikation und neue Medien (German association for information technology, telecommunications and new media)
BVDW	Bundesverband der Digitalen Wirtschaft (German association for the digital economy)
CA	Conjoint Analysis
CCG	Cassel Competence Grid
CEO	Chief Executive Officer
CFC	Consideration of Future Consequences
cf.	confer
comp.	competency
Dr.	doctor
Ed(s).	editor(s)
e. g.	exempli gratia (for example)
et. al.	et alii (and others)
etc.	et cetera
EU	European Union
EUR	Euro
f(f).	following page(s)
FFM	Five Factor Model (of Personality)
fig.	figure
GMA (or g)	General Mental Ability

GmbH	Gesellschaft mit beschränkter Haftung (German private limited company)
GPA	Grade Points Average
HLM	Hierarchical Linear Modeling
HR(M)	Human Resource (Management)
i. e.	id est (that is)
I / O psychology	Industrial and Organisational Psychology
IQ	Intelligence Quotient
IT	Information Technology
KSAs	Knowledge, Skills, and Abilities
Max	maximum
MBA	Master of Business Administration
MBTI	Myers-Briggs Type Indicator
Min	minimun
MNC	Multi-National Company
Mr.	Mister
NACE	Nomenclature générale des activités économiques (European classification of economic activities)
n. b.	nota bene (take notice)
NEO-PI	Neuroticism, Extraversion, Openness – Personality Inventory
NTBF	New Technology-based Firms
PC	Psychological Contract
PhD	doctor of philosophy
P-J fit	person-job fit
P-O fit	person-organisation fit
p(p).	page(s)
SD	standard deviation
SME	small and medium-sized enterprise
SPSS	Statistical Product and Service Solution
tab.	table
UK	United Kingdom of Great Britain and Northern Ireland
US(A)	United States (of America)
vs.	versus
yr(s).	year(s)

1 Introduction

1.1 The importance of personnel selection to growing new ventures

Young and small ventures that intend to grow and to enlarge the scope and scale of their activities need to recruit new employees. Both, venture growth and employment growth are closely connected and the latter is usually considered as the major measure of the first (Baum, Locke and Smith, 2001; Rauch, Frese and Utsch, 2005). Staffing a company is a central means to broaden its knowledge base (Zellner and Fornahl, 2002) or to enhance (product) innovation (Rao and Drazin, 2002). Because new ventures do generally have a weaker base of financial resources they do particularly depend on a highly qualified and committed workforce to overcome financial resource constraints (Behrends, 2005). Neiswander, Bird and Young (1987) point out the particular importance that employees hired in an entrepreneurial firm have on the development of that venture. At the early stage of a company, wrong selection of resources or waste through inefficient management may cause the failure of the new venture (McGrath, 1999).

In the general context of staffing, personnel selection plays a special role. Although there is no direct and linear relationship between personnel selection and organisational effectiveness and performance, it is still reasonable to assume that improving personnel selection will lead to improved organisational performance (Kurz and Bartram, 2002). Next to the potential benefits from good selection, there are also less direct costs of poor selection, especially the danger of rejecting good employees who might be hired by direct competitors (Robertson, Bartram and Callinan, 2002a). This economic importance of personnel selection has been laid out drastically by Schmidt and Hunter (1998, p. 263): taking into account the variability of job performance and the selection ratio, they come to the conclusion that—assuming medium job-complexity—an increase in the validity of the hiring methods might lead to an average increase in output per hire of $ 18,000 per year. Consequently, Singh and Crocker (1988,

p. 167) call personnel selection "one of the most important functions in the management of an organization" and other authors equally stress the importance of selection among other HRM functions (e. g. Rees and Doran, 2001).

Kersting (2006) stresses that two major forces will put more and more pressure on the selection system in the near future. Due to demographic changes, we will face a diminishing workforce. In very short time, labour shortages especially in the area of high-potentials will stress the importance of sophisticated selection procedures that operate with a long term focus and help the firm to cover its need for future leaders. In addition to these demographic challenges, legislation puts more and more emphasis on the sophistication of selection procedures.[1]

In this environment, small and young companies often face a twofold problem: the decision makers lack the necessary routine in selection and the firm does not attract a sufficient pool of applicants to choose from, thus the selection decision is often suboptimal (Born and Scholarios, 2005). Additionally, they face particular difficulties in recruitment, as most graduates prefer large, multinational companies to SMEs (Moy and Lee, 2002). Entrepreneurs and small business managers seem to be aware of this challenge as they rate the successful recruitment of qualified employees as one of the key factors influencing success and business growth (Williamson, 2000; Williamson, Cable and Aldrich, 2002). At the same time, they are highly concerned about the ability to attract and retain this workforce (Hornsby and Kuratko, 2003).

1.2 Unanswered questions at the junction of entrepreneurship and personnel selection research

Following these thoughts, staffing and recruitment are promising fields of research at the still underdeveloped junction of human resource management (HRM) and entrepreneurship (Welbourne and Katz, 2002). Heneman and Tansky (2002) call for more research on Human Resource issues in entrepreneurial firms. However, researchers still seem to neglect this importance and tend to focus on studying HR in established organisations rather than in new ventures (Katz, Aldrich, Welbourne and Williams, 2000). Rauch *et al.* (2005, p. 683)

[1] In Germay, for example, the General Equal Treatment Act (Allgemeines Gleichbehandlungsgesetz—AGG) passed in August 2006 stresses that selection must not discriminate on the basis of particular characteristics such as gender, race or age. Thus it becomes more and more important for the selecting companies to describe their criteria very narrowly in order to be able to prove, in case of litigation, that the criteria used to select have been based on rational facts and do not discriminate for any reasons mentioned in the act.

state that "while entrepreneurship research studied human capital of business founders / owners, human capital of employees in small enterprises has been widely ignored."

In their literature review on HRM in small and medium enterprises (SMEs)[2], Cardon and Stevens (2004) identified 15 studies relevant to staffing issues. This number is considerably small compared with the large number of studies conducted on staffing in large and established companies (for a recent review see Ployhart, 2006). Only six out of 15 studies focus on *emerging* companies, while the rest mainly concentrates on small but established firms. The majority of the studies is descriptive and deals with recruiting and attraction practices and methods employed by smaller firms. Compared to large and established companies, SMEs utilise less formalised recruitment practices. Their sources of recruitment are much more based on existing networks, like the founders' families, employee referrals, or university contacts (e.g. Barber, Wesson, Roberson and Taylor, 1999; Bartram, Lindley, Marshall and Foster, 1995; Carroll, Marchington, Earnshaw and Taylor, 1999).

This sparse research left many questions about staffing and selection in small and young ventures unanswered. For example, Dunn, Mount, Barrick and Ones (1995) point out that we need further understanding of the decision policies used in selection and thus investigation into managers' perceptions of the importance of applicant attributes is needed. Graves and Karren (1996) found that interviewer's decision policies and processes are idiosyncratic and that the differences in processes are closely related to selection effectiveness. Hooghiemstra (1992, p. 19) pointed out that "when it comes to people, organisations must improve their decision making dramatically." Thus it is useful to investigate those decision processes. Anderson, Lievens, van Dam and Ryan (2004) state that the question how organisations can select members for highly changeable job roles, newly created jobs, and flexible forms of work organisation is an important issue to be addressed by future research on employee selection. Heffernan and Flood (2000) stated that competence analysis is an important new topic in HRM.

[2] An important problem in this review was the ambiguous use of the term *SME*, as many papers do not distinguish whether they are talking about small or large firms, emerging or established firms, or even small or medium enterprises.

1.3 The German IT industry: A particularly interesting sample for selection research in new ventures

A great deal of research on entrepreneurial new ventures has traditionally centred around the high-technology sector and especially new technology-based firms (NTBFs, e. g. Tether and Storey, 1998; Storey and Tether, 1998; March-Chorda and Yagüe-Perales, 2000; Collinson and Gregson, 2003). These firms "characteristically base their business on exploiting advanced technological knowledge" (Autio and Yli-Renko, 1998, p. 973) and have often shown extraordinary growth rates with respect to employment, sales, or export figures (Storey and Tether, 1998). Information technology (IT) related industries such as electronic data processing equipment, telecommunication equipment, or computer services are usually considered as an important part of this type of firms (Butchart, 1987; Tether and Storey, 1998). Furthermore, the software and electronics industry is, next to biotechnology, usually associated with entrepreneurial business models (Engelhardt, 2004) and mainly consists of small, niche market entrepreneurial ventures (Nowak and Grantham, 2000). Empirical evidence backs up this notion; for example, nearly one third of the firms that went public on the German *Neuer Markt* (the dedicated growth segment on the Frankfurt stock exchange) during its six years of existence from 1997 to 2003 were software and IT-service companies (105 out of 350, Engelhardt, 2004).

Furthermore, the labour market in this particular industry has shown some interesting developments in the last decade: Due to the high growth rates in the last ten to 20 years (Riew, 2006) and the particular boom of the dot-com era in the late 1990s, IT companies industry experienced a dramatic labour shortage (Witt and Burke, 2002; Falk, 2003; Steedman, Wagner and Foreman, 2006; Umesh, Jessup and Huynh, 2007). In 2001, the 'bubble' of the new economy burst and numerous IT professionals suddenly faced unemployment. Nevertheless, the situation has changed again and today, as predicted by some consulting firms (Mikosch, 2004; Nöcker, 2004), the industry faces a threatening shortage of skilled labour (BITKOM, 2007; Umesh *et al.*, 2007). At present, demographic (the exit of the baby boomer generation) as well as behavioural (job-hopping tendencies of the existing IT-workers, especially the highly talented) reasons indicate a tightening labour market in the IT-sector and require new and better staffing techniques (Amaram, 2005). Problems in staffing the firm with properly qualified employees are a major threat to corporate development in many IT firms causing the rejection of new projects and leading to loss of turnover (BITKOM, 2007).

Furthermore, Amaram (2005) states that many job applicants in the IT sector lack basic skills, a fact that stresses that selecting those applicants who possess the necessary quality to perform well, is becoming more and more essential. With respect to job-hopping, he states that among the reasons for the emerging trend towards job-hopping are the lack of perceived fit between the job and the personal life-style as well as incompatible co-workers. This hints towards the necessity to include aspects of person-environment fit in the selection process in order to reduce the risk that talented workers leave the firm because of those reasons.

1.4 Research questions and approach

This dissertation project aims at contributing to close the research gap identified in section 1.2 by examining the decision making behaviour in personnel selection of entrepreneurial IT-firms and compare it to that in large and established companies. I focus on two aspects of decision making: the decision criteria applied and the role of the decision maker.

The first aim of the project is to identify how particular attributes of the applicant are used as decision cues by selection professionals[3] when assessing the hirability of potential employees. While the criterion-related validity of an applicant's attribute is a major issue in the research of personnel selection (see chapter 3.4.3 for a deeper look into questions of validity), some authors have explicitly demanded for research into the relative importance that decision makers in the selection context put on particular attributes when predicting which candidate will be best suited for a particular position (Ones and Viswesvaran, 1999).

By reviewing the existing literature and reconciling the results with the insights gained by an exploratory survey of personnel selection, I identified a set of three areas of applicant attributes which—among others—seem to be particularly relevant. Following the calls of Anderson *et al.* (2004), Amaram (2005), and Heffernan and Flood (2000), I will particularly look at those criteria that can be regarded as responses to changes in work environment, job roles, flexible forms of work organisation, and issues of fit between employee and organisation. This leads to the first research question:

[3]Henceforth, I will use "selection professionals" to describe the organisational members who are involved in personnel selection and recruitment on a more or less regular basis. In entrepreneurial firms this might be the founder or Chief Executive Officer (CEO), in larger companies specialised HR or line managers often perform this task.

> *RQ 1:* What is the relative importance of applicant attributes (competencies, notions of fit, and applicant networks) when used as cues in high-technology firms to recruit academic staff? How do these cues interact?

In the next step, I take a closer look at the selection professional and the environment in which the decision is made. Cardon (2003, p. 361) points out that many models of HRM do not apply to emerging companies / start up firms. In particular I seek answers to

> *RQ 2:* What is the impact of company size and age on the relative importance these cues? Do decision makers in large / established firms base their selection decisions on different criteria than their counterparts in small and young firms?

The third and last research question deals with the quality of the decision process:

> *RQ 3:* To what extent do selection professionals possess insight into their own decision making? Do their espoused decision policies differ from the policies in use?

Because the research questions stated above deal with the decision making processes in personnel selection and the decision policies are under investigation, a special research approach was chosen: metric conjoint analysis. This method allows to get insight into the decision making processes of the participants in the study by investigating their decision made in an experimental situation on a real-time basis. This leads to better insights into the decision making than other methods, for example self-reports of participants.

The results of the study might be beneficial for applicants as well as for HR managers. Applicant preparation and search behaviour can benefit from greater understanding of how candidates are assessed by selection professionals in small as well as in large firms and how these assessments differ. HR managers benefit from getting insight into the decision process of personnel selection.

1.5 Structure of this thesis

The structure of this thesis is depicted schematically in figure 1.1 and can be described as follows: The thesis consists of eight chapters that are grouped into four major parts. In the first part the topic of the research is introduced, its

importance and research gaps are described and the research approach is laid out. Furthermore a literature review (chapter 2) provides a brief overview of the literature written on staffing in small and / or emerging firms.

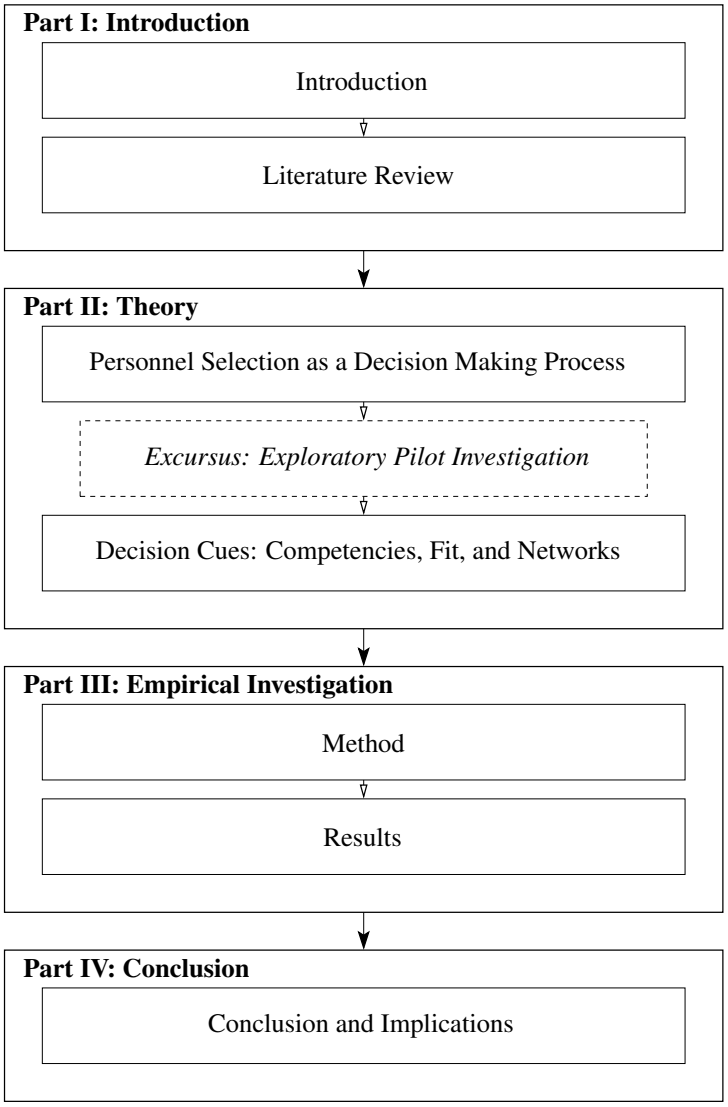

Figure 1.1: Overview of the structure of this thesis

The following second part comprises the theoretical backbone of this work. In chapter 3, I will elaborate that personnel selection is basically a decision making process with three major components: decision cues, criteria, and predictors. The description of selection theory with the interaction of criteria and predictors in the process of predicting future job performance of the applicant

as well as a brief overview of selection practices with a vast number of potential decision cues leads to the next chapter. Chapter 4 presents an excursus in this thesis. As the findings of the previous chapter created a particular tension between theory and practice, an empirical pilot investigation was conducted to close that gap and to reconcile both theory and practice. Five case studies in emerging German IT and high-tech companies shed light on the elements to focus on in the further research. These case studies do also help to reconcile the theory of personell selection with the special aspects of selection in the IT-context which is the particular focus industry of this thesis. In chapter 5, I continue with laying out the theory of personnel selection and close the theoretical part. I analyse the role and impact of three sets of decision cues: applicant competencies, applicant fit, and applicant networks. This chapter is closed with the generation of a number of hypotheses on the use and importance of these decision cues in personnel selection in emerging high-technology firms.

The third part of this thesis describes the empirical research undertaken to further investigate decision making in selection situations and to test the hypotheses. Chapter 6 introduces conjoint analysis as an appropriate means to capture decision policies and to answer the research questions. Variables, research instrument, and research approach are presented. The results of the described experimental survey are laid out in the following chapter 7. After the sample has been described, the data collected is analysed and presented and the hypotheses are tested. The fourth and final part of this thesis comprises the conclusion. In the last chapter, the results are discussed in the light of the previously laid out theory. Both limitations of the study as well as hints for future research are presented.

2 Staffing in small and young firms: a literature review

2.1 Introduction

Before looking more closely at the underlying theories of recruitment and personnel selection, it is worthwile to review the existing literature dealing with staffing in small and / or young firms. The combination of staffing research and entrepreneurship is still young and apparently underdeveloped (Heneman, Tansky and Camp, 2000; Katz *et al.*, 2000) and compared with the literally hundreds of studies published on the topic in large and established firms (for a recent review see Ployhart, 2006), the existing literature is rather sparse.

As a starting point for this review, I used an article of Cardon and Stevens (2004) which listed 15 papers dealing with staffing in SMEs. I supplemented their work with an independent research of the literature published in the past twenty years.[1] Using a combination of database research and the evaluation of the references of existing papers, I identified 32 studies related to staffing in SMEs (see table 2.1 for an overview in chronological order). Thus, compared with Cardon and Stevens (2004), I included 19 additional papers in my review while omitting two papers (Greer, Youngblood and Gray, 1999; Klaas, McClendon and Gainey, 2000) because no substantial contribution to the relevant fields of interest was found.

The studies were analysed for their scope and focus. The scope of a study varied according to company size and age. With regard to company size, a study might either focus exclusively on small firms, or compare small organisations with medium and / or large ones. As to firm age or life cycle stage, a study might deal with emerging or established companies. Concerning their focus, this review distinguishes studies concentrating exclusively on staffing issues from papers dealing with HRM in general but nevertheless providing important information on staffing.

[1] Part of this research was done parallel to Cardon and Stevens (2004), i. e. before their paper had been published.

Out of the 32 publications considered in this review, 23 focused on SMEs while nine compared small firms with medium and / or large firms. 19 papers dealt with small but established companies and only 13 studies focused explicitly on emerging or entrepreneurial companies (six out of them compared emerging with established firms). Again, that does clearly show that the issue of staffing and personnel selection in start-up firms is still hardly researched. 21 papers specifically concentrated on recruitment issues, while eleven dealt with HRM questions more generally. The majority of the papers included in this review was empirical (24 vs. eight theoretical papers), however, many of the empirical studies simply described the status quo of recruitment and selection methods and thus remained rather descriptive in nature.

The majority of the reviewed papers had their background in the USA or Canada, which is in accordance with Segalla, Sauquet and Turati (2001b) who state, that most studies in the organisational context focus on this part of the world. However, European papers (e. g. Bartram *et al.*, 1995; Carroll *et al.*, 1999) have also been included.

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
McEvoy (1984)[e]	small	established	HRM	empirical	Staffing strategies of SMEs are "unimaginative". Innovative strategies (e. g. referrals of professional organisations) are rarely used. Selection methods are not validated.
Gatewood and Feild (1987)	small	established	staffing	theoretical	A three-step personnel selection strategy (job analysis – employee characteristics – selection instruments) is developed which is useful for SMEs to detect easily and less costly the proper candidates for specific jobs.
Neiswander *et al.* (1987)	small	emerging	staffing	empirical	The first five hires play an important role for company development. When hiring managers, the type of manager hired depends on the personal background of the entrepreneur. HR managers are the least important type of managers and the last to be hired.
Hornsby and Kuratko (1990)[e]	small	established	HRM	empirical	The most important concern of SMEs focuses on the need to obtain and retain a qualified workforce. Small firms tend to use inexpensive and less sophisticated recruiting practices.
Aldrich and von Glinow (1992)[e]	small	emerging	HRM	theoretical	Start-ups might be constrained from making high up-front investments in new employees. Enormous time pressure distorts the recruitment process, which is often among the last to be formalised and often highly neglected.
Ng and Maki (1993)	small / large	established	HRM	empirical	The main difference between small and large firms is in recruitment and job evaluation processes: small firms prefer simple and easy-to-understand HRM techniques.

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Pritchard and Fidler (1993)	small	established	staffing	empirical	SMEs look for motivation and willingness to do hard work as well as interpersonal skills rather than academic achievement or skills like leadership and creativity when selecting recent graduates for entry-level positions. The most frequently used methods for recruitment are referrals from employees as well as third parties.
Baker and Aldrich (1994)[e]	small	emerging	staffing	empirical	Entrepreneurs tend to hire either senior or junior employees as first staff leaving the middle uncovered. The first hires are mostly personally known to the founder and occupy only vaguely defined jobs. Turnover is induced by employees rather than by the companies.
Deshpande and Golhar (1994)[e]	small / large	established	HRM	empirical	Many personnel practices of small and large firms are similar. However, small firms make less use of external recruitment sources and thus miss a potential source of fresh talent. The "desired workforce characteristics" are more important in small firms than in large ones.
Bartram *et al.* (1995)	small	established	staffing	empirical	The selection and recruitment practices of SMEs differ markedly form those of large organisations and are far more informal and unstructured. Employers emphasise the importance of personality characteristics as honesty and integrity and rate them more important than aptitude or attainment.

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Aldrich and Langton (1997)	small	emerging	HRM	empirical	Small firms are less dependent on family members than expected, even during the start-up phase. Workforce size affects the formalisation of HRM practices. However, net of size, age does not affect formalisation, as informal hiring practices in small firm dominate regardless of the life-cycle stage.
Ahmadi and Helms (1997)	small	emerging / established	staffing	theoretical	Based on theoretical considerations of the business environment, the article provides reasons of why SMEs offer many opportunities for business graduates and why this source of employment should not be neglected by this type of employees.
Golhar and Deshpande (1997)	small / large	established	HRM	empirical	This replication of Deshpande and Golhar (1994) uses a sample of Canadian firms and states basically the same results as the predecessor-study.
Barber *et al.* (1999)[e]	small / medium	established	staffing	empirical	Large and small firms act on separate labour markets. On the firms' side, recruitment methods vary significantly with firm size (lager firms use more formalised, bureaucratic, and resource-intensive methods). On the other hand, graduates adjust their search activities according to their preference for either small or large employers.

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Carroll *et al.* (1999)	small	established	staffing	empirical	SMEs tend to use informal, rather than formal methods of recruitment and rely on tried and trusted techniques. This may vary, however, according to industry sector. Closed searches (referrals, networks, etc.) are the most widely used recruitment method. This "exclusive" form of recruitment might be harmful to both, SME and society.
Heneman and Berkley (1999)[e]	small	established	staffing	empirical	Applicant attraction practices in small firms were compared to attraction outcomes. Only 24 out of 88 practices had a significant link to the outcomes. Thus, firms must carefully choose and adapt the attraction practices to the desired outcomes (e. g. employee acquisition or retention).
Heneman *et al.* (2000)[e]	small	emerging / established	staffing	empirical	Literature topics are compared to issues mentioned by CEOs / founders. This group is very concerned about staffing. The focus is matching applicant competencies with the organisation rather than with job requirements.
McLarty (2000)[e]	small / medium	established	staffing	empirical	Graduates have an important impact on the skill enhancement of SMEs. Thus, it is important for small businesses to include graduates as a recruitment target.
Stewart and Knowles (2000)	small / large	established	staffing	empirical	SMEs particularly seek transferable skills in graduate hires. The notion of "fit" is particularly emphasised as compared to large organisations. Selection methods are more sophisticated than expected (e. g. use of psychometric tests and job descriptions).

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Williamson (2000)[e]	small	emerging / established	staffing	theoretical	Organisational legitimacy plays an important role for recruitment success. Small and young firms may lack this legitimacy compared to large and established firms. By using strategic isomorphism, these firms may enhance their legitimacy and thus their recruiting success. A number of contingencies, like size, growth orientation, or the experience of managers, might influence the effects of strategic isomorphism.
Kickul (2001)	small	established	staffing	empirical	Psychological Contracts (PCs) play an important role in employee attraction and retention. SMEs convey the promises that constitute the PC by using informal techniques rather than formal HRM procedures. Breach of the PC (perceived unfulfilled promises) have negative consequences (reduced employee loyalty and commitment, higher intention to leave).
Cassell, Nadin, Gray and Clegg (2002)	small	established	HRM	empirical	Compared to other HRM practices (appraisal, rewards, and development) selection practices are used most in SMEs, however, still far less formal and procedural than in large and established firms. How selection practices are used is highly dependent on the vacancy that has to be filled.
Graham, Murray and Amuso (2002)	small	emerging	HRM	theoretical	Reward systems are an important means of attracting new employees, especially in entrepreneurial firms. They might help to signal to job seekers the extent to which firms are entrepreneurial. Consequently, they help to attract specifically those applicants that are interested in working for entrepreneurial firms.

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Moy and Lee (2002)	small	established	staffing	empirical	Recent business graduates regard employment with SMEs as a 'second choice' career,as employment packages of SMEs are perceived to be less favourable and less competitive than those of MNCs. The graduates' and SMEs' perceptions of the attractiveness of job attributes differ. Thus, SMEs have to enhance their communication in order to attract more qualified graduates.
Rao and Drazin (2002)	small	emerging	staffing	empirical	Recruiting top managers from high-performing, larger, and older rivals significantly enhances the product innovation of the poaching company. Hence it is seen as an important method by which new and poorly connected firms can reduce resource constraints on innovation. Recruitment enables firms to acquire new competences and strategic hiring my be a practical method which organisations can use to surmount institutional disadvantages.
Williamson *et al.* (2002)[e]	small	emerging / established	staffing	theoretical	Two main barriers to recruitment faced by small firms are identified: job seekers have low knowledge of the organisations and the firms have low legitimacy in the eyes of job seekers. Three groups of strategies are proposed to overcome these barriers: brand marketing, strategic isomorphism, and interorganisational networking. SMEs need to adopt a dual strategy of distinctiveness and isomorphism to to optimise their recruitment outcomes.

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Cardon (2003)[e]	small	emerging	staffing	theoretical	As emerging companies face a particular lack of ressources, legitimacy, and time, contingent labour might be an advantageous means of extending their human resource basis. Contingent labour can offer even more advantages to emerging companies than to established firms.
Hornsby and Kuratko (2003)	small	established	HRM	empirical	HRM practices in SMEs stagnated or even regressed during the last decade. SMEs still perceive a need for quality workforce and are, at the same time, concerned with the cost of attracting it (offering benefits and compensation). Issues related to work-live balance (e. g. childcare) experienced growing importance in the last decade.
Tanova (2003)	small / large	established	staffing	empirical	Although the recruitment practices in smaller organisations are far less formalised than in large firms, HRM outcomes, like turnover rates, are not affected. Thus, both types of organisations might just have different needs which require different methods.
Hausdorf and Duncan (2004)	small / large	established	staffing	empirical	A greater number of large firms compared to small ones has own websites and is aware of Internet recruiters. However, small firms that are aware of the Internet and have websites use these sites to the same extent as large firms. Thus, use of the Internet reduces the differences in recruitment activities between small and large firms.

Table 2.1: Overview of publications related to staffing in SMEs (continued on next page)

Study	Scope		Focus[c]	Method[d]	Major findings related to staffing in SMEs
	Size[a]	Age[b]			
Kotey and Slade (2005)	small / large	emerging / established	HRM	empirical	Recruitment practices change during the growth process of a firm, leading to more formalised practices. This affects both recruitment sources as well as selection procedures. The level of the position to be filled (operational vs. managerial) influences the sources and methods employed.
Cardon and Tolchinsky (2006)[e]	small	emerging / established	staffing	theoretical	Three alternative forms of staffing in SMEs are discussed: hiring workers directly, contracting contingent workers, and outsourcing staffing entirely to PEOs. The choice of a particular model might depend on factors such as speed of growth, firm mental model, or organisational flexibility, with a trade-off relationship among the factors.

Table 2.1: Overview of publications related to staffing in SMEs

[a] Indicates the scope of the paper according to company size (small, medium, large, or a combination / comparison of different sizes)
[b] Indicates the scope of the paper according to company age or life cycle stage (emerging or established)
[c] Indicates whether the paper focused specifically on staffing or whether it was covered only as one aspect of HRM
[d] Indicates the type of the paper (empirical or theoretical)
[e] Indicates that the paper was included in the review by Cardon and Stevens (2004)

2.2 Major findings and contributions

Among the major sub-functions of HRM, staffing is the one which is most established and elaborated, not only in practice (Ng and Maki, 1993; Cassell *et al.*, 2002) but also in research (Cardon and Stevens, 2004). A fact that is not surprising, as managers of small and young firms state that they are highly concerned about staffing issues (Hornsby and Kuratko, 1990; Heneman *et al.*, 2000; Hornsby and Kuratko, 2003). However, it is also the context where the most significant differences between small and large firms can be found (Ng and Maki, 1993).

With four exceptions, the findings of the papers can be grouped into three major areas which are presented in the following subsections: recruitment and selection *methods and strategies*, selection *criteria*, and recruitment *sources* (including the aspect of applicant attraction). The four "maverick" papers focused on psychological contracts, poaching of employees and alternative forms of staffing. Kickul (2001) concentrated on one specific aspect of recruitment in small firms: the Psychological Contract (PC). This construct is defined as "a set of promises held by an individual employee about the terms of the exchange agreement between the employee and his / her organization" (p. 320). She identifies items that employees of small firms perceive as promises made to them while entering the organisation and asks the participants of their study to indicate the degree of perceived fulfilment of these promises which, on average, was not very high. Applying regression analysis, Kickul establishes a significant relationship between the breach of the contract and a reduced commitment of the employee, leading to a higher intention to leave the organisation, which is very costly to the small business.

Rao and Drazin (2002) analysed how recruiting talented employees can help young firms in the investment banking industry to overcome resource constraints. They found that poaching managers from rival companies is indeed a helpful way of enlarging a company's own resource base and to get fresh input. The topic of both papers by Melissa Cardon (Cardon, 2003; Cardon and Tolchinsky, 2006) does equally diverge from the common pattern of topics because the role of alternative forms of staffing is analysed. They show how contingent labour or the use of professional employment organisations can help SMEs to overcome resource constraints. These forms of staffing are often more advantageous for emerging organisation than for large or established firms. On the other hand, trade-off relationships might exist among the factors that influence the choice of a particular staffing model.

2.2.1 Findings related to selection methods and strategies

The majority of the empirical papers deals with the question which strategies and methods SMEs use in staffing, recruitment, and selection and how these strategies differ from those applied in large organisations. The tenor of these papers is that SMEs use less sophisticated, less innovative, and cheaper strategies and that the methods applied are rather informal, unstructured, and less validated than those used in large firms (McEvoy, 1984; Hornsby and Kuratko, 1990; Ng and Maki, 1993; Bartram *et al.*, 1995; Carroll *et al.*, 1999; Barber *et al.*, 1999; Cassell *et al.*, 2002; Tanova, 2003). According to Hornsby and Kuratko (2003), this tendency is quite stable as the replication of their 1990 study found that the current HRM practices of small firms seem to have stagnated or even regressed over the 13 years elapsed since their first study. The costs of the recruitment process might be a major reason for these differences (Hornsby and Kuratko, 2003). However, Stewart and Knowles (2000) contradict these results and state that the methods used by the SMEs that participated in their study have been more sophisticated than expected (e. g. the use of psychometric tests or job descriptions).

Tanova (2003) states that recruitment outcomes are not affected by the lack of methodological formalisation and sophistication and concludes that small and large firms might just have different needs and use different means to satisfy them. Furthermore, new technologies like the Internet are likely to reduce the differences between small and large firms in the near future (Hausdorf and Duncan, 2004). The methods and procedures of staffing change as the firms grow, and especially the formalisation of methods is strongly affected by firm size (Bartram *et al.*, 1995; Aldrich and Langton, 1997; Barber *et al.*, 1999). In particular, Aldrich and Langton (1997) found that it is size rather than age, that affects formalisation, as informal hiring practices dominated in small firms regardless of their life-cycle stage. According to Kotey and Slade (2005), this fact is due to the institutional pressures that go along with firm growth. This is in line with Klehe (2004), who states that various economic and social demands do highly affect the choice of particular selection procedures.

Williamson's theoretical contributions drawing on institutionalism support this finding and stress that strategic isomorphism, (i. e. the adoption of well established and legitimate practices) is an important means to overcome recruitment problems (Williamson, 2000; Williamson *et al.*, 2002). As organisational legitimacy plays an important role for recruitment success and small and young firms may lack this legitimacy compared to large and established firms, strategic isomorphism might enhance their legitimacy and thus their recruiting success. However, isomorphism does not recognise the possible advantage of distinctive

characteristics of young firms which might also attract particular candidates. Thus, Williamson *et al.* (2002) suggest that small firms need to find the balance between distinctiveness and uniqueness (as suggested by the resource based view of strategy) on the one hand and imitation of legitimised and established practices (as suggested by institutionalism) on the other. This equilibrium, however, might be difficult to find.

Neiswander *et al.* (1987) found that the type of employee hired first is a function of the personal background of the entrepreneur: those with a technical background tend to hire their first employees for technical positions. They would rather hire an operations person before a secretary. Non-technical entrepreneurs tend to do the opposite.

2.2.2 Findings related to selection criteria

Compared with the number of studies dealing with recruiting methods, only a handful of papers is concerned with the skills and characteristics that SMEs seek in their first hires.

Pritchard and Fidler (1993) analysed the expectations of 171 small enterprises concerning newly graduated candidates. Among the most valued characteristics of candidates are skills, abilities, and personal characteristics rather than academic achievements. Motivation and the willingness to work hard, as well as interpersonal skills, like the ability to relate to others or communication skills, are highly important. Deshpande and Golhar (1994) found that small firms perceived the overall importance of nine *desired workforce characteristics*[2] higher than large organisations (compared on the basis of the overall mean scores for both types of firms).

Bartram *et al.* (1995) surveyed the selection of young people in small businesses and questioned which personality characteristics are sought by SMEs in young candidates. They conclude that general characteristics like honesty, integrity, and conscientiousness are rated 'very important', motivation, health, and trainability are among those rated 'fairly important', whereas vocational qualifications, academic achievement, or work experience are rated 'not very important'. However, these results have been gathered exclusively by looking at small firms and have not been compared to the desires of larger organisations.

[2]These characteristics are concern for firm's success, ability to inspect one's work, worker flexibility, ability to work in groups, self-discipline, problem-solving skills, multi-skilled workforce, communication skills, and quantitative skills.

Stewart and Knowles (2000) looked at the kind of skills that SMEs focus on during the decision making process in recruitment and selection. They collected data from 30 decision makers in SMEs by a questionnaire-based survey and found that SMEs particularly seek those kind of skills which can be called transferable skills, e. g. motivation, problem solving, or social skills (see also Stewart and Knowles, 1999, p. 374). Neiswander *et al.* (1987) described the characteristics or attributes entrepreneurs seek in their first employees: the list is lead by entrepreneurial spirit, followed by the following traits: drive, self-motivation, initiative, and action orientation.

The concept of person-organisation fit (P-O fit) is touched in several papers. Baker and Aldrich (1994) point out that entrepreneurs have a tendency to hire senior employees for vaguely defined positions and thus look for fit with the organisation. Stewart and Knowles (2000, p. 38) state that the ability to "fit in" is particularly important to recruiters in SMEs, however and in contrast to the common definitions of P-O fit (see chapter 5.3.1), fit is mostly associated with teamwork and not with culture. They state that the emphasis of fit is a major difference between SMEs and larger organisations. Heneman *et al.* (2000) state that especially growth oriented founders seem to favour matching candidates to the organisation over matching their KSAs to the job requirements. Neiswander *et al.* (1987) stressed the importance of P-O fit as they described the long range implications that the fit of the candidate with the culture of the company has for the company's development.

2.2.3 Findings related to recruitment sources and applicant attraction

With regard to recruitment sources, small firms do heavily rely on existing networks and do often recruit from the circle of their friends and family (Baker and Aldrich, 1994). Word of mouth and referrals from friends and current employees are another widely used means to attract a pool of applicants at low cost (McEvoy, 1984; Pritchard and Fidler, 1993; Carroll *et al.*, 1999). Due to this strategy of "exclusive" recruitment practices (Carroll *et al.*, 1999, p. 249), SMEs are in danger of missing a potential source of fresh talent as many qualified job seekers might simply not get to know the offered openings (Deshpande and Golhar, 1994; Golhar and Deshpande, 1997; Carroll *et al.*, 1999). Aldrich and Langton (1997), however, state that small and new firms are far less dependent on family members than expected.

In line with Carroll *et al.* (1999), McLarty (2000) concludes that graduate employees are an important source of fresh talent and innovative thinking for SMEs. Thus it is crucial to ask whether small firms can attract a sufficient number of that type of candidates. However, Barber *et al.* (1999) found that in their sample the number of students seeking employment with large firms was nearly three times larger than that looking for jobs with SMEs. As they also found that students looking for employment in large organisations adopt their search behaviour to the recruitment behaviour of those organisations, they conclude that "large and small firms effectively operate as separate labor markets" (Barber *et al.*, 1999, p. 864). This view is supported by Moy and Lee (2002) who state that business graduates regard employment with SMEs as a second choice career. They perceive employment packages offered by SMEs as less favourable and less competitive than those of MNCs. The paper of Ahmadi and Helms (1997) seeks to overcome this problem by offering sound reasons why business graduates should join small firms. Next to the fact that the majority of jobs in the US economy is offered by firms smaller than 100 employees and that large multinationals did not create a single net job in the years between 1975 and 1990, structural reasons related to the working environment in small firms are offered that might help to attract business graduates to that particular type of employer.

Williamson addresses these issues from a theoretical viewpoint: next to a lack of organisational legitimacy of staffing practices, a lack of organisational knowledge is the main barrier to recruitment success of small firms (Williamson, 2000; Williamson *et al.*, 2002). Job seekers may not be familiar with small organisations or attribute a low perceived organisational image. The less formalised 'muddling trough' approach to HRM used by small firms might reduce the organisational legitimacy of smaller firms even more. They suggest to combine strategic isomorphism (i. e. the adoption of legitimate staffing practices employed by large and established firms) with organisational brand marketing in order to enhance company image and company publicity.

Graham *et al.* (2002) found that stock-related reward systems are a helpful means of attracting those employees that are themselves risk-taking and entrepreneurial. The reward system helps entrepreneurial firms to convey their entrepreneurial spirit to candidates and thus helps to attract those candidates that explicitly look for entrepreneurial firms and fit their culture.

2.3 Conclusion and implications for the present research

The results of the studies and theoretical papers included in this review are sometimes inconsistent with each other. This can be explained with the long time elapsed between the first and the last study or with differences in research approach, focus, methodology, or observed region.

For example, Deshpande and Golhar (1994) stress that many practices are similar in small and large firms, whereas Bartram *et al.* (1995) state the opposite. The preferred staffing methods may vary over time, as new methods emerge, e. g. the use of the Internet as described by Hausdorf and Duncan (2004). Some of the findings are highly specific for the industry concerned (e. g. Carroll *et al.*, 1999) whereas others do apply specifically to the country or region where the research had been conducted. For example, the system of college recruitment and campus placement, as described by Barber *et al.* (1999), seems to be typical for the USA (and maybe Canada) but does not apply in Germany.

The reviewed papers brought up some important hints for future research which influenced the design and framework of this study. As only one out of thirty papers directly dealt with candidate profiles and skills (Stewart and Knowles, 2000), the need for more research in this direction is obvious. Heneman and Berkley (1999) stress that future research in the field of recruitment in small businesses needs a direct comparison of small and large companies. In a later publication, Heneman *et al.* (2000) suggest that the needs and procedures of staffing may vary across growth stages, different values might be emphasised at different stages, whereas a core set of values remains stable

Deshpande and Golhar (1994, p. 55) stress the fact that many studies focused on reports of managers. However, they find that "what is perceived as important by managers may not actually be practiced by them" and suggest to investigate this issue. Thus, a research method, that does not rely on self reports that are often subject to a retrospection bias might be a helpful means to analyse this gap. Similarly, Aldrich and von Glinow (1992) suggest a closer look at the gap between intended and realised selection practices. They do also address the problem that the person who is concerned with searching and screening might be subject to a similarity bias (e. g. technical staff might prefer technical staff with a similar background). Heneman *et al.* (2000) encourage researchers to take a closer look at the role of person-organisation fit in selection of SMEs. They suggest that growth-oriented founders might match person to organisation rather than person to job requirements (as the latter change rapidly in growing and emerging companies).

3 The decision making process of personnel selection

3.1 Introduction

HR and general managers are regularly due to deal with staffing issues in order to satisfy the firm's demand for new employees or to tackle fluctuation. Attracting the right type of talent to the organisation and selecting those applicants that propose to deliver high performance to the firm is essential for the firm's success. Despite this importance of personnel selection for all organisations, especially for those which start with only a handful of employees and face high growth-rates, I have shown in the previous chapter that selection research in small and emerging ventures is sparse. In this chapter, I will start to tackle this gap by laying out the foundations of personnel selection research and show how research into decision making can contribute to this field of interest.

This chapter is structured as follows: first, I will contextualise the process of personell selection in the embracing staffing function. I use the *staffing cycles framework* introduced by Carlson and Connerley (2003, see figure 3.1, p. 28) to structure the processes implied and to understand the interactions and interdependencies among the actors, contexts, and actions that comprise staffing systems. Then, I describe the decision making process of personnel selection and its basic components: decision cues, criteria, and predictors. The prediction of future job performance is at the heart of this process which is laid out in greater detail in the following section. Prediction consists of linking employee attributes (predictors) with employee performance measures (criteria) and inferring from the first on the latter in the case of applicants whose performance is not yet known. Because predictors have received considerable attention in selection literature and theory, the following section is exclusively dedicated to predictor variables and methods and their coverage in the literature. After having dealt with selection theory, the last section of this chapter comes back to selection practice and covers a number of applicant attributes that do not appear in pure selection theory but are nevertheless used by selection professionals, as many studies have shown.

3.2 Selection in the context of staffing and recruitment

Personnel selection is a cognitively complex information-processing task (Huber, Northcraft and Neale, 1990) which is normally considered as a part of the *staffing* function of an organisation. This, in turn, can be defined as "a complex organizational function that determines the flow of candidates into and out of an organization" (Carlson and Connerley, 2003, p. 51). It deals with "acquiring, deploying, and retaining a workforce of sufficient quantity and quality to create positive impacts on the organization's effectiveness" (Heneman and Judge, 2003, p. 4). Staffing describes an embracing function that comprises different subfunctions whose number and names vary in the literature (Snow and Snell, 1993; Rynes and Gerhart, 1990; Jetter, 2003).[1]

The first subfunction, usually labelled *recruitment* (sometimes also called *attraction*), deals with the attraction of talent to the organisation and the creation of a pool of candidates who are interested in joining the organisation (Carlson, Connerley and Mecham, 2002; Rynes and Gerhart, 1990). Barber (1998, p. 5) defines recruitment as "those practices and activities that are carried on by the organization with the primary purpose of identifying and attracting potential employees." Firms might actively attract new personnel by specific means of HR marketing, given the fact that, like in product marketing, they have established a defined target group for their activities. A large body of research has been written with respect to recruitment and employee attraction (see e. g. Ahmad and Schroeder, 2002; Amaram, 2005; Barber, 1998; Connerley, Carlson and Mecham, 2003; Witt and Rode, 2004). Part of the outcomes of this research has been well summarised by Gatewood and Feild (2001, p. 9–17). They cover the subject of recruitment and HR marketing dealing with aspects like recruitment sources, qualification and training of recruiters, the administration of the process, and the content of the recruitment message.

Once a pool of candidates is attracted, the managers of the firms have to turn to the second subfunction of staffing—selection—when they perform the delicate task of choosing those candidates from the pool that fit the firm's requirements. Thus, "the objective of any selection system is to choose the candidate who possesses the most suitable *characteristics*" (Smith and Robertson, 1986, p. 30). Gatewood and Feild (2001, p. 3) define human resource selection as follows:

[1] A different approach is used by Huber, Neale and Northcraft (1987, p. 136) who use selection—"the set of procedures through which an organization chooses its human resources"—as the more general term which they split into four subfunctions.

> "Selection is the process of collecting and evaluating information about an individual in order to extend an offer of employment. [...] The selection process [...] addresses the future interests of the organization and of the individual."

Rynes and Boudreau (1986) point out that the distinct line between the two subfunctions which had been drawn in earlier publications vanishes more and more and that recruitment might also encompass both attraction and selection. This interaction between both aspects of staffing is also stressed by Breaugh and Starke (2000) as well as Gatewood and Feild (2001). The latter (p. 9–10) point out how both functions interact as the applicant pool—the result of HR marketing and recruitment efforts—is the limiting factor for selection. This implies that decision making in personnel selection does not just start with selecting between applicants but that certain fundamental decisions about the whole staffing process must be made before starting to recruit people to the organisation (Robertson *et al.*, 2002a).

Carlson and Connerley (2003) introduce a *staffing cycles framework* (see figure 3.1) providing a structure for a better understanding of the interactions and interdependencies among the actors, contexts, and actions that comprise staffing systems. Staffing is a *sequence of decision events*, in which decisions made by individuals (i. e. the applicants) and by organisational decision makers alternate. In the context of this framework, this thesis deals with decision number four which represents "the organizational decision maker's decision regarding who will be selected to receive an offer of employment" (Carlson and Connerley, 2003, p. 55). It is anteceded by the individual's decision to apply for a position in the particular organisation and succeeded by the individual's decision to accept or to reject the offer. This particular decision event has been rarely covered by research on SMEs as the review presented in chapter 2 has shown. Existing studies on that type of firm focus on recruitment rather than on selection.

The selection process itself usually comprises at least two different phases: in the initial *pre-screening phase* a large pool of candidates is narrowed down to a small group of finalists based on the screening of resumes and application documents. In this phase, the selection devices are applied to all applicants (Carlson *et al.*, 2002) in order to gather data for a first decision and to prepare the second phase, especially if this consists of an interview (Jetter, 2003, p. 78). During the *final selection* the remaining candidates are scrutinised more closely, using instruments like interviews or assessment centres to select the future job holder (Highhouse, 1997; Kompa, 1989; Färber, Keim and Weitzel, 2003). Knoll and

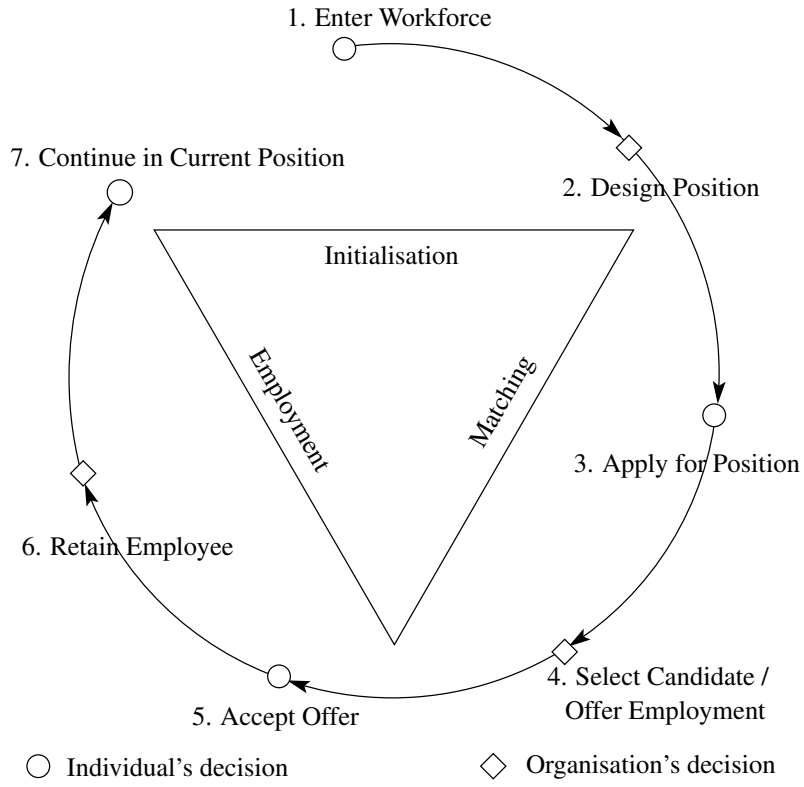

Figure 3.1: The staffing cycles framework (Source: Carlson and Connerley 2003, p. 54, modified)

Dotzel (1996) state that that different criteria[2] apply in both phases, the first using more formal criteria that can easily be assessed using the documents provided (grades, drivers licence, age, etc.). Highhouse (1997) states that we have significantly less knowledge about the factors that influence job-finalists choice, i. e. that are used in the final stage. This is the area this thesis focuses on.

3.3 Decision making in personnel selection

Decision making is at the heart of personnel selection as the selection process culminates in a decision to hire or to reject the applicant (Guion and Gibson, 1988). The selection decision is made without definite information about the future performance of the candidate in the hiring organisations and can thus be

[2] N. b. that the authors, like many others, adhere to the confusing use of the term **selection criteria**. For a dissociation of criteria and predictors from decision cues and other sources of information used in selection decisions see section 3.3.2.

regarded as decision making under uncertainty (Highhouse, 2001). In personnel selection, decisions are made in broader and in narrower senses. In a broadest sense, decisions apply to the general conditions of the whole staffing process (which methods to use, how much money to spend, etc.). In a broad sense, decisions on the constructs to be measured and the criteria to be used are necessary. In a narrow sense, the decision whom to select and whom to reject has to be made (Born and Scholarios, 2005).

Focusing on decision making in personnel selection is important in two ways. First, the way in which recruiters make actual decisions during the staffing process should be considered as the focal point of selection research and consequently more attention should be spent on this aspect (Boudreau, Sturman and Judge, 1994). Second, this topic has received relatively little attention compared with the broad band of research considering the validity of selection methods (Born and Scholarios, 2005).

Highhouse (2001) sums up recent research in decision making theory and shows areas in which selection decisions might be affected. For example, the display of the information gathered on a candidate has been found to have significant effects on the decisions made. People show intuitive preferences for certain expressions of probability and sometimes allow their intuitive preferences to override coldly rational information. Furthermore, *ambiguity aversion*[3] might induce managers to devaluate applicants with missing application information even when this information is beyond the candidate's control. In cases when conflict is high because the options are psychologically similar, decision makers tend to delay their choices which they do not do when one option explicitly dominates the other.

In this section, I will first lay out how the decision making process is composed of gathering and processing of information about the applicants. Then I will introduce and define the main components of this decision making process aiming to resolve and enlighten the confusing use of terms in this area, including selection criteria, predictors, selection methods, and decision cues.

3.3.1 Gathering and processing information

Selection is a cognitively complex task which includes gathering and encoding information from various sources, organising data, and integrating the information to come to the final decision (Huber *et al.*, 1990). Information is at the heart of the selection process, as Aguinis, Henle and Ostroff (2001) state that

[3] Ambiguity aversion is the way how the lack of second-order probability dimensions—like information known—affects decision making and judgement.

employee selection decisions rely on solid measurement of employee attributes such as skills, abilities, interests, and values, in other words on information about the applicant. Gatewood and Feild (2001, p. 75) point out that

> "an important assumption in selection decision making is that information is available with which selection decisions can be made. But, what type of information can be used? Where does this information come from?"

To retrieve the necessary information from the applicants, various selection methods and processes are used. Companies rarely use only one single predictor or method in making selection decisions but rather a combination of various sources of information (Salgado, Viswesvaran and Ones, 2001). The rich literature dealing with these means and their validity will be briefly summarised in section 3.5. The second step deals with processing this information, using it as decision cues, and applying a decision rule in order to make the decision whom to hire and whom to reject. According to Born and Scholarios (2005), this step comprises three stages:

Stage 1: Combining information: How is the information which had been gathered during the screening phase processed?

Stage 2: Making predictions: Shall predictions on the potential future performance of the candidate be made *mechanical* (i. e. statistical, without human involvement) or *clinical* (i. e. judgemental, based on human judgements)?

Stage 3: Decision outcomes: Will a particular candidate be accepted for a position or rejected? Proves the chosen candidate to be the right choice?

Stage 1

Gordon (1986) points out two basic strategies to narrow down the mass of information: companies can either *reject* those candidates that are low on the required criteria or assign "suitability" to candidates and *accept* candidates with a high score for further consideration. While the organisational decision makers do so, they employ different factors or criteria which can be differentiated in *hard* and *soft* factors. Different selection methods are used to analyse different factors: information on hard factors (e. g. educational facts or vocational experience) can easily be gathered analysing application blanks, CVs, and cover letters. Soft factors like cognitive, social, and personal competencies need more sophisticated methods like biodata questionnaires, interviews, or assessment centres (Jetter, 2003, p. 74).

Huber *et al.* (1990) suggest two different approaches to how this information-processing can be handled: (1) All candidates can be evaluated *simultaneously*, restraining the final evaluation until all candidates can be compared against each other, or (2) they can be evaluated *sequentially* and contrasted against the job requirements. The choice of the decision strategy significantly influences both decision making and decision outcomes. For example, simultaneous applicant evaluation might lead to a smaller but better qualified pool of applicants. On the other hand, sequential decision makers accepted significantly more applicants of the first half than of the second half of the selection process. This might reflect their dilemma that the early rejection of marginally qualified candidates bears the danger of not having sufficiently qualified candidates in the remaining pool. Thus the acceptance of marginally qualified candidates seems a justified strategy but on average leads to a less qualified pool than simultaneous applicant evaluation (Huber *et al.*, 1990).

Stage 2

There are different approaches both to collecting and to combining / processing predictor information about the candidate. *Mechanical* collection does not employ human judgement to gather the information, e. g. by using test scores. By contrast, *judgemental* collection does involve human judgement, e. g. in rating interviews or appraising performance. The combination of both approaches leads to four different ways of data collection and eight different ways of data combination (Gatewood and Feild, 2001, p. 237–238).

This distinction between analytical and intuitive decisions has been a long-standing dichotomy in decision making and cognition theory (Highhouse, 1997). This dichotomy, however, has been rejected by Hammond (1996) who suggested that the decision making process is rather anchored on a continuum with the two poles mentioned above. Most decision makers use *quasirationality*, i. e. some spot on the continuum that integrates both aspects.

Gatewood and Feild (2001, p. 240–242) sum up ample empirical evidence to support the notion that mechanical methods of data collection should be emphasised over judgemental methods and that judgements should not play a major role in processing the information. For various reasons mechanical approaches lead to significantly better results than their judgemental counterparts. For example, judgemental combination is subject to cognitive limits of the decision maker that inhibit the improvement of the prediction models. Decision makers do often depend on inappropriate judgemental models which have been adopted many years ago and never changed subsequently. Additionally, they are likely to add errors and biases to their decisions, because they rely on implicit theories of good applicants and are often inconsistent across decisions.

Despite these shortcomings, judgemental decision making seems to be the favoured method both for many selection professionals as for the majority of applicants. Gut feeling and intuition give the selection professional the impression of control over the process and support confidence in his or her own judgement. Furthermore, in mechanical combination, the selection professional's role shifts from making the decision to merely providing input (Gatewood and Feild, 2001, p. 241). As far as mechanical methods for combining information are concerned, Gatewood and Feild (2001, p. 242–244) list several strategies that can help to effectively perform this task. These include (a) multiple regression, (b) multiple cutoffs, (c) multiple hurdle, (d) combination method, and (e) profile matching.

Stage 3
The outcome of a selection decision can be positive—the chosen applicant proves to perform satisfactorily on the job—or negative. A negative outcome can be due to two possible types of errors (Gatewood and Feild, 2001, p. 236, see fig. 3.2):

(a) *false positive errors* are situations in which the selected applicant proves unsuccessful on the job,
(b) *false negative errors* occur when an applicant is erroneously rejected and would have been successful on the job. This type of error is hard to detect but can nevertheless turn out to be damaging to the company, for example, if the rejected candidate is hired by a direct competitor.

Among the basic pitfalls and sources of erroneous selection decision making are the unsystematic combination of information about the applicant and the lack of evaluating the own selection decisions. The auditing of selection decisions is especially important as learning from the past is the only way to improve future behaviour. Even if systematic evaluations do not prevent from making selection errors, they are certainly a good way to reduce the decision-maker's overconfidence in his or her own ability (Gatewood and Feild, 2001, p. 261–262).

3.3.2 Components of the decision making process

Generally speaking, judgements in decision making processes comprise two elementary aspects: the *decision* itself and the *cues* upon which the decision is based (Brown, 1972). In this sense, a cue is "*a decisive factor that elicits a response in the judgment process*" (Mainprize, Hindle, Smith and Mitchell, 2003, p. 16). The cue describes the relationship between the judgement and the

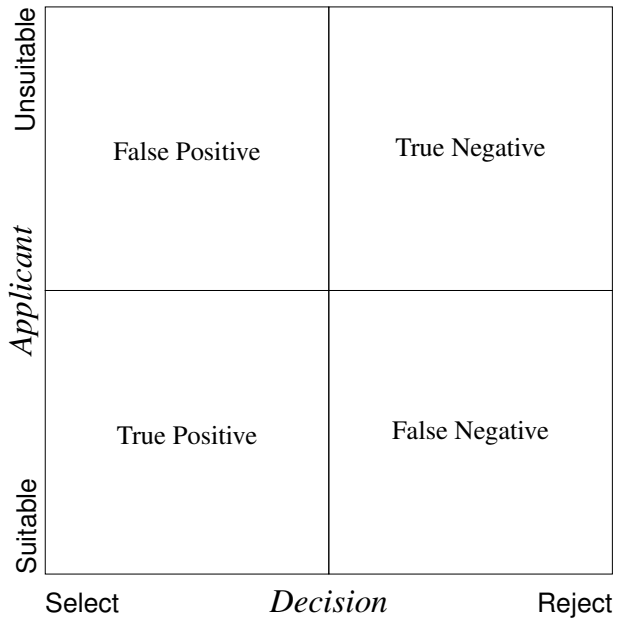

Figure 3.2: Outcome types in selection decisions

information used to make that judgement (Stewart, 1988). Cues are combined and weighted by the decision maker according to the individual importance ascribed to each cue. So the decision making process or judgemental model can be represented by a multiple regression equation such as equation 3.1.

$$\hat{Y} = b_1 X_1 + b_2 X_2 + \cdots + b_k X_k \tag{3.1}$$

In this simple equation, $\hat{Y}$ is a prediction of the judge's decision that is simply represented by the sum of the products of all the cue values (X_n) and the cue importance (b_n). Such simple linear models can account for most judgemental decisions (Brown, 1972).

In decision making theory and research (e. g. Shepherd, 1999a; Shepherd, Zacharakis and Baron, 2003; Choi and Shepherd, 2004) as well as in everyday language, these decision cues are often labelled *criteria*. Any information about applicant attributes such as skills, abilities, interests, and values might be used as decision cues (Aguinis *et al.*, 2001). However, in personnel selection there is much *confusion* about the notion of these terms because the information about the applicant is often labelled *predictor data* and the term *criterion* is not necessarily used as a synonym of the decision cue.

Instead, in personnel selection theory it labels a measure of employee success in the job the candidate is selected for. It represents the *dependent variable* to be predicted.[4] There is a wide range of variables that can be used to operationalise employee performance in the prediction and selection process. Some of them represent employee behaviours, production outcome, or reactions to the job. These criteria must fulfil two requirements: they must be important to the job and they must be appropriately measured (Gatewood and Feild, 2001, p. 77–78). The second type of variable, the predictor, represents an indicant of the criterion (Gatewood and Feild, 2001, p. 77–78) which leads to the notion that personnel selection is "the process of identifying and mapping predictor samples of behavior to effectively overlap with performance domains" (Binning and Barret, 1989, p. 481). The relationship between both variables is described as *validity* of the predictor.

Färber *et al.* (2003) describe the relationship between criteria, predictors and selection decisions as follows: the criterion is the basis for matching candidates and jobs. It is an indicator of actual job performance. The information on individual attributes available at the time of the selection decision is labelled predictor data. Predictor is a label for the method of prediction, i. e. the assessment of the criteria based on the predictor data. One problem in dissociating selection predictors and criteria is the fact that both comprise a mixture of constructs, methods, and techniques (Salgado *et al.*, 2001).

Taking into account the aforementioned differentiations, both predictors *and* criteria might be used as decision cues in personnel selection. Consequently, in a wider sense, a selection cue might be any characteristic or attribute of the applicant that distinguishes one applicant from the other and that the decision maker uses to base the selection decision upon.

In the next sections, I will dissociate criteria and predictors in greater detail by viewing them as two parts of the prediction process: the performance and the applicant domain. Afterwards, I will come back to the fact that nearly any applicant characteristic might be used as decision cue or might at least influence the selection decision. In the last section of this chapter, I will structure this vast mass of information.

[4]The confusion about the terms is even more enhanced as some authors (e. g. Huo, Huang and Napier, 2002) mix terms like selection criteria, predictors, and selection methods. Other authors (e. g. Peppas, Peppas and Jin, 1999) use completely different terms like "selection attributes" when referring to those attributes of an applicant that are used to make selection decisions.

3.4 Prediction in personnel selection

Classical selection theory views the selection process as combination of the prediction of future job performance and the choice of the applicant that shows the highest probability of high performance in the job (e. g. Gatewood and Feild, 2001). This process and its components are described in this section. The process comprises two domains: the performance domain of prediction is represented by criteria while the applicant domain is represented by predictors. The relationship between both domains is described by the validity of the predictor. Consequently, a selection decision is based on a number of consecutive choices: Choosing the proper operationalisation of job success (the criterion) and choosing a predictor that has been identified to be valid for the particular criterion. In the third step, the predictor data for all the applicants is collected and the candidate with the best results will receive a job offer.

3.4.1 The performance domain of prediction: criteria

According to Binning and Barret (1989), the starting point for developing personnel selection systems must be the performance domain. The delineation of desirable work outcomes and job behaviours must lead to a process of reverse engineering specifying which behaviours or outcomes should be sampled by the predictors. The performance domain is represented by the selection criterion (Binning and Barret, 1989; Robertson *et al.*, 2002a) which is regarded as an indicator, measure, or definition of employee success on the job (Smith and Robertson, 1986; Gatewood and Feild, 2001).

Smith and Robertson (1986) propose three levels of criteria: first level criteria describe whether the selected candidates do the expected things and behave in an appropriate way, second level criteria define the results which should be achieved, and third level (ultimate) criteria indicate how much the person contributes to the organisational goals. According to Gatewood and Feild (2001), criteria share the following characteristics:

- they serve as measures or definitions of what is meant by employee success on the job
- they are the dependent variable to be predicted
- they derive from job-analysis
- a wide array of variables might serve as criteria
- they might deal with behaviours as well as attitudes.

For many authors as well as practitioners, the most important criterion in personnel selection is *future job performance*. It is sometimes labelled "THE criterion" (e. g. Robertson and Smith, 2001), however, it is "complex, dynamic, and multidimensional, and consequently personnel selection systems might predict individual differences for several types of job performance" (Hough and Oswald, 2000, p. 633).

Defining and measuring employee performance is a very important issue which has often been labelled the "criterion problem" and goes down to the question of what shall be predicted with the selection measure (Murphy and Bartram, 2002). Because of this importance, Mount, Barrick and Ryan (2003) explicitly called for more explanation of the criterion that researchers are interested to predict and Nunnally and Bernstein (1994, p. 96) stated that "obtaining a good criterion may actually be more difficult than obtaining a good predictor."

Robertson and Smith (2001) summarise how the use of performance criteria in psychological literature has changed over the last fifty years. While the idea of a single (THE) criterion dominated the first half of the last century, the following period was characterised by an unorganised band of various sources and diverse criteria of job success and modern researchers tend to group criteria into three broad groups: production data, personnel data, and judgements.

At present, the construct of job performance has been substantially broadened by the inclusion of constructs such as contextual performance or organisation citizenship behaviour. For example, Robertson and Kinder (1993) used 12 criteria of job success reflecting various aspects of occupational performance. Modern models of employee performance (e. g. Gatewood and Feild, 2001; Hough and Ones, 2001; Robertson *et al.*, 2002a) incorporate a broad band of variables and measures such as

- production data (e. g. quantity of output)
- judgemental data (i. e. other people's opinion of the employee's performance)
- personnel data (e. g. attendance or absenteeism)
- training proficiency (i. e. how the employee performs immediately after completing a training programme)
- tenure (length of stay in the job)
- progression (through the organisational hierarchy)
- prosocial behaviour
- corporate citizenship

According to Marcus (2004), the most important measure of occupational success is *judgemental data*, i. e. the performance appraisal by a third party, e. g. a supervisor. As discussed earlier on page 31 for the case of judgemental vs. mechanical combination of information, that type of measure is prone to biases

as it relies on individual opinion. However, its use is unavoidable in modern organisations with many jobs that do no longer produce tangible and countable outputs (Gatewood and Feild, 2001, p. 709).

Next to the described difficulties and controversies about measuring job performance, there is also a debate whether future job performance is truly the most important criterion. Bartram, Robertson and Callinan (2002) show how organisations differ in their overall concept of effectiveness and consequently construct differring definitions of effectiveness which are then used as yardsticks to evaluate organisational success definitions. If individual job success is taken as the individual's contribution to the organisation's effectiveness, there are as many different definitions of job success as there are of organisational effectiveness. In line with these thoughts, Mount *et al.* (2003) call for the use and integration of other sets of criteria, like happiness, training and learning performance, fit, job and life satisfaction, conflict attributions, workplace aggression, leadership, and adaptive performance. They state that the clear identification and definition of the outcomes that shall be predicted will enable better selection decisions. Huo *et al.* (2002) set out that personnel selection criteria are seldom set by a consensus generating process but rather result of trials and errors over the years, bound by legal requirements, and subject to many other institutional constraints.

There are other important issues in measuring criterion data. The time of measurement plays a non-negligible role due to existence of a so-called *honeymoon effect* which describes a slope in performance after a certain time spent in the new job. Given that most employees start a new job with relatively high motivation, performance in the first phase is limited only by ability and experience, whereas in later stages, the initial motivation might decrease with some employees and so the remaining motivation becomes an explanation of variance in performance. Consequently, measures of motivation are valid predictors of later rather than early performance (Guion and Gibson, 1988).

Another problem in measuring work performance is that performance often depends on many other aspects next to the employee's direct contribution. These moderating aspects are often out of the employee's control and thus must not be used as validation criteria (Gatewood and Feild, 2001, p. 719). If multiple criteria are used in personnel selection, rational weights to performance criteria have to be applied (Hough and Oswald, 2000, p. 633). These weights are the same as the factor weights of decision cue importance (b_n) shown in equation 3.1 (page 33).

3.4.2 The applicant domain of prediction: predictors

After having described the performance domain of prediction, I will now come to the applicant domain. On that side, the second type of variable, the predictor, represents an indicant of the criterion (Gatewood and Feild, 2001, p. 77–78). The basic question in personnel selection is to identify individual characteristics and variables that express individual differences that are related to job performance (Salgado *et al.*, 2001). In order to measure these characteristics different methods can be used, e. g. tests, interviews, assessment centres, or certain biodata items. Drawing on these relationships, Salgado *et al.* (2001) use the term *predictor* to describe a particular construct-method combination.

Binning and Barret (1989, p. 481) describe predictors as "clusters of behaviors created by research psychologists to capture general regularities in behavior." According to Smith (1994), predictors are at the heart of the selection process as the core function of selection is to identify those candidates who are supposed to perform well and will be successful in the position to be filled. Thus, the pieces of information on which the selection decision will be based and the candidates will be matched with the job requirements should have high predictive power and help to anticipate future job success (Schneider, 1995). However, reality is often less ideal and many decision makers use decision cues with less or little predictive power (e. g. the candidate's physical attractiveness). I will devote section 3.5 to a more detailed description of predictor variables and methods.

3.4.3 Linking both sides: validity

The basic goal of personnel selection is to estimate which of the candidates have a high probability to become successful job incumbents, in other words who will score high on the criterion measure when employed in the organisation (Gatewood and Feild, 2001, p. 699). The means to link the criterion and the predictor is the *predictive validity*, or as Schmidt and Hunter (1998, p. 262) put it:

> "From the point of view of practical value, the most important property of a personnel assessment method is predictive validity: the ability to predict future performance."

The validity of any selection device is based on the correlation between the predictor data representing estimates of future job performance and the actual performance on the specific job (Murphy and Bartram, 2002; Färber *et al.*, 2003).

A correlation coefficient (r_{xy}) of 0.0 indicates that there is no coherence between the predicted and the actual performance, a coefficient of $+1.0$ indicates an absolute positive correlation, a coefficient of -1.0 an absolute negative correlation (Payne, Anderson and Smith, 1992).

Validity answers the question whether a measure assesses the attribute that it is supposed to measure and consequently can be used to make sound decisions. It is not the measure itself that is validated but rather the inferences about what the measure is assessing (Aguinis *et al.*, 2001). The literature (e. g. Nunnally and Bernstein, 1994) mentions three different types of validity or different *types of evidence* for validity determination (Aguinis *et al.*, 2001):

1. *Content-related* evidence: evidence that relies on judgements of potential users and experts and that posits whether the measure is assessing the attribute that it is supposed to measure.
2. *Criterion-related* evidence: the answer to the question whether the measure can be used to make accurate predictions, which is based on correlating scores of the predictor with those of the criterion to determine the accuracy of inferences made from these scores.
3. *Construct-related* evidence: the process of accumulating evidence whether the measure is assessing the attribute it is intended to assess. It investigates hypothesised relationships between a construct and other constructs to assess if actual relationships are similar to the predicted ones.

While the latter forms of validity stress correlations among various measures, the first is based on subjective opinions of people who deal with the instrument (Nunnally and Bernstein, 1994). Linked to content-related validity is an instruments's *face validity*. This type of validity is not a form of statistical validity but the degree to which a test or method looks good for a particular purpose and is accepted by the participants. However, a good-looking instrument might nevertheless be a bad predictor of job performance (Cronbach, 1960; Nunnally and Bernstein, 1994; Robertson *et al.*, 2002a) and it is often desirable that the instrument has little face validity and does not reveal what it attempts to measure in order to avoid distortion of the participants' behaviour (Nunnally and Bernstein, 1994).

Robertson *et al.* (2002a) describe two ways to estimate criterion-related validity: The *concurrent method* makes use of existing job incumbents who have to perform the particular test in question. The results are then compared with the employees' performance measures. In the *predictive approach* the measure to be analysed is administered by actual job applicants. After some time, measures

of job performance of the chosen applicants can be compared to the ratings of the selection measure. Both methods have particular drawbacks and advantages as described by Robertson *et al.* (2002a).

The construct-related validity is often far less known than the criterion validity. It can be assessed either by analysing the correlations between the total interview score and other variables like cognitive ability, social skills, personality traits, job-knowledge, or power of judgement, or by applying *multitrait-multimethod matrices* which assess particular dimensions (traits) using various methods and analyse the correlations between the different assessments (Melchers, Kleinmann, Richter, König and Klehe, 2004).

Many managers base their selection decisions on conventional wisdom and on the basis of their professional experience (Dunn *et al.*, 1995). In these cases the *perceived* predictive validity of a given information, i. e. the fact that the decision maker is convinced that the piece of information he or she uses helps to find a sound decision, might be based on this conventional wisdom mentioned above.

The pivotal point of measuring predictive validity is the existence of a defined and measurable criterion of job success and performance (Robertson *et al.* 2002a, see also section 3.4.1). Concerning the basic assumptions that underlie this relationship and state the foundations of validity research, Murphy and Bartram (2002) raise some concerns: the relationship between test scores or other predictor measures and individual performance is complex and multivariate. The individual differences that influence the applicant's performance during a selection procedure are likely to influence a wide range of work-related behaviours and outcomes. Finally, performance is not linearly dependent on a single aspect. The relationship between the predictor and work-related criteria is moderated by many other factors, such as the type and complexity of the job, the type of the criterion, the criterion measurement methods, or the validation strategy (Hough and Ones, 2001).

Hülsheger, Maier, Stumpp and Muck (2006) showed that the choice of the criterion representing vocational training success moderated the predictive validity of various intelligence tests. It was significantly higher when success was operationalised by grades in the final exam rather than subjective ratings of trainers and supervisors. This was mainly due to differences in the reliability of both criteria. However, grades are only indirect criteria of training success based on the assumption that apprentices with good grades will be able to successfully transfer their knowledge into work performance. Supervisor ratings, on the other hand, are direct measures of this performance when put into practice.

Early validation studies of selection methods and predictors provided only poor results concerning their criterion-related validity. It was only after the introduction of meta-analytic approaches to validity analysis in the early 1980s that profound results of the validity of selection instruments have been made available (Robertson *et al.*, 2002a). This substantially increased researchers' confidence in the validity of selection methods, probably "the most significant change within the personnel selection research literature within the last decade" (Robertson and Smith, 2001, p. 442). Based on a meta-analysis of over 80 years of research, Schmidt and Hunter (1998) summarised the predictive validity for overall job performance of 19 different selection methods / predictors, some of the results are shown in table 3.1.

Method	Validity	
	alone	combined with 1)
1) Cognitive ability tests	.51	—
2) Biodata	.35	.52
3) Assessment Center	.37	.53
4) Work Experience	.18	.54
5) Unstructured Interviews	.38	.55
6) Personality Tests (conscientiousness)	.31	.60
7) Structured Interviews	.51	.63
8) Work Samples	.54	.63

Source: Schmidt and Hunter (1998, p. 265, modified)

Table 3.1: Validity of various selection methods

Different studies often led to variations in the validity coefficients which are mostly due to various sources of error in the data (Bartram, 2004). Furthermore, it is important to keep in mind that different predictors can only be compared on the basis of the same criterion for job performance. If done that way, a comparison of predictors can help so set up different selection strategies (Hunter and Hunter, 1984).

There is evidence that methods with very low predictive validity (e. g. graphology) are also among the least preferred by applicants (Marcus, 2003a). Thus there is no need to worry about the dilemma that higher social validity and acceptability may come at the price of lower criterion-related validity. Kersting (2006) quotes results from various studies indicating both validity and application in professional context of various methods as well as changes in the employment of the methods in the last ten years (see table 3.2).

Selection Method	Cognitive Ability Tests	Work Samples	Structured Interviews[a]	Assessment Centres	Unstructured Interviews[a]	Personality Tests[b]	References
Freq. of Use: 1993[c]	34	44	70	39	57	21	71
Freq. of Use: 2003[d]	30	45	82	58	34	20	57
Δ	-4	$+1$	$+12$	$+19$	-23	-1	-14
predictive validity	.62[e]	.54[f]	.44[g]	.37[h]	.33[g]	.27[i]	.26[f]
Sample Size	9,554	32,124	12,847	12,235	9,330	48,100	5,389

Source: based on Kersting (2006, p. 20, modified)

Table 3.2: Frequency of use and validity of various personnel selection methods

He concludes that changes in the attractiveness and use of selection instruments reflect the increase in knowledge of their validity. For example, unstructured interviews lost attractiveness in favour of structured selection interviews which reflects the fact the the validity of the first is substantially lower than that of the latter (.33 vs. .44).

In Germany however, there is still a strong reluctance towards the employment of methods that have proven to be highly valid predictors of future job performance, especially psychometric tests and cognitive ability tests (validity .62). Among the members of the European Union, Germany has the lowest frequency of use of psychometric tests and also personality inventories are avoided (Kersting, 2006). The relationship of the components of the prediction process in personnel selection as described in this section is summed up and integrated in figure 3.3:

[a] Frequency of use of selection interviews conducted by the HR department

[b] Frequency of use based on general personality tests, correlation coefficient based on conscientiousness tests

[c] Percentage of organisations that use the method during the selection process, source: Schuler, Frier and Kauffmann (1993)

[d] Source: Schuler, Hell, Trapmann, Schaar and Boramir (2007)

[e] Validation study: Salgado, Anderson, Moscoso, Bertua and de Fruyt (2003)

[f] Validation study: Hunter and Hunter (1984)

[g] Validation study: McDaniel, Whetzel, Schmidt and Maurer (1994)

[h] Validation study: Thornton, Gaugler, Rosenthal and Bentson (1992)

[i] Validation study: Barrick, Mount and Judge (2001)

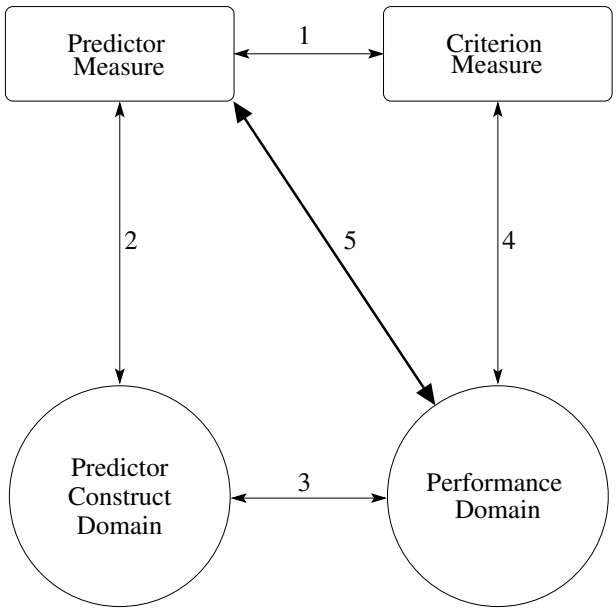

Figure 3.3: A common conception of the inferences in personnel selection (Source: Binning and Barret 1989, p. 480, modified)

Inference 1 describes the relationship between predictor measurements (predictor data in the words of Färber *et al.* 2003) and criterion measurements

Inference 2 shows how the predictor measure is an adequate sample from a psychological construct domain

Inference 3 indicates that the predictor construct domain overlaps with the performance domain.

Inference 4 represents the aforementioned criterion problem, i. e. the choice of the indicant of employee performance and success

Inference 5 is a representation of the predictor validity which is expressed by a correlation coefficient between both measures (Binning and Barret, 1989).

3.5 Content and process predictors: a closer look

One obstacle to finding a common language in personnel selection theory and decision making theory is the dual use of predictors describing both variables and methods. A variable is the *result of a measurement* while the method describes the *procedure of the measurement*. A brief look in the literature demon-

strates this confusing use of terms: Gatewood and Feild (2001) explicitly say that predictors are variables, but their book covers many predictors that are rather methods. Aguinis *et al.* (2001) talk of measures that are used to predict future performance, e. g. measures of cognitive ability. This point of view suggests the notion of the predictor being a measure or variable and the test being the method to gather the information. Anderson, Born and Cunningham-Snell (2001a) use the term *selection methods* when describing applicants' reactions to various selection devices.

In their review on personnel selection, Hough and Oswald (2000) use the term *predictor* in the sense of a characteristic of the applicant that is used to predict the criterion (i. e. job performance) and distinguish predictors and *assessment methods*, i. e. the means to gather information about the predictors used to predict future job performance. In this sense, a predictor would be general mental ability and an assessment method would be any particular ability test, e. g. the Wonderlic Test.

Other authors (e. g. Salgado *et al.*, 2001; Borman, Hanson and Hedge, 1997) do not make this dissociation and use the term predictors to describe both the characteristic and the method. They label an intelligence test "predictor" without referring to the construct of intelligence as predictor.

Schmidt and Hunter (1998, p. 271) use the labels personnel measures, predictors, and methods at the same time. They address this issue as they state that some of the measures are measures of single psychological constructs whereas others are methods rather than constructs. A method, in turn, might measure different constructs or combinations of constructs in different settings:

> "For example, employment interviews probably measure a combination of previous experience, mental ability, and a number of personality traits, such as conscientiousness; in addition, they may measure specific job-related skills and behavior patterns."

In this section, I will briefly summarise the results of the ample research on predictors, both content and process. I will first cover the two most often mentioned and described content predictors (personality and cognitive ability) and then deal with four methods that are mostly mentioned in the selection literature. For further reading on predictor research, several excellent reviews give comprehensive insight into the application and validity of various selection methods (Borman *et al.*, 1997; Gatewood and Feild, 2001; Hough and Oswald, 2000; Murphy and Bartram, 2002; Robertson *et al.*, 2002a; Salgado *et al.*, 2001).

Table 3.3 on page 46 provides an overview of the coverage of various selection methods in selected reviews and textbooks. The five predictors above the line are discussed in all analysed papers and books and thus presented in the following sections. The other predictors have less coverage and will not not be concerned in the further analysis.

Borman *et al.* (1997)[a]	Gatewood and Feild (2001)	Hough and Oswald (2000)[b]	Murphy and Bartram (2002)	Robertson *et al.* (2002a)	Salgado *et al.* (2001)
Abilities and Achievement (C)	Ability Tests	Cognitive Abilities (P)	Cognitive Ability Tests	Cognitive Ability Tests	Ability and Aptitude Tests
Personality (C)	Personality Assessment	Personality (P)	Personality Inventories	Personality Scales	Personality Scales
Interviews (P)	Selection Interviews	Interview (M)	Interviews	Selection Interviews	Interviews
Assessment Centres (P)	Performance Tests and Assessment Centres	Assessment Centres (M)	Assessment Centres	Assessment Centres	Assessment Centres
Biodata (P)	Application Blanks and Biodata	Biodata (M)	Biodata	Biodata Questionnaires[c]	Biodata
—	—	—	Work Samples and Simulations	Work-Sample Tests[c]	Work Sample Tests and Simulations
—	Application Forms & Reference Checks	—	Job Knowledge	References[c]	Job Knowledge Tests
—	Integrity & Drug Testing, Graphology	—	Integrity Tests	—	Physical, Psychomotor, and Perceptual Ability Tests

Table 3.3: Coverage of different predictors in the literature

[a] Borman *et al.* (1997) distinguish between predictor (C)ontent and (P)rocess
[b] Hough and Oswald (2000) distinguish (P)redictors and (M)ethods
[c] Robertson *et al.* (2002a) presented the marked methods under the heading “other”

3.5.1 Content predictors: variables in the prediction process

In this subsection, I will describe the two content predictors with the broadest coverage in literature (e. g. Schmidt and Hunter, 2000; Barrick and Mount, 2000): cognitive ability and personality.

3.5.1.1 Cognitive ability

The first predictor variable is cognitive ability, very often also labelled (cognitive) intelligence, general mental ability (GMA), or the g factor. GMA is a general factor representing the commonality of various specific skills like verbal, numeric, deductive, or spatial skills (Hülsheger *et al.*, 2006). It is generally operationalised as the common variance in a battery of cognitive ability tests (Borman *et al.*, 1997). Many authors (e. g. Carretta and Ree, 2000; Ree, Carretta and Steindl, 2001; Bertua, Anderson and Salgado, 2005) state that there is general consensus among researchers that cognitive abilities manifest a hierarchical structure with general cognitive ability opposed to specific cognitive abilities, such as numerical, spatial, verbal, and perceptual ability. In these models, the general factor usually accounts for more of the variance than do all the other specific factors (for alternative theories about the structure of intelligence see Sternberg, 2000).

Schmidt and Hunter (2000, p. 3 ff.) define intelligence as "the ability to grasp and reason correctly with abstractions (concepts) and solve problems [and] the ability to learn." They call it "the broadest of all human mental abilities." Neisser *et al.* (1996) provide a concise review of cognitive ability and intelligence reflecting the views of leading researchers on the nature of general intelligence, subgroup differences, the heritability of intelligence, environmental effects on intelligence, and a variety of related topics.

Intelligence is often called the best and most valid predictor of job performance (Smith, 1994; Schmidt and Hunter, 1998; 2000, see also table 3.1, page 41). It is nearly identical across gender and ethnic groups (Ree *et al.*, 2001) and shows a very high correlation with job performance ranging between .70 and .45 depending on the skill level of the task and on how performance is measured. The validity is mainly moderated by job complexity in the way that validity increases as job complexity increases (Bartram, 2004). The high impact of intelligence on job performance is basically due to the effect that intelligence has on learning: "GMA causes job knowledge, which in turn causes job performance" (Schmidt and Hunter, 2000, p. 5, see also Ree *et al.*, 2001). However,

the role of GMA as a predictor of job performance is still discussed controversially and Borman *et al.* (1997, p. 306) quote a number of studies that contradict the alledged superiority of this predictor for all kinds of jobs:

> "the most important note of caution is the fact that our understanding of the basic cognitive processes that underlie intelligent behavior and the reasons some people are more able than others is still quite limited."

Robertson *et al.* (2002a) sum up concerns about the use of intelligence in the selection context. There are other basic abilities possessed by most successful individuals that are not covered by traditional measures of intelligence but that nonetheless represent fundamental aspects of human intelligence. One of these abilities is *practical intelligence* (Wagner, 2000), the ability to solve problems in the real world rather than in abstracts contexts. Another kind of intelligence widely discussed in popular and practitioner-oriented literature is *emotional intelligence*, the ability to perceive, understand, and manage emotions. Witt and Burke (2002) point out that effective social relationships are increasingly critical to the success of IT professionals. Anyhow, Robertson and Smith (2001) state that—so far—there is neither empirical evidence to prove that practical intelligence is a more effective predictor of subsequent job performance than GMA nor published studies to demonstrate the criterion-related validity of emotional intelligence.

Schmidt-Atzert, Deter and Jaeckel (2004) posit that in the context of vocational training success, g was the best predictor only for success in the theoretical exams while the results of practical tests have been better predicted by other factors, e. g. mechanical comprehension or orthographic knowledge.

The role of GMA is especially significant in the IT industry. Witt and Burke (2002, p. 45) state that GMA is highly important to predict the cognitive side of job performance.

> "Individuals with greater GMA are likely to write code with fewer errors, solve systems problems more effectively, generate solutions more quickly and innovatively, and so on."

Despite the aforementioned arguments, selection professionals do not seem to be aware of the importance of GMA and many managers base their selection decisions on conventional wisdom and on the basis of their professional experience rather than taking into account recent studies showing the validity of GMA (Dunn *et al.*, 1995; Rynes, Colbert and Brown, 2002).

3.5.1.2 Personality

The second predictor variable generally covered in research and literature is the candidate's personality which is mostly described using the *Five Factor Model (FFM)*, also known as the "Big Five" personality traits (Digman, 1990; Barrick and Mount, 1991). The model is a robust taxonomy of personality which has been proved to be stable across language, ethnicity, age, and gender (Witt and Burke, 2002; Costa and McCrae, 1992; Goldberg, 1993; Barrick and Mount, 1991) and can be considered to be the "most widely studied typology of personality" (Kristof-Brown, Barrick and Franke, 2002a, p. 31). A concise historical review on its emergence has been provided by Mount and Barrick (1995).

There is general agreement among researchers concerning the number of factors although their precise meaning and labelling is still disputed (Barrick and Mount, 1991, p. 3). The literature on the FFM is ample and detailed descriptions of the Big Five can be found in John, Angleitner and Ostendorf (1988); John (1990a;b); Digman (1990); Costa and McCrae (1992); Wiggins and Trapnell (1997); Antonioni and Park (2001); Witt and Burke (2002), or Barrick, Mount and Gupta (2003). In summary, the model consists of the following five personality traits:

Emotional Stability: the disposition to be optimistic, calm and well adjusted, and self-confident. The opposite, *neuroticism*, can be described by traits like anxiety, depression, and embarrassment.

Extraversion: the disposition to be talkative, assertive, and sociable.

Openness to Experience: the disposition to intellectual curiosity and independence of judgement, and the attention to inner feelings.

Agreeableness: the degree of empathy and cooperativeness in a social context, like helpfulness and tolerance. People scoring high on this factor are often tolerant, friendly, and trustworthy and have better conflict resolution strategies.

Conscientiousness: the ability to control one's impulses (e. g. to delay gratifications), often in conjunction with long-term plans and an organised support network. High conscientiousness is associated with a focus on goals, being disciplined, responsible, and systematic, whereas low conscientiousness is often related to procrastination, and being unproductive, unorganised, and irresponsible.

Stevens and Ash (2001) point out that until the mid-1960s, researchers and practitioners thought personality inventories to be of little use in personnel selection. This viewpoint changed with the emergence of more sophisticated taxonomies—especially the FFM—so that today, there is consensus among re-

searchers that personality is both consistent across adulthood and predictive of job-performance and career success over years. It does also influence virtually all kinds of organisational behaviour such as career and occupational choice, training, organisational health, job satisfaction, and leadership (Hough and Ones, 2001). According to Mount and Barrick (1995), the emergence of the FFM helped to provide a long missing framework for the examination of the relationship between personality and performance and fanned the increased interest in personality measures at the end of the last century.

Bartram (2004) points out that personality measures tend to be independent of ability measures and thus can contribute to personell selection by significantly increasing the incremental validity of a selection battery. This is due to the fact that, while GMA is a 'can do' component, the Big Five, especially conscientiousness and emotional stability, are 'will do' components of work motivation (Barrick and Mount, 2005; Wood and Beckmann, 2006).

Not all five factors are equally good predictors of employee performance. Barrick and Mount (1991) found that conscientiousness is a consistently valid predictor across different types of jobs and occupational groups so that "it is difficult to conceive a job in which the traits associated with the Conscientiousness dimension would not contribute to job success" (p. 21 f.). Secondly, emotional stability is a good predictor, although with less consistence. This is supported by Salgado (2003) who additionally found that the predictive validity of those two personality factors was higher when the personality inventories were based on the FFM as opposed to non-FFM inventories. This positive relationship is especially exerted in the long run as meta-analysis found that the effects are accumulated and compound over time (Barrick and Mount, 2005). Next to these two "generalisable predictors" the other three factors exert their predictive validity only in specific niches (Barrick and Mount, 2005). For example, extraversion was found to predict performance, but only in some types of jobs, particularly those related to sales and management.

Personality traits do not only bear importance to the individual employee but also to whole teams. Barrick, Stewart, Neubert and Mount (1998) found that teams with a high mean conscientiousness, agreeableness and emotional stability of their members show higher performance (supervisor ratings). Interestingly, with respect to the two latter variables, these results differ from the findings of Barrick and Mount (1991) at the individual level where both traits have not been found to be consistent predictors of job performance. Similarly, personality traits do also affect team viability (the capability of team members to work cooperatively over a longer time). In this case, not only the mean score shows the effect, but also the minimum score: a single team member without the disired traits can negatively affect the whole team (Barrick *et al.*, 1998).

Despite the mentioned advantages of the FFM both as a taxonomy of personality traits and as predictors of job performance, the concept is not free of criticism (for an overview see e. g. Block, 1995; Hough and Ones, 2001). When personality traits are included in hirability decisions, their relative importance is significantly moderated by the methods used to assess those predictors (Lievens, Highhouse and De Corte, 2005). Furthermore, there is little knowledge about how well the various instruments used to establish the personality requirements of a job are able to identify the traits that are good predictors of subsequent job performance (Robertson and Smith, 2001).

Other authors (e. g. Paunonen, Rothstein and Jackson, 1999; Hough and Oswald, 2000) state that work performance is better predicted by more specific factors than the rather broad Big Five, e. g. emotionality and social competence. Abele-Brehm and Stief (2004) found that a person's concept of self-efficacy expectation, the career and growth expectations, and a masculine self-concept are valid predictors of a successful career start. Similarly, Hough and Ones (2001) state evidence that personal integrity is a valid predictor of many kinds of counterproductive behaviour such as absenteeism, violence, or tardiness.

Next to these criticism and despite the mentioned advantages of personality traits as predictors of job performance, practitioners are not much aware of personality issues when making their selection decisions. In the exploratory interviews conducted for this thesis (see chapter 4), personality played only a minor role and with one exception, none of the interviewees was able to use correct personality taxonomies. This is in line with the findings of Johns (1993) and Anderson, Herriot and Hodgkinson (2001b) who found that practitioners are often constrained from applying psychology-based practices in their daily work.

3.5.2 Process predictors: methods to gather information

As mentioned in the introduction to this chapter, predictors do often describe the methods used to gather information about the applicant (e. g. Smith and Robertson, 1986). Borman *et al.* (1997) called those predictors "process predictors" but other terms are equally used: for example, Gatewood and Feild (2001, p. 20) use the term *selection devices* and Bartram (2004) calls them *selection assessment practices*. Evers, te Nijenhuis and van de Flier (2005) use the terms "test" and "predictor" in an interchangeable manner to refer to all kinds of selection instruments or methods that are used to gather information on the criteria (e. g. cognitive tests, work samples, interviews, personality inventories, assessment centres, biodata).

According to Färber *et al.* (2003), a selection method is *either* the assessment of the aptitude for a job based on selection criteria *or* the whole process from collecting data to the actual prediction. Selection methods do not only play an important role as a means to gather information on applicant attributes used as decision cues; they also influence the way those information is processed in the decision making process. For example, GMA and extraversion have a higher relative importance when the selection professionals know that they are derived from an unstructured interview than from a paper-and-pencil test (Lievens *et al.*, 2005).

Murphy and Bartram (2002) state that personnel selection is always a multivariate process as organisations usually employ more than one method when hiring. Many methods cover multiple domains like cognitive ability and personality reflecting that job-performance is complex and multi-dimensional. The employer's use of different selection methods and the choice among them does certainly depend on a number of factors, such as demographic characteristics of the HRM practitioner, the firm's industry (Terpstra and Rozell, 1997), the firm's national culture (Ryan, McFarland, Baron and Page, 1999), or characteristics of the work itself (Wilk and Cappelli, 2003).

Terpstra and Rozell (1997) showed that lack of familiarity, concerns about usefulness, legal concerns, and resource constraints are important reasons why potentially useful selection practices are not used by many organisations. Legal regulations like anti-discrimination legislation and the fear of being sued for adverse impact strongly influence the choice of particular instruments (e. g. Robertson *et al.*, 2002a). In Germany for example, psychological tests such as personality inventories have for long time only been available to certified psychologists, a fact that probably reduced their use in many German firms (Hossiep and Mühlhaus, 2005).

Klehe (2004) offers some explanation why organisations often tend to use selection procedures that are not recommended by selection researchers due to their low validity. Taking an institutional perspective, she explains how institutional pressures (e. g. the need to use inexpensive methods that are simple to administer and pay off in the short run) influence the selection decision makers and that do often have a greater weight on the choice of selection procedures than the recommendations of I / O psychologists. Among the factors affecting this diversity, firm size plays an important role as smaller firms lack the people and resources to accumulate the necessary specialist knowledge and skills for sophisticated methods (Bartram, 2004).

Schuler *et al.* (2007) found that the predominance of the employment interview and application document analysis in German firms had hardly changed over the last twenty years. The use of assessment centres continuously increased

in the same period while the use of psychometric tests remains at approximately 30 % of large German firms with ability tests being slightly more used than personality scales. Schuler *et al.* (2007) are happy that the use of more valid methods increased while methods with little to nil validity (especially graphology) are hardly used anymore.

Research has shown practitioners' preference for subjective selection procedures, experiential data, intuitive thinking, and personal evaluations (e. g. Dipboye, 1994; Highhouse, 2002). A reason for this preference might be the belief that humans can become intuitive experts in predicting future behaviour (Kleinmuntz, 1990). Another factor influencing the choice and use of different selection devices is the applicant's reaction to the method and how the use of specific methods consequently affects the applicant's decision to accept or reject a potential job offer or the general attitude towards the organisation. Applicant perception of selection processes and methods is basically based on the concept of organisational and procedural justice and influences the applicants' further reactions in the selection process up to the question whether they will finally accept a job offer and their attitude in the new position (Gilliland, 1993).

Interestingly, applicants rate instruments that have shown to be rather unreliable, like job interviews, very positive (i. e. they lead to higher evaluation of organisational attractiveness), whereas instruments with a high criterion-related validity, like personality tests, are rated negatively (Reeve and Schultz, 2004; Carless, 2006). Marcus (2003a) investigated cultural differences in applicant reaction to various selection procedures. He found that across different countries (the US, France, and Germany), applicants preferred interviews, work sample test and résumés while being neutral to most forms of written tests and strongly objected personal contacts and graphology.

In the following, I sum up some of the insights literature and research provide on four selection methods common to most literature sources.

3.5.2.1 Psychometric tests

As described in section 3.5.1, the two most often used content predictors of occupational performance are cognitive ability and personality. Although selection professionals do often infer on them from other attributes (e. g. interview behaviour, academic grades), they are best assessed using proven psychometric tests.[5]

[5] See Sarges and Wottawa (2005) for a comprehensive overview of more than 100 different German tests used in the field of I/O psychology (not limited to the context of personnel selection).

> A psychometric test is "a carefully chosen, systematic and standardised procedure for evoking a sample of responses from a candidate, which can be used to assess one or more of their psychological characteristics by comparing the results with those of a representative sample of an appropriate population."
>
> (Smith and Robertson, 1986, p. 152)

Tests can be dissociated from other diagnostic instruments in the context of personnel selection by their ability to provide information about a person's behaviour and experience that is psychometrically valid as well as comparable (Sarges and Wottawa, 2005, p. vii).

Although psychometric tests usually yield high validities, their use by German selection professionals is still underdeveloped, especially compared with Anglo-American countries (Murphy and Bartram, 2002; Sarges and Wottawa, 2005; Hossiep and Mühlhaus, 2005). For example, Schuler *et al.* (2007) found that German practitioners ascribe low validity to cognitive ability tests in particular and psychometric tests in general. They tend to both prefer and ascribe high validity to those methods in which they can actively observe applicant behaviour and can control the situation, like the interview or assessment centre. Furthermore, there are also concerns about the use of psychometric tests on the applicant's side. With respect to the social acceptance of psychometric tests, Marcus (2003a, p. 527) stated that "a lot of myths surround psychological testing—ranging from 'complete nonsense' to 'big brother is watching you'—are discussed in Germany." However, he also found that the applicant's attitude towards psychometric tests is likely to change substantially after a test had actually been administered. However, the directions of these changes have been almost equally distributed and did not substantially correlate with the participant's personality.

In the following two sections, I will briefly describe the two major types of psychometric tests that are used in the field of personnel selection. A very coarse classification distinguishes ability tests and personality tests (Sarges and Wottawa, 2005). According to Rost (2004), the first demand for maximum behaviour (e. g. to prove a candidate's cognitive capacity) whereas the latter demand for typical behaviour (to collect information about a participant's personality).

Ability Tests

Ability or aptitude tests seek to represent the testee's maximum ability or performance with respect to a particular area, in the case of personnel selection mostly cognitive ability. One of their major characteristic is the fact that the

results can only be manipulated in one direction, to the worse. A person can pretend to be less intelligent but cannot fake the results to pretend to be more intelligent than he or she actually is. For this reason, aptitude tests are often called *semi objective* (Rost, 2004).

In line with the finding that GMA does strongly affect job performance (see section 3.5.1.1), cognitive ability tests are viewed as a very good—if not the best—and highly consistent predictor of job performance as well as of training success in many different occupations both in the US and in the UK (Hunter and Hunter, 1984; Huffcutt, Roth and McDaniel, 1996; Schmidt and Hunter, 1998; Salgado and Anderson, 2003; Bertua *et al.*, 2005).

Despite their very convincing ratio of validity and practicability, which would make them the preferred method for personnel selection, cognitive ability tests have some important shortcomings. Firstly, the variation in the intelligence of highly qualified applicants for senior jobs is supposedly very small. When all applicants show high levels of GMA, the small differences in test scores (which might also be due to measurement errors) are often not large enough to make a meaningful comparison among applicants (Robertson *et al.*, 2002a). Secondly, there is consensus about the fact that mental ability tests scores tend to vary as a function of race and ethnicity and thus their sole use as selection instrument might lead to indirect discrimination of members of certain protected groups (Hunter and Hunter, 1984; Murphy and Bartram, 2002). Finally, Taylor and Small (2002) stated that maximum performance measures are not able to assess differences in an individual's motivation to transform the possessed capacities to day-to-day job performance, because in the test situation, all performers are motivated to perform well.

Personality Inventories

Personality inventories can be used to gather information on the candidate's preferences and the typical way of thinking and acting in specific situations. They have gained importance due to the now generally accepted evidence of relationship of certain personality traits (particularly conscientiousness and emotional stability, see Salgado 2003) with job performance (Murphy and Bartram 2002, see also section 3.5.1.2).

Personality tests can be subdivided into *tests of structure* (e. g. the NEO-PI) and *tests of type* (e. g. the MBTI and its derivatives).[6] The first group aims at representing the structure of human personality by various attributes / traits that are depicted on different continuous scales. The latter cluster attempts to group

[6]The NEO-PI (Costa and McCrae, 1992) is a very popular test to assess the Big Five Personality traits, the MBTI (Bents and Blank, 1992) is a personality test based on Jungian personality types

its participants in one of several categories (e. g. 16 in the case of the MBTI) using discrete, bipolar scales. These tests are usually based on rather ancient psycho-analytic theories of personality dating back to the 1930s, e. g. those of C. G. Jung (Hossiep and Mühlhaus, 2005).

Hough and Ones (2001) state that most of the personality measurement in applied settings is based on *self-reports* which has been source of much concern. According to Rost (2004), self-report measures have three requirements: (a) *metacognition*, (b) willingness to *self-disclosure*, and (c) a proper *yardstick for appraisal*. Without a sufficient level of metacognition, which represents the testee's proper insight into the own cognitive processes, there will be a discrepancy between the testee's self-perception of personality and the true personality. Without the willingness to self-disclosure it might be that the participant discloses his ideal self-perception instead of the real one (Hossiep and Mühlhaus, 2005). This problem is particularly salient in selection situation when the candidate has a strong incentive (getting the job) to show self-monitoring and act in a socially desired way (Barrick and Mount, 2005). Without a proper yardstick the testee will not be able to compare his own reaction with those of others and calibrate the answers.

Apart from these requirements, there are two important demands the test itself must meet. It must not be transparent and it should not be fakeable. These concerns are linked to the test's *face validity* (see section 3.4.3). Issues of faking tests and social desirability in answering questions have often been raised against using personality tests in applied settings (Ones and Viswesvaran, 1998). If the participant can easily perceive the criteria that are measured and which items are related to which criterion, he or she can try to fake the test, especially if there is an incentive to act in a socially desired manner. This incentive will be particularly greater if the test is used in a selection situation rather than in a development situation. The underlying fear is that honest individuals (who do not attempt to fake the test) will be rejected while those who answer in a socially desired manner and attempt to fake will be selected. However, Ones and Viswesvaran (1998) found no empirical evidence for this intuitively appealing argument.

The question whether faking personality tests is an issue in the context of personnel selection is subject to some controversy in Germany (Marcus, 2003b; Kersting, 2004; Melchers *et al.*, 2004). On the one hand, transparent tests are not less valid than their intransparent counterparts and socially desirable behaviour in test situations can even be a predictor of future job performance on its own as it might be regarded as a facet of social competence (Marcus, 2003b; Melchers *et al.*, 2004; Ones and Viswesvaran, 1998). On the other hand, the use of selection procedures that are regarded as unfair or unfavourable might dis-

courage candidates from entering the application process and thus narrow the applicant pool which is especially detrimental when qualified employees are a scarce resource (Kersting, 2004).

In order to overcome the shortcomings of personality questionnaires, *objective personality tests* have a low face validity and are not transparent. These tests use items to judge the testees' personality which have no direct and obvious link to the criteria to be measured. This concept requires a non-trivial theory about the relationship between intransparent items and relevant aspects of personality which is difficult to conceive. Consequently, this type of tests only plays a minor role in academic psychology (Rost, 2004, p. 46).

3.5.2.2 Interviews

The employment interview is a procedural method that helps the decision maker to gather a multitude of information which is subsequently used as cues in the selection decision. For a review on different types of interviews see Dipboye (2005) or McDaniel *et al.* (1994).

There is consensus among researchers and practitioners that selection interviews are one of the most frequently used and most popular selection methods (e. g. McDaniel *et al.*, 1994; Evers *et al.*, 2005). Their popularity is so high that Murphy and Bartram (2002, p. 93) call them the "nearly universal component of all systematic personell selection strategies." Interviews seem especially popular in smaller organisations (Gatewood and Feild, 2001, p. 561), as they are easy to administer and thus a very cheap means of gathering information on applicants.

According to Barclay (1999; 2001), their popularity with practitioners has various reasons: interviews are accepted as selection tools by selection professionals as well as applicants, they are very similar to other social functions well known to managers (e. g. selling, persuading, and negotiating), they are less expensive and time-consuming than other methods of selection (e. g. tests or assessment centres), and they allow to convey a positive image of job and organisation to the applicant better than other forms of applicant evaluation.

Not only selection professionals but also candidates seem to prefer interviews over psychometric tests as they believe that an interview allows them to present themselves more favourably than a test (Silvester and Brown, 1993).

Despite their popularity and widespread use, interviews have many shortcomings, e. g. stereotyping of applicants, primacy effects, interviewer overconfidence effects, or negative information weighting bias (e. g. Anderson, 1992; Barclay, 1999). These problems are deeply rooted in the nature of the interview which puts high demands on the skills of the interviewer. Because the job inter-

view, especially the unstructured alternative, leads to a multitude of information and cues, it depends on the interviewer whether valid or invalid cues are used in the actual decision (Kinicki, Lockwood, Hom and Griffeth, 1990). This in turn puts the emphasis on the information processing skills of the interviewers and their ability to use multiple criteria in the evaluation of candidates as well as their ability to combine information in decision making (Graves and Karren, 1996).

Although many interviewers lack the necessary skills and capacity to combine and use the information properly, they are subject to the overconfidence effect, i. e. they believe that they are capable of making sound decisions although they are not (Dipboye, 1994; Highhouse, 1997). Among the reasons for this effect is the fact that the detailed information which can be gathered during the unstructured interview process gives the decision maker an erroneous sense of diagnosticity and security (Kleinmuntz, 1990)

Furthermore, job interview outcomes are particularly susceptible to applicant influence tactics, i. e. specific actions or behaviours of the applicant (e. g. opinion conformity) applied to convey a positive image (e. g. Stevens and Kristof-Brown, 1995; Baron and Kenny, 1986; Gilmore and Ferris, 1989; Higgins and Judge, 2004). Kristof-Brown *et al.* (2002a) showed how candidates use various tactics of impression management whose use depends on their personality, especially on the degree of extraversion and agreeableness.

Consequently, badly constructed interviews lack the differentiating power among applicants because they focus on general questions about career goals or the self-assessment of strengths and weaknesses (Kinicki *et al.*, 1990). This might induce that the majority of applicants appears to be equal on the relevant aspects and the choice will be very difficult (Gatewood and Feild, 2001, p. 20 f.).

The aforementioned shortcomings have caused academic psychologists to dismiss interviews—particularly the unstructured interview mostly chosen by untrained and unprofessional selectors—and ban them from the toolbox of valid selection devices (McDaniel *et al.*, 1994). In recent years however, this viewpoint has changed due to new research methods (Huffcutt *et al.*, 1996) and it is now clear that interviews can be a valid selection method if they are carefully and appropriately structured and criterion referenced (Campion, Palmer and Campion, 1997).

The notion that adding structure greatly improves selection interviews is shared by a large number of authors (e. g. Hough and Oswald, 2000; Barclay, 2001; Robertson and Smith, 2001; Murphy and Bartram, 2002; Bartram, 2004) and

meta-analytic reviews of research on selection interviews (e. g. McDaniel *et al.*, 1994) support this point of view: structured interviews are more valid than their unstructured counterparts for predicting job performance criteria.

A major advantage of structured interviews is that they require the selection professional to have a clear idea of the requirements of the vacant job. In order to make the structured interview really efficient, the questions asked have to be drawn closely around the required competencies. This urges the selection professional to put more effort in the preparation of the interview (Barclay, 2001). Antother advantage is the possibility to score the candidates with rating scales. Campion *et al.* (1997) noted that those scales are strongly recommended to facilitate easy comparisons among the candidates and they are an effective means to reduce subjectivity and gut feeling in the decision process.

Two major techniques of structuring interviews have received considerable attention in the literature (e. g. Barclay, 2001): the *situational interview* and the *behavioural description interview* (Latham and Skarlicki, 1996). Both techniques focus on observable behaviour and are based on the critical incident theory (Flanagan, 1954).

Situational interviews pose hypothetical situations with relation to situations that may typically occur on the job and ask the applicant what he / she *would do* in that kind of situation. On the other hand, behavioural interviews concentrate on past behaviours of the applicant and ask what he / she *actually did* in situations similar to those in question (Krajewski, Goffin, McCarthy, Rothstein and Johnston, 2006). Barclay (2001) states that one advantage of behavioural interviews over situational interviews is that candidates are not restricted to work experience to describe their competencies. They can also recur to situations outside the job, e. g. experiences made in volunteer work or during their university education. Consequently, this type of interview is more suitable for the selection of recent graduates or young professionals with little working experience.

Taylor and Small (2002) posited that situational interviews mainly measure the knowledge-based aspects of job performance while the behavioural interviews are able to measure both knowledge-based and motivational aspects of job performance. This might be a reason that the meta-analysis conducted by these authors found higher criterion-related validities for the latter type of structured interviews. In a recent study, Krajewski *et al.* (2006) showed that the behavioural interview outperformed its situational counterpart with respect to the prediction of managerial job performance and that the first incrementally predicted performance over the latter. Only the past-behaviour structured interview evidenced a consistent pattern of significant relations with the managerially relevant facets of cognitive ability as well as with relevant personality traits such as achievement orientation and dominance.

Summing up their findings, Krajewski *et al.* (2006) suggest that situational interviews are not suitable as selection tools for managerial positions. They might be used to assess applicants' probable work styles or the match of their values to those of the hiring company but behavioural interviews are better suited to predict the applicants' performance of job-related behaviours, the extent to which they possess managerially relevant personality traits and cognitive ability. This is supported by the review of Salgado (1999) who found that past-oriented questions yield a higher validity than future oriented questions.

Behavioural interviews are particularly linked with the competency approach (see section 5.2) as competencies are reflected in peoples' behaviour (Boyatzis, 1982; Janz, 1982; Motowidlo, Carter, Dunette, Tippins, Werner, Burnett and Vaughan, 1992; Rees and Doran, 2001; Murphy and Bartram, 2002). In her study on structured interviews, Barclay (2001) found that changes in the use of behavioural interview techniques have often been related to the use and definition of the competencies used for selection.

3.5.2.3 Assessment centres

The assessment centre (AC) method is based on various roots such as military assessment programs in both world wars, early personality research, and leadership / supervision job analysis research (Thornton and Byham, 1982).[7] Introduced to the business context by AT&T in the 1950s, it is today extensively used both in personnel *selection* and in HR *development* (Obermann, 2002). It is commonly regarded as a fair and relatively unbiased method of information gathering and decision making (Murphy and Bartram, 2002).

Despite its name, an assessment centre is not a place but a process of assessment (Robertson *et al.*, 2002a) which can be defined as "a structured combination of assessment techniques that is used to provide a wide-ranging, holistic assessment of each participant" (Murphy and Bartram, 2002, p. 96). The AC aims "to give multiple expert raters several opportunities to view performance under controlled stimulus conditions" (Jones, 1992, p. 195). Following the principle of simulation, the AC draws on the applicants' actual "experience" of potential tasks of their future job. In this context the candidate's personality is unimportant as opposed to the question how a specific challenging situation will be dealt with (Anderson, Payne, Ferguson and Smith, 1994; Obermann, 2002).

Although assessment centres have both shown high validity and are at the same time regarded as valid and useful method by practitioners (Schuler *et al.*, 2007), there are also concerns about their validity. One issue is the question

[7] For critical reviews of the history and use of Assessment Centres see Kompa (2004) or Obermann (2002).

whether it is the validity of the overall process (as done by most validation studies) or the validity of the component parts of the process that is assessed. Despite the fact that ACs show considerable criterion-related validity, Robertson *et al.* (2002a) doubt their construct validity and conclude that *what* is measured by the AC (i. e. the source of the criterion validity) remains unknown (for another critical review of assessment centre construct validity see Jones, 1992). In an earlier publication, Robertson and Smith (2001) stated that the primary construct measured by an AC was GMA.

Practitioners sometimes raise the question of utility. Due to the high costs of this methods each organisation has to decide whether other and cheaper procedures can yield applicant information with similar degrees of predictive validity (Robertson and Smith, 2001). In their review on selection methods, Hough and Oswald (2000) suggest several means to improve AC ratings, including limiting the AC to only a few conceptually distinct constructs, concrete and job-related construct definitions, assessor training with evaluative standards, cross exercise assessment, and the use of psychology-trained assessors. Similarly, Wick (2007) described how the AC-method might be improved by using the specific expertise of the assessors in their particular domain of experience and make them concentrate on those dimensions that do particularly match their expertise. For example, assessors from the HRM might focus on social and personal competencies, line managers on the subject competencies, and the future direct supervisor might focus on the person-team fit and personal sympathy.

3.5.2.4 Biodata questionnaires

The last process predictor that I will briefly look at is the use of applicant's biographical data. It is very common to analyse the biographical information provided by the candidate, including experiences in family, school, or prior jobs as well as hobbies and other pursuits (Schmidt and Hunter, 1998). The underlying principle of biodata assessment is the so-called consistency principle, i. e. the notion that past behaviour is the best predictor of future performance (Hough and Oswald, 2000).

Biodata are ascribed substantial and generalisable criterion validity as well as established construct validity (Salgado, 1999). Murphy and Bartram (2002) state that biodata evaluation is—if the systems applied are empirically validated—among the most valid and cost-effective selection methods. Schmidt and Hunter (1998), however, posit that although biodata questionnaires are easy to use once constructed, their construction is technically difficult and time consuming.

This method, however, has some particular shortcomings which include the fact that the links between biodata and success are not necessarily generalisable across jobs or organisations and—maybe even more important—that assessments made on biodata might lead to direct or indirect discrimination against people protected by equal opportunities legislation (Murphy and Bartram, 2002). Furthermore, they point out that the methods used to analyse biodata sources have to be profound and empirically validated. The commonly used methods, however, do often merely scratch the surface of the useful information contained in the sources. Similarly, Hough and Oswald (2000) states that the distinction between negative and positive aspects of past behaviour is often in the eye of the beholder and a clear taxonomy of positive and negative responses to elements of a broader life-events may be needed.

3.6 Using applicant attributes as decision cues

In the last sections, I have differentiated selection criteria, predictors and decision cues used in selection. While I have shown which predictors—both content and process—are generally regarded as valid in selection theory, practitioners use many more applicant attributes as decision cues than those described before. Very often decisions are based on conventional wisdom and on the basis of the decision maker's professional experience (Dunn *et al.*, 1995) and there are many other factors that are likely to enter into the selection decision, e. g. an intuition about a specific applicant or the desire to balance the demographic composition of the workforce (Gatewood and Feild, 2001, p. 23). Hooghiemstra (1992) state that selection professionals tend to look at the requirements of successful job-performance in an unstructured and unfocused way and often make too many demands on applicants which cannot be fulfilled. The criteria used during selection do often lack the link to corporate strategy and are not specific enough.

In this section, I attempt to systematise and categorise at least part of the mass of attributes, some of which are more or less valid indicants of future job success while others are mere representatives of implicit models of the decision maker. Overall, I reviewed 41 papers in the context of personnel selection. The attributes found are organised according to their internal relatedness and similar criteria are clustered if possible. This lead to a final number of 33 cues which are presented in figure 3.4.[8] Following Kinicki *et al.* (1990), I grouped the

[8]For the sake of clarity, the figure only represents the attributes and their categorisation. An extended table indicating the sources of the attributes as well as additional notes can be found in table A.1 in the appendix.

attributes in four categories: (1) professional background attributes, (2) socio-demographic attributes, (3) psychometric attributes, and (4) miscellaneous attributes. However, the dissociation is sometimes fuzzy and it remains unclear to which category an attribute belongs. Ree *et al.* (2001, p. 221) pointed at the problem stating that

> "human characteristics, especially job-related characteristics, are intercorrelated. Selection on one constitutes indirect selection on all correlated variables. This can have undesirable effects on observed correlations."

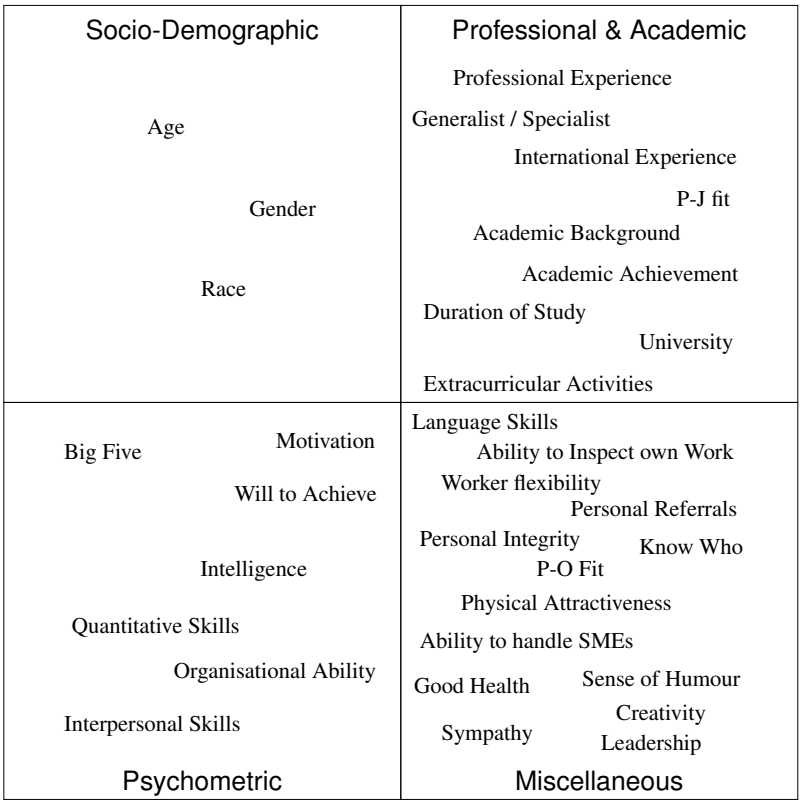

Figure 3.4: Categorisation of applicant attributes used as decision cues in personnel selection

This review only represents an extract of possible implicit or explicit decision cues as the total of implicit cues used in selection is so large that it is nearly uncountable. Partially they are socially undesirable but so deeply rooted in the decision maker's personal convictions that they would not be omitted even if they were made aware (Wick, 2007).

Furthermore, many cues can be broken down into finer and finer sub-cues according to the decision maker's preferences. For example, the criterion *educational background* might, in a very broad sense, refer to whether or not the candidate has an academic education. However, decision makers might also take into account the details of the academic background and emphasise sub-criteria like the educational programme attended, the major subjects, the university, or the duration of the studies.

Many of the applicant's attributes are used as indicants of other less visible attributes or hypothetical constructs like intelligence, personality or motivation. However, the exact relation which the decision maker hypothesises often remains unknown and unclear. For example, a candidate's extraordinary academic achievement represented by his / her GPA (grade points average) can both indicate high cognitive ability, strong achievement motivation or a combination of both factors.

Finally, many assessment techniques and judgemental information processing methods combine characteristics and attributes that are truly job related (e. g. cognitive ability or interpersonal skills) with those that have no connection to later job-performance and are most probably sources of irrelevant biases (e. g. physical attractiveness, Murphy and Bartram, 2002).

Socio-Demographic attributes

The first cluster of cues contains attributes related to the applicant's socio-demographic background. Selection professionals do often include the candidate's age, gender, or ethnic and racial background in their decision making, if not openly, then implicitly.

However, due to anti-discrimination legislation in the US as well as in Europe[9] the use of most socio-demographic cues is very problematic and might cause legal actions against the organisation.

Among the reasons why age is still used as an implicit decision cue might be the fact that many selection professionals do believe that age is related to job performance and fear that older candidates are less able to perform than younger ones. Research, however, did not confirm this hypothesis and Schmidt and Hunter (1998, p. 271) conclude that age "is about as totally unrelated to job performance as any measure can be."

Other firms try to establish or to maintain a certain age structure of their employees and thus want to recruit applicants that fit a particular age bandwidth. In this sense, age is related to P-O fit. Wichert and Zange (2007) state that law

[9] In Germany, the General Equal Treatment Act (AGG) prohibits any discrimination based on gender, age, ethnic background, physical or mental handicaps, sexual orientation, and religion.

firms and consultancies have established a particular difference in standing and reputation of (younger) associates and (older) partners. This is also recognised by their clients and makes it necessary to operate with teams that consist of members of all age ranges. Consequently, it is at least partially justified to hire new people at entry level positions that fit a particular age range and whose style of work is free of firm specific routines and thus can still be shaped by the employer.

Although many studies showed that applicant gender is often used as a selection criterion (e. g. Marlowe, Schneider and Nelson, 1996), Graves and Powell (1988) stated that the effect was considerably smaller than expected: the direct effect on interview outcomes was not significant and was greatly exceeded by the effect of subjective qualifications. However, when other aspects like qualification were kept equal, gender did significantly influence hiring decisions and men were perceived as more suitable and more likely to advance to an executive level than women (Marlowe *et al.*, 1996).

Professional & Academic Background

The next cluster of cues is related to the professional and academic background and experience of the candidate. An important criterion is often labelled professional experience or work experience. It describes the experiences the applicant made in in similar jobs and lead to transferable knowledge that can be applied to the new position. Schmidt and Hunter (1998) point out that this criterion effects its main influence on job performance indirectly through the opportunity to accumulate job knowledge. However, other sources state that the marginal benefit of professional experience strongly decreases after five years of experience (Schmidt and Hunter, 2000). Related to these questions are details of the experience. Depending on the particular type of job opening, the *international character* of prior work experience might be important. This, in turn, might also be obtained by an international education or studies abroad. The international experience will ultimately lead to the language skills of the candidate, although staying abroad is not the only means to obtain good language proficiency. The type of prior work experience will, in association with the type and scope of the academic education, lead to the answer to the question whether the applicant is more generalist or specialist. Depending on the type of the vacant position and on the culture of the firm, the preference can be either of both.

The candidate's academic background is also important. The first and basic question will be whether an academic education is required to fill the position or not. Furthermore, the level of education (master vs. bachelor degree) might be important to judge the qualification of the applicant. In Germany, the question from which type of university (scientific university—*Universität*—,

university of applied sciences—*Fachhochschule*—, or university of cooperative education—*Berufsakademie*) the applicant graduated is often very important because it determines the profoundness of the academic education. Related to the academic background of the candidate is academic achievement and performance which is usually measured by the GPA. The underpinning logic of considering GPA is that positive performance in the past is often a good predictor of future performance (Hough and Oswald, 2000). Especially when selecting recent graduates, the academic performance is often the only available measure of past performance. Furthermore, the information about the academic performance is very easy to assess. It can usually be found in the application documents and is thus very often used in candidate pre-selection.

In sum, GPA is often used to assess both the candidate's achievement motivation and intelligence. This makes this characteristic a problematic part of the selection process. While some authors (e.g. Pfeffer and Fong, 2002) point out that no relationship between an MBA degree or GPA in business school and *long term* career had been found, Hough and Oswald (2000) state that meta-analytic evidence supports the notion that undergraduate college GPA predicted job performance across many types of organisations. Although it has long been doubted that school grades are related to any behaviours of importance (McClelland, 1973), grades are strongly influenced by the candidate's intelligence and thus are often used as an indicant of cognitive ability (Schmidt and Hunter, 2000). However, they also state that GPA are less valid than standardised intelligence tests because they are only partial measures of intelligence.

Next to academic achievement, the duration of studies is of particular importance to many German decision makers (e. g. Schewe and Lissinna, 1993; Bauer, 2003). However, this criterion is specifically related to the Germany system of higher education in which the duration of studies depends on the organisation of the courses and exams which is at the discretion of the individual student. Less ambitious students are likely to take less exams per semester or might fail some exams and thus extending the duration of their studies. Against this background, a longer length of studies (especially in combination with mediocre grades) is an indicator of lower self-organisation and achievement motivation rather than of the profoundness of knowledge accumulated.

Psychometric Attributes

Attributes that are rooted in the applicant's psyche have been described in great detail in sections 3.5.1.1 and 3.5.1.2. Next to cognitive ability and the Big Five personality traits, decision makers do often include the applicant's achievement motivation and interpersonal skills in their portfolio of decision cues. Bartram (2004) points out that many recruiters focus on such characteristics as emotional

intelligence, honesty, integrity, or the "right general personality". He states that these characteristics, as opposed to skills and knowledge necessary to do a job, are relatively difficult to change or to be trained for. However, it is often very difficult to elaborate the exact mix of psychological characteristics that is important for job success (Robertson *et al.*, 2002a).

Other Attributes

There are many other attributes that do not fit the abovementioned categories. Of particular importance as implicit decision cues and strongly connected with each other are the decision maker's sympathy for the applicant and the candidate's physical attractiveness

Both aspects do influence the selector's notion of organisational fit (Marlowe *et al.*, 1996) because sympathy is often influenced by a high level of shared values which in turn increases the attribution of fit (Adkins, Russell and Werbel, 1994). Sympathy does not only influence the decision via the described attribution but also by the way the available information is used and processed in the decision making process (Wick, 2005). The use of sympathy and liking can be justified as an additional cue in the overall decision because as job performance usually is an outcome of various factors, and the relationship between e. g. personality or intelligence is moderated by other factors (e. g. Hough and Ones, 2001; Ree *et al.*, 2001), the individual liking between employee and supervisor will help to create an atmosphere that facilitates good job performance of the employee, given that the necessary KSAs are provided.

Physical attractiveness is likely to increase sympathy effects and thus is also associated with the evaluation of fit and the hiring recommendation (Beehr and Gilmore, 1982; Gilmore, Beehr and Love, 1986; Raza and Carpenter, 1987; Dipboye, 1992; Cable and Judge, 1997; Watkins and Johnston, 2000). Rennenkampff (2004) showed that the physical appearance is directly related to the attribution of leadership competencies and thus impacts the selection decision. In particular, a person with a typical masculine physical appearance is likely to be perceived to possess higher management skills than a person with a typical feminine appearance. Gilmore *et al.* (1986) found that selection professionals attributed a more appropriate personality for the job as well as better expected job-performance to attractive candidates. Consequently, they were more likely to be hired than their less attractive counterparts. Marlowe *et al.* (1996) summed up evidence that attractive applicants are favoured over unattractive candidates of equal qualification as they are perceived as having more desirable traits. This might partially be explained for jobs that involve a high degree of customer contact because managers probably believe that attractive employees are able to elicit positive reactions from customers.

3.7 Summary

In this chapter, I have shown how personnel selection integrates into a company's staffing function. Selection professionals gather information about the candidates attracted to the firm by recruitment and use this information to make a selection decision.

Selection theory condenses the selection process to the prediction of future employee performance by linking measures of job performance (criteria) and applicant attributes that are used as indicants of these criteria (predictors). The latter term, however, is used to describe both methods and variables. I have shown that among the variables mostly recommended by psychological selection theory are the candidate's cognitive ability and personality, especially conscientiousness and emotional stability—two of the "Big Five" factors of human personality. Furthermore, I have shown that selection practitioners tend to use many more attributes as explicit or implicit cues in their selection decisions.

Because their number is so large and they are often interrelated and interdependent, the next chapter will present the results of an exploratory investigation undertaken to reconcile theory and practice and to guide the further conduct of this research into selection decision making.

4 Excursus: exploratory pilot investigation

4.1 Objective and method

The previous chapter has shown that the number of potential decision cues to influence a personnel selection decision is enormous. In order to focus the ongoing research in this project on those cues that are particularly salient to decision makers, a reconciliation of theory and practice was necessary. Furthermore, chapter 3 laid out the basic principles of personnel selection theory which apply to selection in general without any particular reference to young and / or emerging ventures. Although these principles are important to every work on personnel selection, they are not precisely in the scope of this research project which concentrates on the particularities of personnel selection in entrepreneurial firms (see the introduction as well as chapter 2).

In order to align theory and practice and to focus the research on decision making policies on those criteria that play a role in actual selection decisions—particularly in those made by decision makers in young and emerging firms—I undertook an exploratory pilot investigation. Its basic aim was to identify how SMEs in the German IT industry use particular characteristics of job applicants in their selection decisions. The IT industry was the research setting of choice for several reasons (see section 1.3): The IT industry and more generally the high-technology industry is a promising setting for entrepreneurship research (Butchart, 1987), usually connected with entrepreneurial business models (Engelhardt, 2004). The sector mainly consists of small, niche market entrepreneurial ventures (Nowak and Grantham, 2000). Finally, the specific development on the labour market for IT-professionals in the last 15 years make this setting a particularly interesting area of research into personnel selection.

In this exploratory part of the research, I conducted semi-structured interviews with managers of five companies in the IT- or related industries. First insights from the literature on selection criteria have been reconciled with prac-

titioners' expertise and experience in the area of staffing and selection. The outcomes of the interviews were used to select the applicant characteristics to focus on in the main part of this research.

The review of the literature presented in chapters 2 and 3 yielded three main areas of interest which were covered in the interviews. First, interviewees were asked how they integrate the assessment of their candidates' personality, intelligence, and skills in the selection process. Next to the importance of those characteristics as perceived by the interviewees, I was curious to find out how these theoretical constructs are assessed in practice.

Second, I questioned the interviewees on the role that P-O fit plays in their selection decisions. Research in the context of SMEs suggests that this aspect might be particularly important in small and emerging firms and I aimed at assessing the importance the case companies ascribe to this concept. Furthermore, I was interested in how this importance did change in the course of the firm's growth and development.

Third, I covered the role of candidate networks in the selection process. The review in chapter 2 had shown that especially small and emerging firms rely on network relations when recruiting their first hires and I was curious how the decision makers in the case companies include the applicants existing networks in their decision making.

Interviews with a member of the case companies' management responsible for recruitment and selection have been conducted in the last quarter of 2004 either by telephone or face-to-face. They lasted between 30 minutes and one hour and have been tape-recorded and transcribed. Data has been coded and analysed according to the three areas of interest mentioned above.

4.2 Description of the cases

The companies included in the case study will be described in an anonymised way as the interviewees have been assured of confidentiality. On average, the participating companies employed 32 people and were 5.4 years old. The ratio of academically educated personnel is near or above 50 % in all firms, which is typical for the IT sector (Falk, 2003). With one exception, the interviewees were executive board members of their company and three out of five interviewees were members of their firm's founding team. Table 4.1 provides an overview of the cases which are described in greater detail below.

A GmbH is the only company that is not a software developer but a manufacturer of high-tech machines that are used in the production of semiconductors. It is located in a very small northern Bavarian town and was founded in 1995.

Company	Employees	Age	Interviewee	Function	Founder?
A GmbH	30	9 yrs.	J. O.	CEO	yes
C AG	26	7 yrs.	S. K.	managing director	yes
E GmbH	30	4 yrs.	R. W.	managing director	no
I GmbH	15	4 yrs.	M. V.	managing director	yes
O AG	60	3 yrs.	A. R.	head of HR	no

Table 4.1: Overview of cases used in the exploratory analysis

Employing 30 people in 2003, 11 of which have an academic background, *A GmbH* realised a turnover of approximately 5 million EUR. The interview was conducted with J. O., a mechanical engineer who is the current CEO and also a member of the founding team of *A GmbH*.

C AG is an in internet service and application provider founded in 1997 and located in the mid-western part of Germany. The company offers all kinds of innovate web-services, including web-design and database-related high-end solutions for inter- and intranet applications. *C AG* currently employs 26 people, mostly software developers and consultants. The administrative overhead is very small. The turnover is approximately 2 million EUR. The interview was conducted with S. K., a member of the founding team and, at present, executive board-member.

E GmbH is a software company in a larger Bavarian town, focusing on the development of complex data warehouse solutions. The company was founded in 2000 by M. G., a software engineer, as a one-man business on part-time basis. Full operations and staffing of employees started later that year when the firm closed its first round of venture capital financing. At that time, the interviewee R. W., a former management-consultant and manager of a business angel network, entered the company as shareholder and second managing director for finance and administration. In 2004, *E GmbH* employed about 30 employees, most of which are highly specialised mathematicians.

I GmbH is a software and web-design company founded and initially located in a smaller Bavarian university town.[1] The company was incorporated in 2000 by two students (business administration and computer science) and one research assistant in business administration. In 2004, the company changed its focus from web design, content management, and application programming to integrated internet marketing. It merged with an established marketing agency and moved to the partner's premises in an even smaller town some 30 kilome-

[1] An expanded description of this company reflecting the years 2000–2002 can be found in Moehle von Hoffmannswaldau (2005, p. 115–130).

tres away from their original location. Just before the merger, *I GmbH* had 11 full time employees, two apprentices and the two founding managers (the third founder had left the company about 18 months ago). The merger lead to a substantial increase in staff and the company plans to recruit further employees. The interview was conducted with M. V., one of the founders of *I GmbH* and now one of the three managing directors of the joint company.

O AG is a software company located in a large Bavarian town. It was founded in 2001 on the debris of a webdesign company which faced bankruptcy during the downturn of the New Economy. The new company changed its strategy and quit web-related products in order to focus on middleware for financial service companies. While *O AG's* predecessor employed 300 people at its best time, *O AG* now counts about 60 people on its payroll, most of them working as IT-consultants. The annual turnover is about 8 million EUR. The interview was conducted with A. R. who joined the company after finishing her PhD in I/O psychology and is now head of HR, responsible for HR marketing and recruiting.

4.3 Results

In this section, I describe how the case companies incorporate applicant skills and personality as well as the concepts of P-O fit and candidate networks in their selection processes. I will compare and align this information with the insights derived from the literature review.

4.3.1 The role of applicant personality and skills

As the body of literature reviewed in the previous chapter showed the importance of personality, intelligence, and skills, I asked the interviewees how they use these criteria while selecting new employees. Results show that there is some ambiguity on the use and importance of cognitive ability and particular personality attributes, especially extraversion: On the one hand, the interviewees consider intelligence and technical skills as highly, if not most, important:

> "Hard skills are most important. If the applicant is not able to do proper coding, he can be the most interesting person but he won't get the job." (A. R.)

On the other hand, the interviewees are very much concerned about their employees' social and communicative skills, as A. R. put it:

> "We need IT professionals who are able to communicate."

With respect to personality attributes, interviewees often seemed to mistake extraversion for emotional intelligence or interpersonal skills. For example, A. R. stated that a particular problem of the IT industry is the fact that extraversion and social competencies are often underdeveloped in highly-skilled computer scientists. Especially in *E GmbH*, whose employees are mathematicians rather than "mere" software-engineers, this problem seems to be very dominant:

> "We have highly-skilled employees who completely neglect any emotions and don't want to be addressed as human beings but as mathematicians. It's sometimes scary, just like Mr. Spock in Star Trek." (R. W.)

In most companies, notions of social competency, applicant personality, and P-O fit are addressed simultaneously. In line with findings of Witt and Burke (2002), the recruiters often mentioned aspects like communication skills, the 'applicant's human side', or being a teamplayer when they were asked for desired aspects of applicant personality.

> "A company does not work well if all employees think the same way. We are using a methodology which assigns different colours to four types of personality.[2] For a well running company, it is important to have people of all colours in key positions." (J. O.)

These examples show that selection professionals, at least in the case companies, do neither have a clear and distinct concept of personality nor of P-O fit. Both aspects of the applicant's traits and character are partially confused and assessed jointly, mainly on the basis of the HR manager's gut feeling. The interviewees did not use generally accepted and scientifically based concepts of human personality, like the "Big Five" (see chapter 5.2.2.2). However, some firms think of professionalising this aspect of selection in the near future:

> "We do consider whether psychological personality tests are a good means of avoiding problems with emotionally difficult employees. At the moment, we are assessing two different companies offering such questionnaire-based tests." (R. W.)

[2] He most probably referred to *Insights Discovery*, a personality test based on C. G. Jung's theories.

Like personality, the candidates' cognitive ability is also neglected in the selection process of the case companies. No interviewee mentioned the use of psychometric achievement tests to assess an applicant's general mental ability. However, at *E GmbH* applicants have to solve a little case study which helps to test their cognitive intelligence and methodology.

They have to merge two data tables while applying certain rules and query criteria. Instead of using IQ or achievement tests, the case companies rely on information about past achievement, especially high school grades and university diplomas, to assess the candidate's general mental ability and to predict future performance.

These results are in accordance with the literature mentioning the intuitive character of personnel selection (Lievens, van Dam and Anderson, 2002) and the reliance on conventional wisdom[3] and implicit personality theories (Rynes *et al.*, 2002; Dunn *et al.*, 1995) in the assessment of applicant personality. Ahmad and Schroeder (2002) stress that although soft skills are crucial for effective quality management, many organisations focus on applicants' technical skills while neglecting their soft or behavioural skills. This type of skills, however, is much more difficult to develop and obtain, cannot easily be trained, and in some cases—depending on an employee's personality traits—it will be completely impossible to develop certain soft skills.

4.3.2 The role of applicant fit

Overall, the interviewees agreed that if the technology of a company is highly specialised and sophisticated, it is very difficult to find applicants who exactly match the job requirements and the fit with organisational culture and values might become more important.

Indeed, P-O fit is important for all interviewees, and what I had found out with respect to personality does also apply here: The social aspect of P-O fit is highly connected with an employee's teamworking and communication skills which might be due to the aforementioned problems of some IT professionals to socialise. The intervied HR managers regard dysfunctional communication as the major obstacle to proper teamwork. R. W. stressed that communication malfunctions might lead to severe problems, e. g. with regard to faulty documentation of projects and are "one of the biggest financial threats to the company."

[3]The term 'conventional wisdom' was coined by the economist J. K. Galbraith in 1958. It describes certain ideas or explanations that are generally accepted as true by the public. They are simple, convenient, and comfortable and much more pleasing than the complex reality, although not necessarily really true (see Levitt and Dubner, 2006, p. 79–80).

Consistent with the literature, all interviewees mentioned P-O fit as an important component of the selection decision. Equally consistent, the concept gains its significance only in the later stages of the selection process, when candidates have already proven their basic qualification for the job in the initial screenings and a decision has to be made which of the remaining candidates will be hired.

None of the interviewees was able to indicate distinct criteria used to assess P-O fit. They rather rely on their gut feeling drawing much on team composition and social aspects. For most of them, the applicant's communicative skills were the most important indicator of P-O fit. The congruence of cultural values—as suggested in the literature (e. g. Adkins *et al.*, 1994)—only plays a minor to insignificant role in assessing whether an applicant would fit the organisation.

Only A. R. explicitly mentioned that *O AG* stresses cultural aspects of P-O fit and strongly emphasises characteristics of their corporate culture—being a young and flexible company with flat hierarchies—in all the publications related to recruitment, including the corporate webpage.[4] They want the employees to feel at ease within the company and thus give realistic previews of how the work in the firm will be like. The other interviewees drew little to nil on value congruence or corporate culture and some even doubt that their young venture had established such culture at all:

> "We are so young that, in my opinion, we don't have anything which comes close to my definition of a corporate culture yet." (R. W.)

4.3.3 The role of applicant networks

As mentioned before, the applicant's social capital was an additional aspect covered in the interviews. The theory of social capital is long established in the context of entrepreneurship research (Bourdieu, 1986; Piazza-Georgi, 2002; Maurer, 2003). However, the research in this area nearly exclusively deals with the social capital of the founder or founding team, which is treated as an important influence on firm growth and success. Little attention has been given to the possibility of extending the social capital of the firm by hiring new employees that introduce an established network of contacts that the new employer can use.

[4] N. b. that the interviews have been conducted before the new German General Equal Treatment Act (AGG) came into effect. Under the new regulation, a firm emphasising its 'young culture' is likely to be be accused of age-related discrimination.

Network relations are linked to the recruitment of new employees in a twofold manner. On the one hand, the network of the founder is an important source of recruitment, especially in very young ventures. On the other hand, the existing networks of new employees might themselves be a valuable resource for the firm.

The founder's existing networks, like friends and relations, contacts from university, or the existing workforce are an important source of employees for young ventures (Baker and Aldrich, 1994). Through these relationships, founders can find early hires whom they can trust implicitly. Moreover, recruiting through networks is at far lower cost compared to other sources of recruitment like newspaper advertisements (Aldrich and Langton, 1997). Aldrich and von Glinow (1992) stress the importance of social networks in the staffing process and suggest that the founder has to decide about the proportion of strangers he wants to recruit for his firm.

Zellner and Fornahl (2002) suggest that informal as well a formal contacts can determine where a firm searches for potential employees and whom it eventually hires. In addition to this, Rynes *et al.* (2002) state that job applicants referred by other employees are likely to have lover turnover than their counterparts attracted through job advertisements (see also Conard and Ashworth, 1986; Decker and Cornelius, 1979). The interviewees supported this point of view, especially if the firm was established while the founders were still at university.

> "At the beginning, networks and referrals are the best method to recruit for a start-up company." (R. W.)

S. K. mentioned that, except for two employees, all the staff of *C AG* had been recruited directly at the very university its founders graduated from. The founders knew the first hires from their own time at university, those first employees then had contact to students one or two years younger. Over the years, a cascading referral chain developed.

> "Last week, for example, we recruited two employees who are acquaintances of other employees. These in turn were known personally since our university time and we recruited them directly from college." (S. K.)

O AG used the founders' contacts in the first years but later somewhat neglected this way of recruiting. Now they have recognised that they have lost an important source of new qualified employees and try to re-activate new contacts

to the universities around them. Similarly, the founders of *I GmbH* made extensive use of their university friends in the first years, but changed their recruiting policy as things became more professional and tasks more complex.

The statements of the interviewees also stress the relation of network-recruitment and P-O fit. New hires that are recommended by the existing staff are likely to fit the corporate culture as they are already known to some of the employees. Additionally, employee referrals have a positive effect on the turnover of the new hires, a fact of which 49 % of the HR professionals surveyed by Rynes *et al.* (2002) have been aware of. *O AG* wants to benefit from these advantages and recently launched a programme called 'Family & Friends' which

> "addresses present and former employees who are still in contact with people from the industry. If they establish an interesting contact with O AG they will be rewarded in case an employment contract is successfully signed." (A. R.)

On the other hand, this positive impact on corporate culture can also turn out to be detrimental, in particular because a negative side-effect might be the creation of subcultures. This is a problem that *E GmbH* has to face as they employ nearly 40 % of immigrants, mainly from the Ukraine. R. W. pointed out:

> "The first immigrant pulled some good fellow Ukrainians to the company. But now we want to slow this down because we do not want subcultures to develop."

4.4 Conclusions and implications for the further research

The successful recruitment of qualified employees is a key factor which influences success and business growth. An important task in staffing organisations is the selection of employees as the organisation has to choose the right candidates who meet the requirements of the job as well as fit the organisation. The literature on personnel selection, dominated by I/O psychologists, suggests to focus on two main areas of applicant attributes when selecting new hires: personality and mental ability.

The interviews, however, showed that practitioners do not seem to share the concepts of psychologists when it comes to both definition and importance of these attributes. Although they admit the importance of hard (technical coding) skills and intelligence, they do not incorporate the personality attributes

that researchers have suggested to be most important predictors of job success (emotional stability and conscientiousness) in their considerations. Instead, social skills seem to be of great importance for the selection of new employees, a fact that does also dominate the view on the applicant's personality seeking extraverted persons.

This notion is also reflected in the interviewees' view on P-O fit which is used in all companies to make selection decisions but is is only important during later stages of the selection process. Somewhat surprising, values had only little impact on the assessment of P-O fit which was mostly operationalised by means of the candidates ability to communicate and to do team-work. This ability, in turn, is inferred from the candidates social competency. Selection professionals use implicit theories of personality and P-O fit to assess candidates. They lack substantial knowledge of sound personality theory or scientifically established means of assessing personality and competencies.

The interviewees did not only almost neglect personality aspects of the applicant, they did equally omit most references to the state-of-the-art methods to validly assess both personality and intelligence. This leads to the supposition that the concept of using applicant personality, although long time advocated by researchers, is not yet fully accepted by practitioners. Instead, the statements of the interviewees stressed the impression, that selection professionals in IT firms rely on very implicit and down-to-earth theories. Thus, it will be important for the success of the further research to use a framework that is as familiar as possible to the potential participants:

In the following chapter, I will introduce the concept of applicant competencies and show how it can be used to integrate many of the criteria mentioned above and relate them to job performance and success. A second concept will be person-organisation fit, which helps both individual and organisation to find a counterpart that matches values, culture, and beliefs. Last, network aspects will be extended from the networks of the founder to the networks of the applicant.

5 Basing selection on competencies, fit, and networks

5.1 Introduction

In chapter 3, I have introduced the general theory of personnel selection as a decision making process and demonstrated the difference between decision cues, selection criteria, and predictors used in selection. Many researchers agree that both cognitive ability and the personality dimension of conscientiousness are very good predictors of job performance (see section 3.5.1), but there are also warnings against summing up selection to one simple 'theory of everything' ($p = g + c$) in which a unitary rating of overall and composite job performance equals the sum of general intelligence and conscientiousness (Anderson *et al.*, 2001a, p. 201). Next to these warnings against the overestimation of both factors, the previous chapter has shown that selection professionals seem to neglect the importance and validity of both factors and at the same time use an uncountable number of different applicant characteristics as cues in their decisions (see section 3.6).

This leads to a dilemma: there are two predictors that are posited to be the most valid indicants of future job performance. Nonetheless, they are neglected by many practitioners who instead use legion of other applicant attributes, sometimes with little or no proven validity. To overcome this dilemma, I suggest a framework of three sets of criteria (applicant competencies, applicant fit, and applicant networks). It attempts to integrate aspects of applicant personality, intelligence, professional and educational background, and the need for social interaction, and seeks to answer the challenges of a changing work environment.

The changing nature of the professional environment that has emerged over the last two decades (e. g. Lawler, 1994) includes the dissolution of traditional and hierarchical organisational structures and their transformation into self-directed, cross-functional, process oriented, and knowledge-based models (Berge, de Verneil, Berge, Davis and Smith, 2002), and urged some authors to posit the "end of the job" (Bridges, 1994). Among the answers to these changes

are the shifts from job-based to competency-based selection (Lawler, 1994) and the focus on person-organisation fit instead of person-job fit (Bowen, Ledford and Nathan, 1991). As the described organisational changes seem to be particularly salient in the IT industry, I will focus on these two aspects of applicant characteristics and deal with how applicant competencies and applicant P-O fit influence the selection decisions.

The first set of characteristics, applicant competencies, provides a promising framework for structuring selection criteria. The concept of competencies and competency management "becomes more and more important in private and public organizations, helping them to attract and develop talented employees, identify the right person for a job positions, performing succession planning, training analysis and other core human resource functions" (Draganidis and Mentzas, 2006, p. 62). Furthermore, Bartram (2004) calls for a focus on workplace behaviours which can probably be better represented by competency models than by personality taxonomies. In this line Schneider (1996) pointed out that "[i]t is *behaviour*, not *personality* that causes outcomes" (p. 292) and that "[w]hat people *do*, not what people *are* causes outcomes" (p. 293).

The second set of characteristics that will be introduced in this chapter is applicant fit. Recent literature has shown that the fit between the applicant and the values and culture of the organisation is a major factor that influences job performance as well as employee retention. The interviewees asked during the exploratory pilot investigation were aware of the concept of applicant fit and includes at least some of its aspects in their daily selection decisions. Furthermore, P-O fit has been reported to be specifically important in young and small firms. Thus it is particularly interesting to investigate the influence of venture growth on the importance of the mentioned criterion in personnel selection.

Finally, I will describe the role of applicant networks in selection in modern IT firms. In line with the aforementioned changes in the work environment, networks become a more and more important factor for business success. The role of the existing networks a new employee 'imports' into the organisation will be examined.

5.2 Applicant competencies

> "Competencies have become an integral part of modern people management throughout the world." (Bartram *et al.*, 2002, p. 6)

In this section, I will lay out the role of applicant competencies as decision cues in personnel selection. After having shown why competency approaches are an appropriate answer to changes in the work environment not only in personnel

selection but also in other areas of HRM, I will define the concepts of competence and competency and dissociate one from the other. Furthermore, I will distinguish competencies from other personal attributes like skills, personality, and knowledge. Afterwards, I will show how competencies can be measured and clustered and I will introduce a model of five facets of competency that is used to analyse decision making in personell selection in this thesis. Hypotheses about the use and the importance of each facet of competency in personnel selection are developed.

As the opening citation laid out, competency approaches to HRM faced growing popularity in the last decades especially in countries outside the US (Kurz and Bartram, 2002). According to Bartram *et al.* (2002) this is due to the fact that competencies meet the demand for more and more sophisticated and complex measures of performance that are at the same time strongly linked to observable behaviour of the individual. Competencies have been proved to be a valid predictor of job performance both of new hires and of existing employees and competency-based recruitment has lead to substantially lower turnover rates than conventionally methods (McClelland, 1998). Furthermore, this approach offers advantages such as helping the organisation to focus on their business needs (Farnham and Stevens, 2000), promoting the organisation's values and strategic mission (Rodriguez, Patel, Bright, Gregory and Gowing, 2002), or contributing to the effectiveness of personnel selection in various ways (Feltham, 1992).

The most important reasons for using competency-based approaches to personnel selection and HRM in general will be described in the following:

(1) Competency-based selection provides answers to the changing needs of HR-managers following drastic changes in the work environment,
(2) they provide a people-oriented approach to HRM rather than a task-oriented approach,
(3) their use is not restricted to personnel selection, but can be extended to various areas of HRM, and
(4) they seem to be far more accepted by practitioners than the more theoretical concepts of personality or intelligence that have been presented in chapter 3.

Nybø (2004) in accordance with Lawler (1994) and Sparrow (1998) suggests competency-based HRM as an appropriate answer to the *environmental changes that affect today's workplace*. These changes in the technological and economic environment as well as the introduction of new principles of organisation (e. g. Appelbaum and Batt, 1994; Bridges, 1994; Rifkin, 2001) foster the dissolution of stable jobs. When jobs are dissolved or become more fluid, the information

needed for traditional job analysis becomes massive which leads to the suggestion to substitute it with broader, longer-term, and organisationally defined competency-models in which the individual is assigned to tasks according to his or her knowledge and skills rather than the position he or she holds (Gatewood and Feild, 2001, p. 396–397).

McLagan (1997) describes the traditional, job-based approach to selection as a *win-lose* situation in which only one person can be best for the job and average but required criteria cancel each other out. To her, competency-based approaches are a way to overcome this outdated approach and gain new flexibility. Competency-based selection is often stated to be more flexible than the more traditional approach of job-based selection which focuses more on the technical knowledge required for task performance (Rodriguez *et al.*, 2002).

While the traditional approach to selection was based on job-specific criteria derived from job-analysis, competency-based selection is a more *person-centred approach* which includes other aspects of the candidate, such as the educational background, appearance, and motivation (Rothwell and Lindholm, 1999; Rees and Doran, 2001). The required competencies specify what the jobholder should deliver as output and thus focuses on performance rather than content (Bethell-Fox, 1992). Consequently, competency approaches help to translate job requirements into sought characteristics of the future employee. The approach "focuses on identifying the desirable and essential behaviours required to perfrom a job, compared to the tasks, roles, and responsibilities identified by traditional job analysis" (Robertson *et al.*, 2002a, p. 104).

The use of competencies is *not restricted to personnel selection* but it can help to select, develop, manage, and retain employees. It can be integrated in nearly every aspect of human resources management and helps to form a common language across various HR functions such as performance appraisal, assessment, training and development, as well as recruitment and selection (Heffernan and Flood, 2000; Rodriguez *et al.*, 2002; Kurz and Bartram, 2002; Draganidis and Mentzas, 2006). Particularly, the competency approach has been widely used and frequently discussed in professional education and personnel development (Rützel, 2007). According to Rothwell and Lindholm (1999, p. 101), HRM systems based on competency "will be the keystone in the bridge between individual career development and organisational strategy." When used in personnel selection, the competency approach extends HRM over the simple selection process and gives a manager the tools to monitor an employee's performance and to guide its development over years (Roberts, 1997).

Not least, competency-based approaches seem to be far *more accepted by practitioners* than the more sophisticated and theoretically based approaches offered by many researchers, e. g. applicant personality. Karren (2001) points

out that "competencies are clearly the preferred jargon for the practitioner." This is in line with the notion that there is a gap between the theory and practice in the use of I/O psychology research outcomes (e. g. Johns, 1993; Anderson *et al.*, 2001b) and the growing number of practitioner-oriented books on selection that concentrate on competencies (e. g. Hufnagl, 2002). Interviews conducted with selection practitioners in German IT firms (see chapter 4) have confirmend that notion. For example, practitioners used the term social competency when referring to whether an employee is sufficiently extraverted to communicate efficiently with customers or colleagues instead of referring to the construct of personality, especially the scientific and abstract constructs of the FFM.

However, this can also be considered as a drawback as Bartram (2004, p. 246) states the approach "has suffered in the past from being used and developed by a wide range of practitioners many of whom had not had a psychologist's background of training in scientific method and measurement" (see also Robertson *et al.*, 2002a; Kurz and Bartram, 2002). For long, psychologists have not attempted to develop valid and reliable measures of competencies (Nikolaou, 2003). And there are controversies about the validity of competencies as measurable constructs which is not yet supported empirically (Lievens, Sanchez and Corte, 2004; Voskuijl, 2005). Shippmann, Ash, Battista, Carr, Eyde, Hesketh, Kehoe, Pearlman, Prien and Sanchez (2000, p. 731) stated that competency modelling has not been led by I/O psychologists who "have been merely riding the wake" of this practitioner-driven trend rather than helping to steer the course for practice.

5.2.1 Definition of competence and competency

Although the term *competency* is frequently used, its definition is ambiguous and there is "considerable confusion surrounding the term" (Delamare Le Deist and Winterton, 2005, p. 28, Bartram, 2004; Ellström, 1997). Across scholars, there is no such thing as a consistent definition of competencies (for an overview see Cannon-Bowers, Tannenbaum, Salas and Volpe, 1995) and the "concept of *competence* is often defined in broad and ambiguous terms" (McEvoy, Hayton, Warnick, Mumford, Hanks and Blahna, 2005, p. 384). In order to work with both term and concept, an adequate and agreed definition is crucial for researchers and practitioners (Woodruffe, 1993) "since without common understanding there is little chance of integration, alignment or mobility in practice" (Delamare Le Deist and Winterton, 2005, p. 28).

A very prominent definition that directly influenced and dominated a great number of researchers (Cheng, Dainty and Moore, 2003) was offered by Boyatzis (1982, p. 21)[1]:

> A competency is "an underlying characteristic of a person which results in effective action and / or superior performance in a job."

This underlying characteristic might be a motive, trait, skill, aspect of one's self-image or social role, or a body of knowledge. According to Boyatzis, the outcome is the intersection of the individuals competencies, the job's demand, and the organisational environment. Similarly, Ellström (1997, p. 268) with his notion of *competence-in-use* notes that "the focus is on the interaction between the individual and the job, and on the competence that is actually used by the worker in performing the job."

Although competencies are by definition linked to superior performance in the job, this term itself is only vaguely defined (Campbell, 1990, see also section 3.4.1). Consequently, Bassellier, Reich and Benbasat (2001) warn against mixing up competencies and performance which would lead to confusing outcome and process as competencies are the enabler leading to better performance, not performance itself. McEvoy *et al.* (2005, p. 385) reduce superior performance to the ability to "function in a position within the profession at or above the level expected to retain that position."

Very often contradicting concepts are meant by the same term. For example, some people use the term competency with the notion of employee attributes that contribute to the human resource and human capital base of the firm while other bear in mind requirements of certain classes of work tasks (Ellström, 1997). This confusion can be blamed on the existence of two very similar concepts and terms that are often mixed: *competency* and *competence*. The two different approaches and definitions have been developend parallel in the US and the UK (for a detailed comparison see e. g. Roberts, 1997, p. 68–69, Heffernan and Flood, 2000; Moore, Cheng and Dainty, 2002; Cheng *et al.*, 2003, or Delamare Le Deist and Winterton, 2005). A clear distinction between both terms "is vital to the whole debate" (Rowe, 1995, p. 12). However, as Winterton and Winterton (1999, p. 26–28) point out, both terms are often confused and their use is inconsistent in the literature. They show how authors either treat both terms synonymously (e. g. McBeath, 1990; Berge *et al.*, 2002), or use the one instead of the other (e. g. Boam and Sparrow, 1992; Mitrani, Dalziel and Fitt, 1992). Even Boyatzis' above cited seminal definition is an example of this confusion. Although it originally referred to competency, many papers

[1] N. b. that although this definition is usually ascribed to Boyatzis, he quoted Klemp (1980).

(e. g. Thompson, Stuart and Lindsay, 1996) quote it referring to competence. This confusion and the lack of a common definition has also been recognised by other writers (e. g. Winterton, 2002; Woodruffe, 1993; Brown, 1994; Bassellier *et al.*, 2001) and Kurz and Bartram (2002, p. 234) call it "unfortunate that two very similar words have been used to describe two different constructs."

Generally speaking, the US-approach is related to competencies whereas in the UK the route is directed towards competence. The fundamental difference between both approaches is "the difference between drivers of performance [US] and standards of work [UK]" (Roberts, 1997, p. 70). In the *behavioural* US-approach the basic question is what distinguishes superior performers from their mediocre counterparts whereas the *functional* UK-approach is driven by the idea of what people do at work, how they can be trained appropriately, and how their vocational experience can be certified (Heffernan and Flood, 2000). The US approach is rooted in differential psychology and aptitude testing, whereas in Europe the use of competencies has its roots rather in the research on education and qualification (Sonntag and Schmidt-Rathjens, 2004).

Summarising a number of the more or less consistent definitions, the two terms can be defined and distinguished as depicted in table 5.1 (page 86):

In recent years however, both approaches have broadened and moved closer together. In the US approach, functional and cognitive competencies have been added to the behavioural competencies and in the UK approach, cognitive and behavioural competencies are now used in addition to the more functional occupational model (Delamare Le Deist and Winterton, 2005). Cross-national ownership of companies drove many practitioners to the adoption of a hybrid approach which was shaped by external influence as well as internal customisation (Roberts, 1997). Furthermore, the German[2] as well as the French approach—although in the tradition of the UK rather than the US approach—are more holistic (Delamare Le Deist and Winterton, 2005). Roberts (1997) points out that both approaches have something of value and none of them is inappropriate. However, in the area of *selection*, the competence approach has strong shortcomings due to its focus on what people do at work and its implicit notion that instead of differentiating in selection the effort should be in training. For this reason, this thesis will follow the behavioural approach to competency which is more concerned with predicting individual performance and thus a greater help in order to decide between several candidates that all fulfil the formal requirements, i. e. have some competence, but vary anyhow.

[2] In German only one word ("Kompetenz", plural: "Kompetenzen") exists to describe both constructs. This does probably cause less confusion of terms but on the other hand lacks some precision.

Competence	Competency
... is state of attainment	... is a set of behavioural repertoires[a]
... refers to functional areas	... refers to behavioural areas[b]
... is the overall ability to perform a job or part of a job	... is a set of behaviours that the person must display in order to perform the task of a job with competence[c]
... is the range of skills wich are satisfactorily performed and demonstrated by applying competencies	... comprises behaviours adopted in competent performance[d]
... is about where a person is now, not where it might be in the future (backward-looking)	... might either be backward-looking, concurrent, or forward-looking[a]
... is job-related	... is managerial[e]
being competent means meeting job demands	*having* competencies means possessing the necessary attributes to perform completely[f]
... describes what aspects of a job people must be able to do	competencies deal with the *behaviours* people need to do the job effectively[g]
... are the aspects of the job at which the person is competent	... are the aspects of the person which enable him / her to be competent[g]
... are aspects of the job which an individual can perform	... is a person's behaviour underpinning competent performance[c]
... is output-based	... is input-based[h]

Table 5.1: Contrasting competence and competency

[a] Kurz and Bartram (2002)
[b] Delamare Le Deist and Winterton (2005)
[c] Woodruffe (1991)
[d] Rowe (1995)
[e] Winterton (2002)
[f] Burgoyne (1988)
[g] Woodruffe (1993)
[h] Farnham and Stevens (2000)

5.2.2 Dissociation from other personal attributes

Competencies are *attribute bundles*, i. e. a specific constellation of an individual's characteristics such as knowledge, skills, motives, traits, behaviour, aspects of one's self-image or social role, or attitudes that gives someone the potential for effective task performance. The specific characteristic of the competency lies in the combination of these psychologically defined characteristics that underpin the construct and can be considered as its components (Boyatzis, 1982; McLagan, 1997; Kurz and Bartram, 2002; Draganidis and Mentzas, 2006).

Which aspect of competencies is stressed, depends on the perspective held on HRM. For example, Berge *et al.* (2002) state that the training and development branch of HRM is bound to view competencies as knowledge, skills, and attitudes that are improvable and trainable. On the other hand, the selection and staffing functions of HRM might focus more on other aspects of competencies such as ability and traits which are not changeable and consequently are factors on which future employees have to be selected. In the following sections, I will dissociate competencies from the following components: (1) skills (2) personality traits, and (3) knowledge (see also Bassellier *et al.*, 2001; Parry, 1998).

5.2.2.1 Competency and skills

One important component of competencies are skills and abilities, i. e. an individual's level of proficiency in performing a special task (skill) or a more general and enduring trait or capability which an individual possesses at the time a task is first begun to be performed (ability, see Gatewood and Feild, 2001; Ree *et al.*, 2001). Some authors (e. g. Goodstein and Davidson, 1998) use both terms synonymously and equal competencies and traditional KSAs. KSAs are the knowledge, skills, and abilities that are needed for a particular task or job (Ree *et al.*, 2001). Klimoski and Jones (1995, p. 299) define KSAs simply as important requirements that are identified in a job analysis (see also Summers and Summers, 1997).

However, competencies are not the same as these KSAs and Woodruffe (1993) explicitly warns that referring to skills as competences will only add more confusion to the definition of competencies and the delineation between competencies and competences. Although skills describe specific components of competencies[3] (Buhrmester, Furman, Wittenberg and Reis, 1988; Kauffeld, 2006a), competencies have to be dissociated from KSAs because they have a much

[3]For example, the ability to decode nonverbal communication can be considered as a specific component of social competency.

wider horizon than the outcomes of traditional job analysis (Hooghiemstra, 1992). Whereas the focus of job-analysis is on the tasks, roles, and responsibilities associated with the job, competency-based profiles focus on behaviours that are desirable and necessary for job performance (Kurz and Bartram, 2002; Bartram, 2004).

Gatewood and Feild (2001, p. 397) differentiate KSAs and competencies as follows: while the first are job-defined and job-specific the latter are organisationally defined and reflect the longer-term organisational needs. They are aimed to facilitate a flexible shift of employees among different jobs and tasks within the organisation whenever new opportunities become visible. Parry (1998) separates skills and competencies by means of two aspects: skills are a combination of nurture and nature and they tend to be situational and specific, whereas competencies are rather generic and universal. Furthermore, competencies are means to cope with a situation. An individual has these competencies, if the requirements of the situation meet the individual's particular combination of skills and abilities (Wollersheim, 1993, p. 89).

5.2.2.2 Competency and personality traits and mental ability

Many aspects of competencies (like, for example, the ability to learn, self-management, self-motivation, beliefs, values, or teamwork skills) fall in the realm of personality constructs (Woodruffe, 1993; Mirabile, 1997; Gatewood and Feild, 2001, p. 397) which has already been laid out in greater detail in section 3.5.1.2. Robertson and Kinder (1993) showed evidence of the link between specific personality constructs and specific competencies and according to Kurz and Bartram (2002) as well as Bartram (2004), eight factors—the "Great Eight"—represent the psychological constructs that underlie competencies and account for most of the variance in competency measures. These factors are (1) GMA, (2) the "Big Five" factors of personality, and (3) two aspects of motivation, in particular need for achievement and need for power or control.

Roberts (1997) clusters competencies into four areas. According to his framework, one cluster—the natural cluster—includes underlying and inherited traits such as dimensions of personality. He claims that this approach is a way of overcoming the criticism of the competency approach that an emphasised focus on observable behaviour ignores the personality characteristics necessary for success.

Despite this close relationship between competencies and personality both constructs are not the same. Robertson *et al.* (2002a, p. 105) state that although personality is certainly a basis of competent behaviour—as is cognitive ability—"competencies are not the underlying personal attributes that allow a

person to exhibit competent behaviour." Graf (2002) states that the widespread idea that competencies can be directly related to personality traits was not confirmed empirically. Erpenbeck and Rosenstiel (2003) use competencies in the realm of action-oriented behavioural diagnosis ('What does a person do?') and personality in subject-centred trait-diagnostic ('Which traits does a person possess?').

Kauffeld (2006a, p. 35) agrees on integrating personality factors as antecedents of competency but strongly disagrees with mixing both constructs as many differential psychologists tend to do nowadays. Her key criterion of dissociation is the *stability* of both constructs: personality traits are believed to be stable over time and across different situations whereas competencies are explicitly unstable and subject to changes; they are subject to planned development and changes and gradually vanish if they are not used and applied. Similarly, McClelland (1998) stated that competencies differ from personality traits because they are (1) fundamentally behavioural and (2) subject to training and development. Consequently, a trait-oriented approach to competencies is more suitable if competencies are part of a selection strategy rather than a training and development concept (Berge *et al.*, 2002).

5.2.2.3 Competency and knowledge

Knowledge—defined as the "body of information, usually of a factual or procedural nature, that makes successful performance of a task" (Gatewood and Feild, 2001)—is another important aspect of competencies. For example, Gersch, Freiling and Goeke (2005, p. 48) say that competencies are the replicable potential to act based on the use of knowledge, conducted by rules and thus not incidental.

However, competencies have a much wider horizon than pure knowledge (Hooghiemstra, 1992) which is only one of several important dimensions that contribute to competency and as such only a necessary, but insufficient condition of competency (Lysaght and Altschuld, 2000; McEvoy *et al.*, 2005). It is probably closest related to the cluster of *subject competency* (see section 5.2.4.1). Furthermore, competency can be labelled as the existence and adequate appliance of behaviour in order to cope with specific situations, which are relevant to the individual and the environment (Sommer, 1977, p. 75). In this definition, behaviour is efficient if it leads to a maximum of positive and a minimum of negative consequences. This is especially applicable to behaviour in specific work situations (Haydock, Connor and Dawes, 1995; Dierk, Sommer and Heinrigs, 2002).

Ellström (1997) states that competency can have the two meanings of *formal* and *actual* competency, the first being measured by years of schooling or credentials received, the latter being the capacity of successfully handling situations arising on the job. The problem, however, is that formal competences do not include learning outcomes achieved apart from formal education, e. g. on the job or in other informal everyday activities. Kauffeld (2006a, p. 28–29) extends the dissociation from pure knowledge to *certified and testified knowledge* which is usually labelled qualification. While vocational qualifications are strictly bound to certificates and diplomas which can only be gained in formal and structured learning processes with a defined curriculum, competencies reflect the fact people often learn in informal ways without any predefined structure or plans, and that the results of these learning processes do anyhow enable them to act competently. This lead Weinberg (1996, p. 3, italics added) to conclude that competencies describe "what a person *really* [. . .] knows."

5.2.3 Competency models and measures

In order to use competencies in practice, it is necessary to *identify* those competencies that are needed for a particular job and to *measure* the extent to which an applicant or existing employee possesses the required competencies. In this section, I will deal with methods to achieve those two goals: competency modelling and measuring.

5.2.3.1 Competency models: identifying the required competencies

According to Dalton (1997), a competency model describes "motives, traits, and so forth as a set of desired behaviors for a particular job position or level." As such, a competency model is an "occupational profile" typically developed for individual occupations but also extensible to occupational groups (Rodriguez *et al.*, 2002, p. 316). Competency models are used to tie job specifications to the organisational strategy; the competencies then function as a common language (Lievens *et al.*, 2004) which is used to identify the critical success factors driving performance in organisations (Delamare Le Deist and Winterton, 2005). Competency modelling has drawn on many different domains in the realm of HRM and I/O psychology, such as (1) the psychology of individual differences, (2) leadership research and the development of assessment centres, (3) job analysis research, (4) the concept of of multiple intelligences, and (5) the concept of organisational "core competencies" (Shippmann *et al.*, 2000).

Both practitioners and academics set out to develop competency models. Generally speaking, the first came up with models that are more fully developed and more detailed whereas the latter attempt to focus on the identification of a small number of general dimensions (Kurz and Bartram, 2002). The recent development of hierarchical approaches to competency models (e. g. Tett, Guterman, Bleier and Murphy, 2000; Kurz and Bartram, 2002) is an outcome of the merging of the academic and the practitioner-oriented approaches to competencies (Bartram, 2004). In this sense, the higher-level constructs reflect the academic viewpoint as they account for major proportions of variance in performance whereas the lower-level and detailed dimensions reflect the practitioners' need for everyday usability.

Because competency models are closely linked to particular jobs, it is difficult to dissociate them from classical job analysis. The line between both concepts is thin and blurry, the main difference between the two approaches might be the level of analysis: competencies are broader human attributes than traditional KSAs and consequently, competency modelling is less rigorous than job analysis (Sanchez and Levine, 2001).

On the other hand, competency models are much more rigorous when it comes to linking the model to corporate strategy and business goals. They attempt to set up a direct link between individual competencies and the broader goals, the mission and the values of the organisation. Such effort is missing in traditional job analysis (Shippmann *et al.*, 2000; Sanchez and Levine, 2001). Another lack of traditional work analysis is the insufficient description of interpersonal behaviour and its dynamics (Sanchez and Levine, 2001). As social competencies receive considerable attention within most competency frameworks, this is obviously another advantage of competency modelling. Furthermore, both approaches differ in the way that the traditional approach analysed the elements of the job whereas the competency approach defines the job in terms of the characteristics and behaviours of successful incumbents of the job or similar positions (Hooghiemstra, 1992).

Despite these differences, both approaches do not need to be mutually exclusive but instead offer many areas of "fruitful cross fertilization" by taking the best of both worlds: the more strategic approach of competency modelling and the greater extent of rigour in job analysis (Lievens *et al.*, 2004, p. 901). Furthermore, Voskuijl (2005) points out that competency modelling is not replacement for job analysis, the latter is rather a necessary step to reach the first.

5.2.3.2 Measuring competencies

Because competencies are hypothetical constructs and underlying characteristics of a person, they are difficult to measure (Rees and Doran, 2001) and their existence can only be inferred through observation of behaviour (McEvoy *et al.*, 2005). However, a competency is not the behaviour or performance itself. It rather comprises a *repertoire of capabilities* that enable some people to meet the desired behaviour or a range of work demands more effectively than others (Kurz and Bartram, 2002; Bartram, 2004). This relation to concrete behaviour distinguishes a competency-based approach to selection from other, more traditional approaches. The use of cognitive ability and personality as predictors of job success implies that the prediction is based on indicants and signs of probable behaviour and not on samples of behaviour (Robertson *et al.*, 2002a).

Competencies can best be described using "behavioural indicators" (Winterton, 2002, p. 5), that show probable behaviours expected of employees possessing the particular competency. This approach of conceptualising and measuring competencies goes back to the 1950s (Nybø, 2004). Bartram (2004) states that the lack of a sound taxonomy of behaviours—comparable to the *Big Five* in the context of personality traits—handicaps the assessment of behaviours in the workplace. Without such a taxonomy, different studies will use criterion measures that are not comparable with each other and thus the results are very difficult to be aggregated. However, the absence of a sound taxonomy is often a sign of a young science (Hough and Ones, 2001), so in this case, the use of competencies simply might not be old enough.

Bartram *et al.* (2002, p. 8) point out the need for a very precise distinction between measures that *predict* competency and measures *of* competency.[4] For example the construct of *persuasiveness* is used both in personality questionnaires and in competency definitions. The first use is related to the predictor meaning and describes a propensity to act in certain ways whereas the latter—the competency—is based on the evidence that a person does *actually act* in those ways.

When assessing behaviour (be it hypothetical in a behavioural interview or actual in during a work sample or simulation) it is important to keep in mind that a substantial proportion of human behaviour is determined by the context in which it is shown. This helps to understand that only a tendency to behave in a particular situation can be surveyed, the full work behaviour cannot be seen without knowing and simulating the real and complete situation in which it will be exercised (Robertson *et al.*, 2002a). Responding to this issue, Bartram *et al.* (2002, p. 7) introduce the concept of *competency potential* which they

[4] Similar to the dissociation of predictors and criteria set out in section 3.3.2.

define as "the individual attributes necessary for someone to produce the desired behaviours." These attributes include aspects like aptitudes, interests, values, motives, and personality as well as knowledge and skills.

An important means to assess the behaviour which reflects competency are *behavioural event interviews* (BEI, see section 3.5.2.2) which have often been described as an appropriate means to assess competency (e. g. Boyatzis, 1982; Rees and Doran, 2001). McClelland (1998) described in greater detail how to design and implement BEIs for selection and performance appraisal and Barclay (1999) empirically supported the notion that the use of behavioural structured interviews is linked to the application of a competency-based approach to HRM. This type or interviews seeks to measure a candidate's competencies on the basis of his / her past experience which is based on two assumptions: (1) that behaviour patterns are consistent over time and (2) that candidates can be compared fairly in this way (Barclay, 2001, p. 96). The use of BEIs often goes along with an increase in interview structure and thus answers the call for more structured interviews to overcome many of the shortcomings of traditional interviews (Rees and Doran, 2001).

Next to the use of interviews, some researchers as well as practitioner-oriented publications seek to assess competencies using psychometric tests. For example, Nikolaou (2003) developed a questionnaire-based instrument to assess managerial action competencies grouped in three clusters. This instrument showed high construct- and criterion-related validity to predict work performance. However, performance appraisal was based on supervisor ratings and thus is not applicable in personnel selection where no such ratings are available. Although McClelland (1998) stated that competency tests developed to be used on large scale samples did not gain much acceptance, Hansson (2001) showed that self-reported measures of employee competency—if obtained with proper instruments—were fairly accurate. One attempt to structure the various methods used to measure competencies has been made by Erpenbeck and Rosenstiel (2003). They gather a number of instruments used in German speaking countries to measure and define competencies. However, Sonntag and Schmidt-Rathjens (2004) heavily criticise the handbook as the methods "degenerate into arbitrariness." They blame them for mixing well proven and tested methods of aptitude testing that have nothing to do with competencies with new attempts that have not yet reached a stage of ripeness.

5.2.4 Clusters and facets of vocational competencies

In order to facilitate both analysis and application of competencies, it is useful to group them into different clusters (i. e. behavioural groups of competencies), which can be done either theoretically (a priori) or empirically (Boyatzis, Goleman and Rhee, 2000).[5] Clustering competencies leads to higher order constructs that some authors label competency clusters (e. g. Boyatzis *et al.*, 2000) while others use terms like dimensions, factors, categories, or facets (e. g. Kauffeld and Grote, 2000; Bartram, Kurz and Bailey, 2000; Draganidis and Mentzas, 2006). Even the term *models* is sometimes used (Delamare Le Deist and Winterton, 2005) but this labelling blurs the differentiation from competency models described in section 5.2.3.1 and both constructs must not be confounded.

A competency model is defined as "a detailed, behaviorally specific description of the skills and traits that employees need to be effective in a job" (Mansfield, 1996, p. 7) while competency clusters are more related to what Mansfield calls "multiple-job competency models" which apply to a number of jobs rather than to a particular occupation. Draganidis and Mentzas (2006, p. 54) use the term *category* to describe a "group to which homogeneous and / or similar competencies belong." On the other hand, they (p. 56) define a *competency model* as "a list of competencies which are derived from observing satisfactory or exceptional employee performance for a specific occupation." Consequently, a competency model is always related to a particular job, whereas competency clusters are more broadly and theoretically defined.

According to Boyatzis *et al.* (2000, p. 351), "clusters are behavioral groups of the desired competencies". Clustering competencies might be useful for the purpose of analysis or application and can be done according to the domain or to the particular roles to which they are relevant (Woodruffe, 1993). Between the competencies in one cluster, an empirical link can often be found and the competencies might have one of the following relationships: they can either (1) complement each other in functional behaviour, (2) be alternate manifestations (3) be compensatory, or (4) be antagonistic. Which competencies are contained in one cluster might also be a function of the sample that is used for clustering (Boyatzis *et al.*, 2000).

Bartram *et al.* (2000) provide a three tier structure of competencies with 110 basic component competencies at the bottom, 20 competency dimensions in the middle and eight competency factors (the "Big Eight") at the top. These

[5] A priori clustering is more closely related to the mental and theoretical models of the researcher and thus seems to make more sense, whereas empirical clustering often leads to completely different clusters. In a study by Boyatzis (1982), the empirical clustering showed greater validity.

eight broad factors that account for most of the variance in competency measures reflect the psychological constructs that underpin competencies and include (1) GMA, (2) the "Big Five" factors of personality, and (3) two aspects of motivation, in particular need for achievement and need for power or control. These factors are in line with the main areas of individual differences studied by psychologists over the last 100 years (Kurz and Bartram, 2002).

According to Sonntag and Schmidt-Rathjens (2004) as well as Sonntag (1999), four clusters are predominantly used in the German HR context: (1) subject, (2) social, (3) method, and (4) personal competencies. This framework has also been taken up by the *Cassel Competence Grid*[6] (CCG, cf. Kauffeld and Grote, 2000; Kauffeld, 2006b) as well as by other authors (e.g. Lenzen, 1998; Hufnagl, 2002).

For the analysis of the impact that applicant comptencies exert on the selection decision, these four clusters are supplemented by a fifth cluster which is particularly salient in emerging organisations (entrepreneurial competency). The following table 5.2 shows that the five competencies used in this analysis can be found in the majority of popular ways to structure and cluster competencies.[7] Afterwards the five clusters are described in greater detail leading to hypotheses about their role in the selection decision process in small and emerging IT ventures.

5.2.4.1 Subject competency

Subject competency[8]—sometimes called professional, functional, or technical competency (Delamare Le Deist and Winterton, 2005; Rowe, 1995; Gray, 1999; McLagan and Suhadolnik, 1989; Berge *et al.*, 2002; Kauffeld, 2006b)—can be obtained by education and professional experience. Its the possession of technical knowledge and the ability to use it appropriately. As this cluster is most closely related to job-specific knowledge and the technical competencies are immediately needed to perform the tasks of the job, it does very often refer to a specific job or task and thus resembles closest traditional KSAs (Delamare Le Deist and Winterton, 2005; Bolt-Lee and Foster, 2003). Sonntag and Schmidt-

[6]The CCG is a way to measure and to assess competencies without getting back to self-description of the participants but rather use objective criteria to measure competency (Kauffeld and Grote, 2000). Additionally, according to Kauffeld (2006b), the CCG shows a clear analogy with the theoretically based systematisation of learning outcomes from vocational training programmes (cf. Kraiger, Ford and Salas, 1993).

[7]An extended version of this table which includes the clusters' labels used by the various authors can be found in the appendix, table A.2.

[8]The most common wording in German is *"Fachkompetenz"* (Delamare Le Deist and Winterton, 2005).

Source	Subject	Social	Personal	Method	Entrep.
McLagan and Suhadolnik (1989)	⊕	⊕	⊗	⊖	⊕
Greatrex and Phillips (1989)	⊖	⊗	⊖	⊗	⊖
Payne *et al.* (1992)	⊗	⊗	⊗	⊗	⊖
Bethell-Fox (1992)	⊖	⊗	⊗	⊗	⊗
Cheetham and Chivers (1996; 1998)	⊕	⊖	⊗	⊕	⊖
Dalton (1997)	⊗	⊗	⊗	⊗	⊖
Goodstein and Davidson (1998)	⊕	⊕	⊖	⊕	⊖
Gray (1999)	⊕	⊕	⊗	⊕	⊕
Erpenbeck (2000)	⊕	⊕	⊗	⊕	⊖
Boyatzis *et al.* (2000)	⊖	⊕	⊗	⊗	⊖
Graf (2002)	⊕	⊕	⊕	⊕	⊖
Brinckmann *et al.* (2005)	⊕	⊕	⊖	⊖	⊕

⊕: fully covered, ⊗: partially covered, ⊖: not covered

Table 5.2: Coverage of various competency clusters in the literature

Rathjens (2004) define the term as the specific knowledge, skills, and abilities necessary to cope with the particular tasks of a specific job and Scullen, Mount and Judge (2003) describe *technical skills* as the degree to which an employee possesses specialised knowledge and analytical abilities normally associated with the professional role. According to Kauffeld (2006b), it is the sum of organisational, process, task, and workplace-specific professional skills. It is the ability to classify and to assess organisational knowledge, to identify problems, and to generate solutions. Technical competencies are specific to a particular occupation or small cluster of occupations while the other competency facets are more general and applicable to all or most professions (Berge *et al.*, 2002).

Taking into account the aforementioned definitions of competency and the delineation from competence (see table 5.1), subject competency is probably the one competency cluster that is closest related to competence and skills. Woodruffe (1993) warns against labelling technical skills "competence" in order not to confuse terms and definitions. Of all competency clusters, functional competences are least behavioural. Shippmann *et al.* (2000) explicitly call for the integration of technical competencies into competency models which do

often suffer from overgeneralising from the core competency concept, tend to look alike even when constructed for different jobs and positions, and thus leave a large portion of what is related to the success in a particular job unaccounted for.

Most often, technical competencies or skills dominate the sought applicant characteristics in job advertisements which is understandable given their ability to discriminate quickly between possible applicants (Gray, 1999). On the other hand, "it is usually not the lack of knowledge, but the inability to *use* knowledge that limits effective managerial performance" (Boyatzis, 1982, p. 4). Segalla *et al.* (2001b) mention the conflict of hiring generalists or specialists that often occurs between line managers and the HRM department: line managers tend to prefer candidates with highly specific skills that can rapidly become productive at work, whereas the HR department often prefers generalists with high potential believing that skills can be taught but potential cannot.

5.2.4.2 Social competency

The second competency that is used in this research is social competency. This facet is easy to define at first sight as its use is omnipresent. But at a closer look it becomes more and more difficult because the variety of different definitions in scientific as well as in practitioner-oriented literature is overwhelming.

Social competency, sometimes also labelled interpersonal competency or social intelligence, is the ability to interact with other people cooperatively and to communicate properly (Baron and Markman, 2003). According to Meichenbaum and Butler (1981), it comprises overt behaviours, cognitive processes, and cognitive structures. Socially competent people are able to seize thoughts, emotions, and attitudes of other people, to be empathic, and to adequately communicate in different situations. This cluster includes the ability to exercise relationships and to interact with others in a rational and conscientious way, including the development of social responsibility and solidarity (Delamare Le Deist and Winterton, 2005).

Thorndike (1920, p. 228) defined it as "the ability to ... act wisely in human relations." As defined by Schneider, Ackerman and Kanfer (1996, p. 471), "socially effective behavior is behavior that is instrumental in helping people achieve personal goals that are social in nature." Kanning (2002) defines social competency as the entirety of a person's knowledge, skills, and abilities which lead to *socially competent behaviour*. This in turn is defined as the behaviour that enables a person to realise his or her own objectives without neglecting

the social acceptability of his or her behaviour. Sonntag and Schmidt-Rathjens (2004) define social competency as the communicative and cooperative behaviour which help to attain goals in situations that require social interaction.

According to Hough and Oswald (2000) and Schneider *et al.* (1996), social competency is not unidimensional but a compound variable that comprises several relatively independent dimensions like social insight, social intelligence, social appropriateness, social openness, social influence, warmth and extraversion and is related to interpersonal effectiveness. Baron and Markman (2003) describe four distinct aspects of social competency:

(1) social perception (i. e. the accuracy in perceiving others),
(2) impression management (i. e. the ability to evoke favourable reactions in others),
(3) social adaptability (i. e. the ability to adapt to different social situations), and
(4) expressiveness (i. e. the skill to express ones emotions as well as feelings in an appropriate way).

As Schneider *et al.* (1996) found out, most aspects of the social competency dimensions stated above are closely related to major personality dimensions. At least four of the Big Five traits do overlap with facets of social competence (e. g. extraversion is included in both models, warmth overlaps with agreeableness, social openness with openness to experience, and social appropriateness with agreeableness and extraversion).[9]

Social competency seems to be particularly important in the context of the IT-industry as computer experts allegedly lack social skills. O'Leary, Lindholm, Whitford and Freeman (2002, p. 326) even go as far as stating that the whole "'generation.com' will be computer literate but socially illiterate." Similarly, Mønsted (2004) described how highly talented IT specialists had been completely unable to communicate what and how they had done in their projects in a manner that was understandable to their peers, not even thinking of lays. The importance of social competency becomes even more obvious, if we take into account that it is a lack of social rather than technical skills that is most likely to derail leaders (McCall and Lombardo, 1983). In this line, Walter and Kanning (2003) found that the social competency of a line executive as perceived by the subordinates directly influences their job satisfaction. Segalla, Rouzies and Flory (2001a) focus on the distinction between "team players" and "loners", with loners strongly related to "high potentials" and "top performers". Well fit-

[9] On the other hand, Hough and Oswald (2000) state that social competence is among the personality constructs that are *not included* in the *Big Five* that have been used to predict work behaviour.

ting so-called "B players" do often have higher impact on the firm's long-term success because the offer steady performance and integrate better into the team than high soaring stars (DeLong and Vijayaraghavan, 2003).

According to Brinckmann *et al.* (2005), this competency is increasingly important in young and entrepreneurial firms which generally lack own resources and thus depend on resources contributed by networks. Similarly, Baron and Markman (2003) found that high social competency is beneficial to entrepreneurial success. This can be explained by the fact that in order to successfully establish their venture, entrepreneurs have to build up social relationships with many different persons, like for example customers, purveyors of capital, or suppliers, "from scratch."

5.2.4.3 Method competency

Method competency is related to cognitive competency and comprises the ability to think and act in an insightful and problem-solving way (Delamare Le Deist and Winterton, 2005). It is the knowledge of what to do when and includes the disposition to find adequate ways for resolving complex problems and situations and to use them in a resourceful manner (Sarges, 2000). Furthermore, it comprises the cognition and usage of proper methods of organising, time-management and knowledge-management (Lenzen, 1998).

According to Kauffeld (2006b), it describes the ability to locate resources and to use them for the accomplishment of a task. The individual structures his or her tasks, e. g. by introducing procedural suggestions, prioritising or visualising main topics. It includes the ability to independently acquire new job-related knowledge and to use ones cognitive abilities in a over-situational manner (Kauffeld and Grote, 2000). Sonntag and Schmidt-Rathjens (2004, p. 26) define method competency as the bundle of cognitive abilities that can be used flexibly and enable a person to cope with new and complex tasks.

5.2.4.4 Personal competency

Personal competency, sometimes (e. g. Kauffeld, 2006a) labelled *self-competency*, can be understood as the disposition to act considerately and deliberately. It comprises the ability to reflect the own person and behaviour critically and to develop as well as to modify emotions, motives, attitudes, and values (Sarges, 2000). Furthermore it includes the individual's willingness to create conditions in order to grow in the process of work (Kauffeld, 2006b).

Individuals with a high personal competency are able to develop a realistic self-conception, to show initiative, creativity and mobility, and to take responsibility (Erpenbeck and Heyse, 1999). In contrast to the aforementioned *inter*personal competency, personal competency always relates to the own person. It describes the willingness and ability to understand and analyse the developmental processes and changes that occur in the person's environment. Furthermore, it includes the ability to develop one's own skills, to act morally, as well as the assertion of a positive self-image (Delamare Le Deist and Winterton, 2005). According to Sonntag and Schmidt-Rathjens (2004), this cluster is closest related to personality and comprises dispositions needed for the motivational and emotional control of professional actions. It consists of attitudes, values, needs, and motives.

Personal competencies have also been used by Greatrex and Phillips (1989), Moy (1991), or Redman and Mathews (1997). Gray (1999) found that the omission of personal competence in McLagan's (1989) model does not reflect the reality of job advertisements analysed in the context of HR development managers in New Zealand. Practitioners thus stress that group of competencies. He suggests that in future, personal competencies will get more attention as Goleman's book *Emotional Intelligence* stressed this particular group and its direct relationship to effective performance.

5.2.4.5 Entrepreneurial competency

Entrepreneurial competencies comprise acting efficiently and farsighted as well as thinking strategically and visionary while taking into account the benefits and costs of an undertaking. Bolt-Lee and Foster (2003) refer to them as "broad business perspective competencies" and include strategic and critical thinking, a strong client focus, and leveraging technology to develop and enhance a broad business perspective.

Erikson (2002, p. 278) defines entrepreneurial competency as "the combined capacity to identify and pursue opportunities, and to obtain and coordinate resources." He links entrepreneurial competency to Bandura's (1997) concept of *perceived self-efficacy*. This concept reflects the confidence in ones ability to perform entrepreneurial tasks which is based on the knowledge of ones past performance and accomplishments. Furthermore, he describes major components of entrepreneurial competency, such as entrepreneurial creativity, perceived feasibility, or the ability to enterprise. In that sense, entrepreneurially competent people recognise opportunities and take advantage out of them, they are focused on developing new business organisations, products or services.

According to Brinckmann *et al.* (2005, p. 22), entrepreneurial competency consists of three aspects: conceptional, innovative and assertive competencies. In this sense, a competent entrepreneur will not only possess the creativity and resourcefulness to recognise and seize opportunities, but also the conceptional capability to integrate the idea into a profound concept that can be the basis for a successful venture. In addition to these two competencies, he or she will be able to pursue his or her ideas and goals and to convince other to support them. In line with these thoughts, Man, Lau and Snape (2008) established and empirically tested a link between individual-level entrepreneurial competencies and firm performance. Their results provide supporting evidence of the positive effects of the entrepreneur's competencies on the long-term performance of the venture.

While the abovementioned sources mainly link the entrepreneur's entrepreneurial competency to venture performance, the same might apply to the entrepreneurial mindset of the firm's employees. In this context, entrepreneurial competency is closely related to corporate entrepreneurship (intrapreneurship) that expects all employees to act as if they were the entrepreneur and thus guarantee corporate success (Reich, 1987; Kuratko, Ireland and Hornsby, 2001). Consequently, this type of competency is especially important to employees in small and emerging firms in a risky environment, because in those settings, the prospects of the whole venture does not only depend on the entrepreneurial competency of the entrepreneur himself but on that of the whole team. As teams are small, it is more important that every member actively seeks to support the development of the company by acting entrepreneurially. In line with these thoughts, Neiswander *et al.* (1987) found that entrepreneurs listed "entrepreneurial attitude" on top of the list of desired attributes the venture's first hires should encompass.

5.2.5 Summary and hypotheses

Table 5.3 provides an overview of the aforementioned competency facets and the skills, abilities, and attributes that represent them.

Taking into account what has been laid out concerning the importance of the various competency clusters, I hypothesise:

> **Hypothesis 1:** *The level of a candidate's (a) subject competency, (b) social competency, (c) personal competency, (d) method competency, and (e) entrepreneurial competency will each be positively associated with the assessment of the candidate's hirability by the selection professional.*

Subject	Social	Personal	Method	Entrepreneurial
Education	Communication skills	Learning aptitude	Decisiveness	Strategic thinking
Work experience	Cooperativeness	Flexibility	Ability to abstract	Responsibility
Specialized skills	Ability to work in teams	Mobility	Organizing skills	Identification with the firm
Foreign languages	Empathy	Charisma	Problem-solving skills	
		Analytical skills	Analytical skills	
		Creativity	Autonomy	

Source: compiled by the author, based on Boettger (2004); Hufnagl (2002); Lenzen (1998)

Table 5.3: Competency grid used in this thesis

However, not all competency clusters might be of the same importance to a selection decision. For example, Boyatzis (1982) introduced the term *threshold competency* which is a competency that, although essential to performing a job, does not differentiate superior from average performance. This is only done by *differentiating* competencies that distinguish superior from average performers (Hooghiemstra, 1992). This is consistent with Campell's (1990) model of performance determinants in which *declarative knowledge* is viewed as a necessary but insufficient precondition of procedural knowledge and skills and only the third type of determinant, *motivation*, is a direct determinant of performance. Similarly, Bethell-Fox (1992) argues that firms should select for those competencies that are inherent in the person and deeply trait-based and not for those that can be rather easily trained, like technical skills. Thus, I hypothesise:

Hypothesis 2: *As subject competency is only a threshold competency, its relative importance in the decision making process will be smaller than that of the other clusters of competency.*

5.3 Applicant Fit

As described above, the competency approach to HRM can be regarded as a response to changes in the nature of the work environment: researchers postulate that in modern organisations the traditional job with a fixed and stable set of responsibilities, embedded in a clear hierarchical structure, is dissolving. It is replaced by a flexible, project-based organisation in which employees constantly change roles, tasks, and functions (Bowen *et al.*, 1991; Bridges, 1994).

Next to the competency approach, another concept seeks to respond to these challenges: person-organisation fit (P-O fit). It encourages selection professionals to hire people that fit their organisation as a whole rather than just a specific job (Bowen *et al.*, 1991). Linking staffing practices to corporate culture and values is supposed to help companies to ensure that employees have internalised the enterprise's strategy and values (Snow and Snell, 1993). These ideas are often opposed to the more traditional approach of selection which focuses on the skills and characteristics immediately needed for the vacant job and is consequently labelled person-job fit (P-J fit).

In this section, I will define and lay out the basic concept of P-O fit as well as its historical development. I will describe ways that are suggested to measure this complex construct and to assess whether potential employees fit a particular organisation. The outcomes and implications of employing P-O fit in staffing and managing organisations are explained and lead to the development of a second set of hypotheses as do reflections about the still remaining impact of P-J fit.

5.3.1 The concept of person-organisation fit

The traditional approach of staffing was to select individuals with skills particularly needed in the vacant position. This approach has been labelled person-job fit (P-J fit, Cascio, 1991; Kristof-Brown, 2000). In recent years, practitioners have been encouraged to use a different approach to staffing, namely to hire people that fit their organisation rather than just a specific job (Bowen *et al.*, 1991). By linking staffing practices to corporate culture, companies are supposed to ensure that employees have internalised the enterprise's strategy and values (Snow and Snell, 1993). This idea led to the concept of person-organisation fit (P-O fit) which Kristof (1996, p. 4) defines as

> "the compatibility between people and organizations that occurs when: (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both."

P-O fit is gaining importance as a reaction to changing organisational environments. The increasing use of task-force teams and project management causes rotation of employees from one activity to another. Organisations require employees that continuously acquire new skills as the external environment changes rapidly (Bridges, 1994; Borman *et al.*, 1997).

There is considerable interaction between the concept of P-O fit and the competency approach. For example, Shippmann *et al.* (2000) stated that competency modelling approaches are much more likely to emphasise long-term organisational fit rather than short-term job match. Furthermore, they typically tend to provide descriptions of the individual-level competencies which are relevant not just for one single job but for an occupational group or an entire level of jobs. The drivers for the use of P-O fit as well as competency-based approaches in personnel selection are very similar and often the same reasons are mentioned and both approaches are contrasted with the traditional job-based approaches to personnel selection (Rodriguez *et al.*, 2002): the changing work environment which leads to the often cited "end of the job" (Bridges, 1994).

On a very basic level, the concept of fit between the person and the environment proposes that for each individual particular environments are more compatible with the individual's personal characteristics than others and that working in those fitting environments will lead to positive consequences such as improved work attitudes, better performance, or reduced stress (Judge and Kristof-Brown, 2004). The underlying theory of this concept goes back to Lewin's (1935) famous equation

$$B = f(P, E)$$

which proposes that behaviour is a function of the person and the environment.

Rynes and Gerhart (1990) provide a list of characteristics consistently ascribed to the concept of P-O fit in the previous literature: the concept

(1) goes beyond factors like KSAs (knowledge, skills and abilities) and requirements that are immediately job-related;
(2) develops its real importance only on those candidates that meet the minimal job requirements;
(3) is distinctively firm-specific and goes beyond general employability and idiosyncratic reactions of individual evaluators; and
(4) is most commonly assessed in the employment interview.

Values and culture play an important role in the definition of P-O fit, as this concept is often defined as a congruence between *patterns of organisational values and patterns of individual values* or between *individuals' cultural pref-*

erences and the existing organisational culture (Chatman, 1991; O'Reilly, Chatman and Caldwell, 1991; Adkins *et al.*, 1994; Bretz and Judge, 1994; Cable and Judge, 1997). Van Vianen (2000) stresses that both approaches are often used synonymously; she points out that values are especially important because they are fundamental, relatively enduring, and guide individuals' attitudes, judgements, and behaviours. Despite this emphasis of values over other potential aspects of fit in the literature, Bretz, Rynes and Gerhart (1993) have not been able to prove this importance empirically. In their analysis of dimensions of fit used by recruiters only one dimension with a clear emphasis on values (work ethic) was found among the thirteen most important dimensions.

Lievens, Decaesteker, Coetsier and Geirnaert (2001) and Schneider (1987) stress the *interactionist* approach to P-O fit. This idea is based on the assumption that both, the individual as well as the organisation, make selection decisions and tend to select those counterparts who best fit their needs and preferences. Similarly, Carless (2005) found empirical evidence that both perceived P-O as well as perceived P-J fit influenced the individual's decision to join an organisation and can be counted as valid predictors of organisational attraction. This is in accordance with the aforementioned Staffing Cycles Framework (Carlson and Connerley, 2003, see fig 3.1, p. 28). Schneider's (1987) Attraction-Selection-Attrition (ASA) framework proposes that organisations tend to become more and more homogeneous over time (Schneider, Goldstein and Smith, 1995) which is due to an interaction of three processes:

(1) *attraction*: individuals will be attracted to such firms where the modal personality most closely resembles their own
(2) *selection*: on the other hand, organisations tend to select and to hire those individuals that bear similarity to their current members
(3) *attrition*: individuals that do not fit the organisation well are likely to leave the firm over time (for a comprehensive review of the ASA framework see Slaughter, Stanton, Mohr and Schoel, 2005, p. 422).

Schneider, Smith, Taylor and Fleenor (1998) provided evidence for the ASA framework's underpinning assumption that a positive relationship exists between organisational membership and personality. The authors found that the variance of personality variables (measured by the MBTI) is significantly larger between organisations than within an organisation.

There is a distinction between *supplementary* and *complementary* fit. The first occurs when a person has similar characteristics to other individuals, whereas the latter means that the individual and the situation meet each other's needs (Kristof, 1996; Carless, 2005). Unfortunately, these two approaches describe

fit from opposite viewpoints. In the first approach, fit is conceptualised as *similarity* between person and environment, whereas the second approach posits fit when person and environment are *dissimilar*. This paradox lead to the consequence that fit is often judged by its outcomes (i.e. positive consequences) rather than its input or prerequisites (Judge and Kristof-Brown, 2004).

5.3.2 Measurement and assessment of P-O fit

Despite the important role of P-O fit in the selection process, recruiters are reluctant to include P-O fit measures in their selection decisions as this measurement is still unclear and somewhat mysterious. Especially assessing organisational culture is problematic and measures of applicants' values may be fakable. Moreover, their relation with the ability to perform the particular job is not clearly proven (Bretz *et al.*, 1993; Van Vianen, 2000).

Judgement of fit is influenced by factors that are subjectively assessed, like interpersonal skills or goal orientation, rather than relying on 'objective' qualifications (Rynes and Gerhart, 1990). So the perceptions of fit that influence the selection decision are always subjective. Thus, reality is much better depicted by subjective fit than by objective (Carless, 2005). Similarly, Higgins and Judge (2004, p. 624) stated that while "objective qualifications had little effect on selection recommendations, subjective evaluations of P-J fit were strongly related to hiring recommendations." Recruiters' judgements of P-O fit are often based on the congruence of their *perceptions* of applicants' and organisation's' values (O'Reilly *et al.*, 1991). Adkins *et al.* (1994) found that the congruence between the values of *applicant and recruiter* is far more important than that of *applicant and organisation*. In other words, recruiters attribute a high fit to those applicants that are similar to their own values or to some universal and ideal values but not the organisation's values. Another way often used to establish P-O fit is to compare applicants' preferences with the preferences of their recruiters, supervisors, and peers (Van Vianen, 2000).

At present there are hardly any robust measures of P-O fit available (Anderson *et al.*, 2004), a fact that makes selection for this criterion increasingly difficult and leads selection professionals to rely on their gut feeling. This lack of objective measures does also lead to the fact that recruiters' perceptions of applicant fit were positively affected by the applicant's use of influence tactics (Higgins and Judge, 2004). In their analysis on how recruiters establish applicant fit, Bretz *et al.* (1993) were able to identify 13 attributes being used as indicators of fit. In contrast to the aforementioned emphasis on P-O fit, this list did not contain any dimension with a clear organisational fit component. Most recruiters seem to stress P-J fit and universally desired characteristics rather than

P-O fit. However, Bretz *et al.* found some indications that the concept exists but is less developed than expected. This result is consistent with Ryan and Schmit (1993) who found that P-O fit was related to performance and turnover of *existing* employees rather than to selection decisions.

Recruiters make extensive use of personality inferences during the selection process which are subsequently used in assessing the applicants' P-O and P-J fit. Yet, the validity of these judgements is doubtable as even on personality traits that are very easy to be observed—like extraversion and agreeableness—recruiters' judgements are only moderately correlated with applicants' self reports. There might be several reasons for this fact, e. g. that recruiters infer personality traits from nonverbal behaviour and appearance and hold implicit personality theories facilitating their judgements (Caldwell and Burger, 1998; Kristof-Brown, 2000; Barrick, Patton and Haugland, 2000). Stevens and Ash (2001) found a link between applicant personality and their perception of fit with the organisation. In particular, they found that there are systematic differences in personality dimensions (three of the Big Five dimensions: agreeableness, openness to experience, and extraversion) and the preference for different supervisor-subordinate relationships. As the interaction between managers and subordinates can be regarded as an important indicator of organisational culture, choosing future managers with the right style is important to organisations. The assessment of personality variables might help organisations to find the right type of manager. The information about the relationship between individual differences in personality and preferences for different managerial styles can be useful to organisations that desire to devise selection systems to maximise person-organisation fit.

As both types of fit differ in terms of their antecedents and factor composition, recruiters use different means to judge both types of fit. The applicants' knowledge, skills and abilities (KSAs) are used to judge P-J-fit and personality traits to assess the latter (Kristof-Brown, 2000). Thus, interviews are the means of choice to assess applicants' value-congruence with organisations in the later stages of the selection process (Cable and Judge, 1997). Kristof-Brown (2000) uses four items to measure recruiter's P-O fit perception (based on Cable and Judge, 1997; Adkins *et al.*, 1994):

– To what degree does this applicant fit with your organisation?
– To what is this candidate similar to other employees?
– To what extent will other employees think this candidate fits well in your organisation?
– How confident are you that this applicant would be compatible with your organisation?

5.3.3 Outcomes and implications of P-O fit

P-O fit gained its importance because many researchers agree on the fact that it contributes to important individual and organisational outcomes (Borman *et al.*, 1997). Potential benefits of P-O fit for both employee and organisation include higher job involvement, greater organisational commitment, and lower turnover (O'Reilly *et al.*, 1991; Bretz *et al.*, 1993). Highhouse (1997, p. 465) states that "the degree to which the ultimate choice reflects the goals and values of the person or organization" is the best indicator of quality. Bretz and Judge (1994) found that the fit between individual characteristics and organisational settings described by human resource systems may be particularly important determinants of job acceptance. For example, applicants with an internal locus of control were more attracted to organisations with competitive, merit-based promotion systems than their counterparts with an external locus of control.

Ryan and Schmit (1993) found a positive relationship between P-O fit and individual performance as well as employee retention, but did not find any significant relationship between P-O fit and the hiring decision. This finding is in contrast with the results of Cable and Judge (1997) but partially supported by Kristof-Brown (2000). Cable and Judge's study revealed that an applicant who was perceived to fit the organisation fairly well would be 44 % more likely to receive a job offer than a candidate with an average fit. Kristof-Brown (2000) notes that P-J as well as P-O fit offer unique prediction of recruiters' hiring recommendations. However, P-J fit had the greater influence on recruiters' decisions.

Consequently she concludes that P-J fit is more important in the first stages of the selection process when those applicants who do not meet the formal requirements for the job are eliminated. P-O fit, in contrast, is rather used in later stages when a decision has to be made between applicants who have already proved their qualification for the job and all remaining candidates meet the minimal job requirements (Ricklefs, 1979; Rynes and Gerhart, 1990). This finding is in line with Jetter (2003) who suggests a coexistence between both types of fit rather than an "either-or relationship".

Following the notion that P-O fit of a potential employee is beneficial for both employee and organisation, I hypothesise

> **Hypothesis 3:** *The level of a candidate's P-O fit will be positively associated with the assessment of the candidate's hirability by the selection professional.*

Although the importance of P-O fit is acknowledged in general, the concept might be more important in some organisations and less in others.

Bamberger, Bacharach and Dyer (1989) explicitly call for the consideration of the firm's life-cycle stage when researching its HR systems and taking a contingency approach. In particular, Heneman *et al.* (2000) suggest that P-O fit is especially important for personnel selection in small and new businesses. This type of organisation is usually less formalised and changes more rapidly. Thus employees are more likely to perform multiple or changing jobs and P-O fit is more important than P-J fit. This is in line with Baker and Aldrich (1994, p. 79) who report that especially when staffing the very first positions entrepreneurs and founders prefer generalists willing to work in relatively undefined positions and "play general organizational roles rather than filling specifically defined jobs." This does particularly apply to senior hires. Furthermore, Neiswander *et al.* (1987) stated that earlier employees tend to be given a wider range of responsibilities.

From another point of view, Schneider *et al.* (1995) argue that homogeneity in organisations (e. g. in personality, attitudes, and values) is beneficial in the early stages of the organisational life cycle because it contributes to enhanced cooperation and communication. However, it can also be dangerous in later stages when it might block organisational change. Furthermore, Kotey and Sheridan (2004) state that selection decisions in small firms are mostly made by the owner with a strong emphasis on the "fitting in" of the candidate. On the other hand, Huang (2000) found that large multinational firms tend to select new employees on the basis of job skills rather than their P-O fit. Similarly, Kotter and Sathe (1978) found that in rapidly growing emerging firms, quality staff consists of generalist rather who are able to grow with the firm in any given direction rather than of specialists who do exactly fit one job-description.

These thoughts do also back up the aforementioned arguments which are confirmed by anecdotal evidence (Moehle von Hoffmannswaldau, 2005) but so far have not been tested empirically, thus I hypothesise

> **Hypothesis 4:** *Firm age and size will moderate the positive relationship between P-O fit and the candidate's hirability such that the relationship is more positive in (a) young than in established firms and in (b) small than in large firms respectively.*

5.3.4 Remaining impact of person-job fit

While I have elucidated that person-oriented approaches like P-O fit as well as applicant competencies are more suitable for staffing rapidly changing organisations, I do believe that traditional, job-based criteria are still taken into consideration in selection decisions.

The counterpart to PO-fit is often described as person-job fit (P-J fit). P-J fit is defined as "the match between individual knowledge, skills, and abilities (KSA) and demands of the job or the needs / desires of an individual and what is provided by the job" (Carless, 2005, p. 412). Kristof-Brown *et al.* (2002a, p. 30) defines P-J fit as a concept that "encompasses the applicant's perceived competence and whether he or she is seen holistically as the 'right type of person' for a particular position." Although some authors raised questions about the distinctiveness of perceived P-J and P-O fit (e. g. Kristof-Brown, 2000), Carless (2005) found that the measures used in her study have been able to segregate both aspects reasonably well and thus both criteria can be treated as distinct. Theory on PO-fit suggests that the importance of P-J fit is decreasing. However, Paunonen, Jackson and Oberman (1987, p. 111) found that "the higher the perceived person-job match, the greater ratings about the candidate regarding suitability for the job and expected success and the greater the interviewer's willingness to hire."

Kristof-Brown (2000) found that among the wide variety of perceptions that interviewers form and consider prior to making their final decision, that of P-J fit is one of the most important. P-J fit helps to overcome one essential shortcoming of P-O fit: the use of a rather abstract criterion such as P-O fit might mislead managers to base their selection decisions on inappropriate cues like gender or attractiveness and justify this behaviour with the concept of fit (Marlowe *et al.*, 1996). Taking the individual (applicant) perspective, Carless (2005) state that the joint and simultaneous assessment of both types of fit provides a more realistic representation of the job search process.

Following Paunonen *et al.* (1987, p. 112) who stated that "reference reports [...] can override concerns about person-job fit when competence is perceived to be extremely high or extremely low," I suppose that the remaining role of P-J fit is particularly exerted in interaction with the applicant's competencies and I hypothesise:

> **Hypothesis 5:** *The candidate's P-J-fit will moderate the positive relationship between the candidates competencies ([a] subject competency, [b] social competency, [c] personal competency, [d] method competency, and [e] entrepreneurial competency) and the assessment of the candidate's hirability by the selection professional such that the relationship is more positive if the candidate's P-J-fit is high than if it is low.*

5.4 Applicant networks

The last decision cue I focus on in this analysis is the existing network or social capital of the applicant. Network relations are linked to the recruitment of new employees in a twofold manner. On the one hand, the network of the founder is an important source of recruitment especially for very young ventures. On the other hand, the existing networks of new employees are themselves a valuable resource for the firm.

There is reasonable evidence that the former workplace of the entrepreneur has an important impact on the new venture's performance by providing blueprints for the newly created firm (Baron, Hannan and Burton, 1999) as well as by the contacts and network relations established in these firms (Burton, Sørensen and Beckman, 2002). These existing networks, supplemented by friends and relations, contacts from university, or the existing workforce are an important source of employees for young ventures. Through these relationships, founders can find early hires whom they can trust implicitly, and who can be counted on to take responsibility. Moreover, recruiting through networks is at far lower cost compared to other sources of recruitment like newspaper advertisements (Aldrich and Langton, 1997). Zellner and Fornahl (2002) suggest that informal as well a formal contacts can determine where a firm searches for potential employees and whom it eventually hires. Carroll *et al.* (1999, p. 244) stress the importance of recruiting "through the network", e. g. hiring friends and family members of existing staff, using employee recommendations, or poaching staff from competitors especially for small firms, as this method is likely to increase the fit of potential new hires.

Rynes *et al.* (2002, p. 155) state that job applicants who answer job advertisements are likely to have higher turnover than those referred by other employees. They state meta-analytic and primary study evidence as a proof of this statement but point out that recent evidence of the effects of recruitment sources has been less consistent than earlier evidence and the influence of the Web as a recruiting source is not yet sufficiently examined. 49 % of the HR professionals surveyed correctly judged this statement as true. Decker and Cornelius (1979) showed that employee referrals are the recruiting source with the lowest turnover in the first year.

On the other hand, Zellner and Fornahl (2002) suggest that new hires do not only embody knowledge as such ("know how") but also "know who". That is, they possess an established network of contacts and relationships as a remainder of preceding jobs and their previous career which they can bring into their new position.

The role of social capital (Bourdieu, 1986), i. e. the ability to establish and maintain networks, is considered as important for young ventures (e. g. Yli-Renko, Autio and Sapienza, 2001) and "has become an important analytical lens for understanding strategic actions of entrepreneurs" (Aldrich and Kim, 2007, p. 147).[10] The particular value of a network is routed in its ability to allow its members to access its embedded social resources (Bourdieu, 1986; Lechner and Dowling, 2003; Florin, Lubatkin and Schulze, 2003). However, despite the generally accepted importance of a firm's social capital for firm growth and success, most studies do concentrate on the existing social capital that is embodied in the founder, the top management team, or the existing workforce (e. g. Florin *et al.*, 2003; Davidsson and Honig, 2003). So far, little attention has been given to the possibility of extending the firm's social capital by adding the network relations of new hires. However, the 'know who' of new employees can help the new employer to solve scientific or technological problems as well as establish new formal cooperation among the firm and other external actors (Zellner and Fornahl, 2002). Newell (2000) as well as Robertson and Smith (2001) stated that rapid changes of jobs in the 'knowledge era' will increase the importance of the ability to form social networks which help to interchange information with other people and thus extend the knowledge pool Following Zellner and Fornahl who argue that the potential employees' "degree of network access should be considered important in the decision-making processes involved in hiring new employees" (p. 196), I hypothesise

> **Hypothesis 6:** *The degree of the candidate's existing network relations to clients, colleagues, and others will be positively related to the likelihood of receiving a job offer.*

5.5 Decision makers' introspection into their own decision making behaviour

In their paper on decision making in personnel selection, Singh and Crocker (1988) differentiated two sets of cues used by selection professionals: operative and espoused cues. This dissociation is in line with Argyris' and Schön's (1974) work on espoused theories of action and theories-in-use. In this context, espoused theories or cues are those that people *report* as the basis for their actions or decisions when directly asked (Argyris, 1976a) while the other category of cues is inferred from *actual decision making* behaviour. According to Argyris

[10] For a comprehensive overview of research about the network paradigm in organisational research see Borgatti and Foster (2003) or Kilduff, Tsai and Hanke (2006).

(1976b), the theory-in-use which governs the person's action is the result of the conceptualisation and interpretation of the espoused theory and both types of theory need not necessarily be compatible. Furthermore, many people are not aware of the fact that they are acting according to their theory-in-use instead of their espoused theory. Argyris' idea was supported by various studies on decision making in different settings (e. g. Singh and Crocker, 1988; Shepherd, 1999b; Mainprize *et al.*, 2003; Bruns, 2004) which found that both sets of cues do not match or, in other words, decision makers "do not have a strong grasp on their decision-making process, especially as the decision becomes information laden" (Zacharakis and Meyer, 1998, p. 72).

There are various reasons for this gap between espoused and operative decision cues: cognitive limitations can cause general difficulties in describing cognitive processes and impede the ability to recall which weight had been put on different factors (Slovic, Fischhoff and Lichtenstein, 1977). The general overflow of information forces decision makers to give up the ideal of perfectly rational decisions and to follow the concept of bounded rationality (Cyert and March, 1963) instead. They use particular heuristics to frame their decisions and to cope with the abundance of information (Kahneman and Tversky, 1979; Kahneman, Slovic and Tversky, 1982; Tversky and Kahneman, 1986). This leads to numerous biases (for a taxonomy of biases see Arnott, 1998) which cause incorrect information processing and might not only lead to inaccurate decisions and judgements but can also reduce the ability to report the decision processes correctly (Shanteau, 1992) For example, the overconfidence effect (the overestimation of one's own knowledge and the overestimation of the likelihood that the favoured outcome will occur) has been reported to influence venture capitalists' decision making negatively (Zacharakis and Shepherd, 2001).

A high degree of introspection is usually considered to be positive. For example, Graves and Karren (1992) found that effective interviewers are more aware of their own decision processes that their less effective counterparts. On the other hand, there are also findings that contradict that viewpoint. Wilson and Schooler (1991) found that introspection (in that case triggered by demanding subjects to explain their decisions and analyse reasons) can cause people to make decisions that, when compared with those of control groups, correspond less with expert opinion. The reason for this observation might be that people's attention was focused on suboptimal decision cues which caused them to base the subsequent decision on these cues.

The fact that decision makers in many other settings lacked proper introspection into their own decision making behaviour and have been found unable to correctly report the different weights ascribed to various decision cues leads to

Hypothesis 7: *Selection professionals' espoused decision-making policy will differ from their operative policy when assessing the hirability of job applicants.*

5.6 Summary

In this chapter, I have elaborated a system of applicant attributes that can be used as criteria or decision cues in the decision making process of personnel selection.

Both the growing importance of applicant competencies as well as of P-O fit emerge out of the present changes in the work environment. The shift from the conception of a job as a fixed bundle of tasks to a conglomerate of constantly changing work activities triggers the use of competencies instead of the more traditional KSAs (Gatewood and Feild, 2001, p. 396) as well as the growing importance of P-O fit (Bridges, 1994). Applicant networks might be particularly important in the environment of entrepreneurial and emerging ventures, which do strongly rely on network relations to costumers as well as suppliers of capital and other resources.

Figure 5.1 summarises the supposed model of the impact of selection criteria on the selection decision:[11]

[11] Note that the last hypothesis is not depicted in this framework. Hypothesis 7 looks at the decision model from a meta-perspective as it covers the decision maker's introspection into the decision making process. Thus it covers all the relationships depicted in the model as a whole instead of adding another relationship to the model.

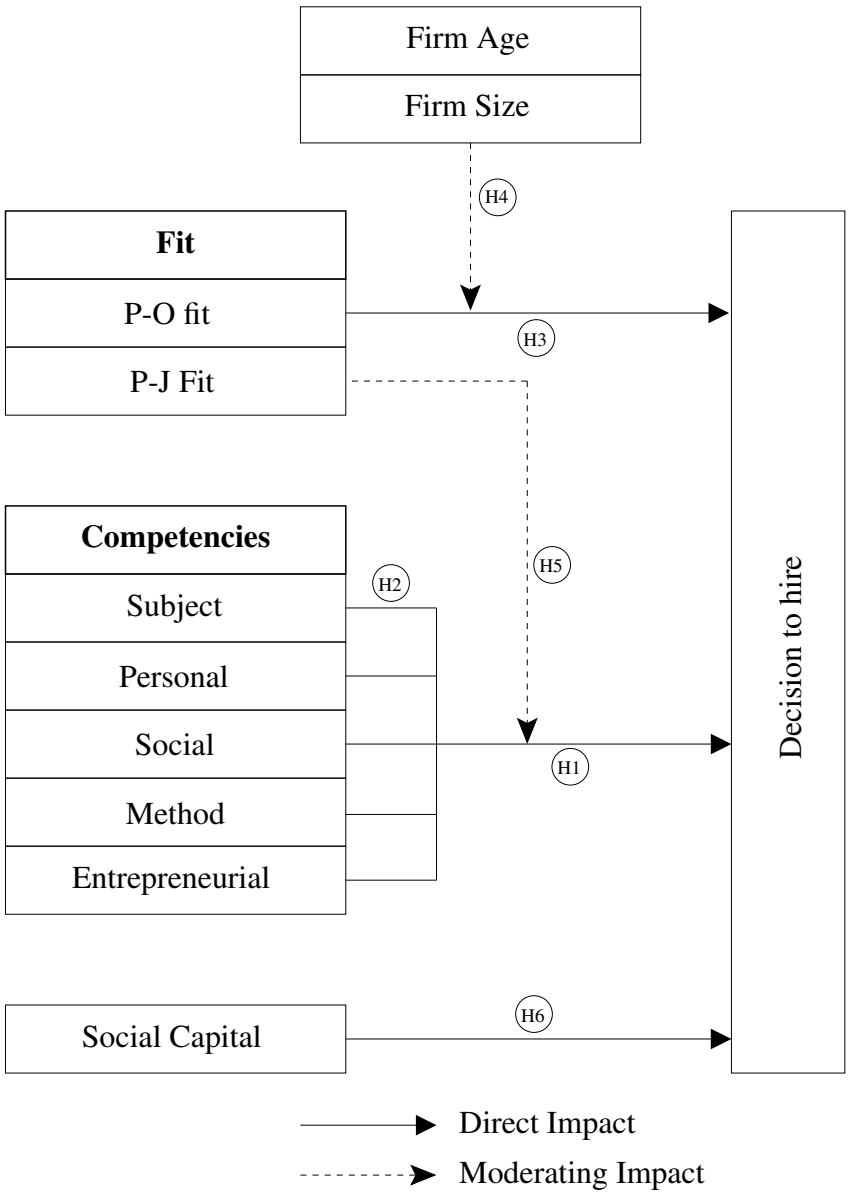

Figure 5.1: Decision model used in this thesis

6 Method

6.1 Introduction

The theories described in the previous chapters lead to a total of seven hypotheses, which are summarised in the following table 6.1 (see also the decision model depicted in figure 5.1).

Hyp.	Description	Page
1	Direct impact of competencies on selection decisions	101
2	Relative importance of subject competency	102
3	Direct impact of P-O fit on selection decisions	108
4	Moderated impact of P-O fit	109
5	Interaction effects between P-J fit and applicant competencies	110
6	Direct impact of social capital on selection decisions	112
7	Decision makers' introspection into selection decisions	113

Table 6.1: Overview of hypotheses

In this chapter, I will describe the research approach and method applied in order to test these hypotheses. After having laid out the theoretical background of the chosen methodology (metric conjoint analysis), I will describe the choice of variables and measures, the sampling plan, the research instrument, and finally the research procedure.

6.2 Conjoint analysis: capturing decision making policies

It is a well established finding in the decision making literature that direct reports of ratings of attribute importance do not correspond overly well with the actual importance those attributes receive in the decision making process (Slovic and Lichtenstein, 1971). Conjoint analysis is a good tool to overcome this shortcoming of direct reports because it mitigates concerns of social desirability better than most other techniques used to study decision cue usage (Ones and Viswesvaran, 1999). Although in some cases, other methods, like projective tests, have been used to discover operative criteria in selection decision making (Singh and Crocker, 1988), there are good arguments that CA is the method of choice for that purpose.

It has been used in a variety of disciplines of judgement and decision making research ranging from marketing to psychology, strategic management, and expert judgement (Green and Srinivasan, 1990; Gustafsson, Herrmann and Huber, 2000; Bruns, 2004). Furthermore, conjoint analysis has been applied to the analysis of decision making behaviour both of entrepreneurs (Choi and Shepherd, 2004; Shepherd, 1999a; Shepherd and Zacharakis, 1997) as well as of HR professionals in the context of personnel selection decisions (Dunn *et al.*, 1995; Kristof-Brown, Jansen and Colbert, 2002b; Moy and Lam, 2004).

In the next sections of this chapter, the theoretical foundations of conjoint analysis as well as its use in the context of HR and entrepreneurship research are laid out.

6.2.1 Basic assumptions and methodology

Conjoint analysis has its origins in market research where it was first used to measure utilities and consumer preferences as well as pricing decisions. However, basically every human decision situation can be researched with CA, if the decision is based on individual attributes at different levels.

CA is a decompositional method, i. e. the relative importance of individual factors on an overall decision is derived from measuring this decision instead of weighting each factor individually to calculate overall utility (Shepherd and Zacharakis, 1997). Consequently, conjoint experiments draw on the assumption that decision processes can be decomposed into underlying structures comprising a number of attributes and their relative importance. These attributes are described at different levels (e. g. high and low) while several different attributes

with predetermined levels constitute a profile. During the experiment, the participants judge the different profiles under the conditions of a given scenario (Louviere, 1988).[1]

There are different forms of conjoint analysis: axiomatic, nonmetric, and metric CA as well as policy-capturing which is a special type of the metric CA[2]. The first two approaches are based on the participants' ranking of the different profiles according to their preferences whereas the latter two rely on the participants' rating of the profiles according to a particular question. Although axiomatic and nonmetric approaches have been found useful in many settings of marketing research, they are of limited use to strategic management research. This is due to the fact that ranking the profiles requires an ordinal response scale which does not properly represent contingent decisions typical for strategic situations. Furthermore, nonmetric approaches are unable to represent the evaluation of interaction-based judgements which are prescribed by contingency theories (Priem and Harrison, 1994). Consequently, policy-capturing was chosen for this study.

In the statistical analysis, the dependent variable is represented by the decision makers' judgements, the independent variables are represented by the attributes and the moderating variables can be derived either by introducing specific attributes (Choi and Shepherd, 2004) or by using additional information on the decision makers provided in a supplementary questionnaire (Bruns, 2004). Regression analysis and analysis of variance (ANOVA) reveal whether the suggested attributes contribute to the decision as well as the relative importance of their contribution (Shepherd and Zacharakis, 1997).

A major advantage of CA is the high comparability and similarity to "normal" decision situation, because the participants do not judge the importance of isolated attributes but rather an overall situation, similar to their day-to-day decisions (Franke, 1999, p. 893). Furthermore, CA is a concurrent method of data collection, i. e. the data is collected at the time of the decision and not based on self-reports. This characteristic allows conjoint experiments to overcome many of the shortcomings associated with post-hoc methods, such as self reporting biases, retrospective reporting biases, and difficulties with collecting contingent decision data (Shepherd and Zacharakis, 1997; Choi and Shepherd, 2004) and makes this research approach particularly appropriate for this study. Consequently, it helps to overcome the problem that direct ratings or rankings of

[1] See section 6.5 for a description of the research instrument used in this study.

[2] See Priem and Harrison (1994) for a comprehensive comparison of the four approaches.

variables used in decision making do not correspond well with the actual importance of these variables in the decision making process (Ones and Viswesvaran, 1999).

This is in line with the findings of Singh and Crocker (1988) who pointed out the difference between *operative* and *espoused* decision cues. The first are those applicant characteristics that contribute to the real decision in personnel selection while the latter are those attributes that the decision maker reveals when he / she is directly asked. They found that operative and espoused criteria differed in their sample. CA is a good method to reveal operative cues instead of merely relying on self-reported espoused cues.

The basic methodology of conjoint experiments has been well described by many authors such as Louviere (1988) or Shepherd and Zacharakis (1997). The researcher first selects a number of appropriate attributes which are derived from theoretical considerations. Then a decision scenario is developed which comprises the various profiles that are the results of the attribute combinations as well as a description of the context in which the decisions are made. This common context helps participants to relate experimental judgements to those in the real world and thus facilitates control of subject variation. The data is collected in an appropriate sample and then analysed.

Conjoint analysis is not free of criticism (e. g. Hobson and Gibson, 1983). The main issue has been that the policies captured by the instrument do not precisely represent the manner in which raters cognitively combine the information in real-life decisions. On the other hand, basing conjoint measurement on the analysis of contrived rather than natural judgements has also advantages and is done for several reasons: real judgements are often too complex, it is difficult to obtain quantified values for both cue and decision aspect of the model, and statistical assumptions and requirements are hard to be met in real judgement situations (Brown, 1972). Moreover, Brown (1972) provided empirical evidence that judgemental models of decision policies obtained using contrived data resemble closely to the natural policy equations. Consequently, it seems legitimate to use experimental set ups to analyse decision making processes and infer to decisions made in the real world.

6.2.2 The use of conjoint analysis in HRM research

Even though CA is rooted in marketing research and many publications stem from this field of research (e. g. Ettenson, 1993), the method can also be applied to other areas of research. Shepherd and Zacharakis (1997) show how to use CA in entrepreneurship research, especially in analysing venture capitalists' decisions on investment in start up-companies. They call CA "a window of op-

portunity for entrepreneurship research". Conjoint analysis has also been used in various areas of human resources management, including decisions of both organisations and potential employees on organisational entry (e. g. Schewe and Dreesen, 1994; Wiltinger, 1997; Karren and Woodard Barringer, 2002; Moy and Lam, 2004).[3]

According to Ones and Viswesvaran (1999), CA has been used to assess performance appraisal situations (Zedeck and Cascio, 1982), compensation decisions (Viswesvaran and Barrick, 1992), and promotion decisions (Viswesvaran, Schmidt and Deshpande, 1994). Dunn *et al.* (1995) used policy capturing to rate the relative importance of personality factors. Lievens *et al.* (2005) used a policy-capturing approach[4] in order to examine the moderating effect of the selection method (namely unstructured interviews vs. paper-and-pencil tests) on the relative importance of the Big Five and GMA as selection decision cues. While preparing a survey of high potential graduates, Franke (1999) used CA in order to define the criteria which characterise high potentials in the eyes of human resource professionals.

Barr and Hitt (1986) as well as Hitt and Barr (1989) used conjoint analysis to identify factors leading to a positive assessment of a candidate in a selection interview and to a high suggested entry salary. They compare the assessment made by students and professional managers. Even though the authors do not explicitly name their experiment "conjoint analysis", their research design clearly shows essential characteristics of conjoint analysis. A scenario is presented to participants—in this case not printed on paper but as a videotaped message and fictitious curricula vitae—and the scenarios can be differentiated by various attributes. Participants do not directly judge the importance of each attribute, but rate a fictitious applicant in toto.

Equally, Baker and McGregor (2000) dealt with selection criteria. In their study based on CA, they determined the relative importance of seven criteria on hiring accountants and, at the same time, scrutinised whether these values differ among different groups of employers, students or professors. Drawing on these results, Baker and McGregor (2000) tested the predictability of employers' preferences concerning the recruitment of graduates. Van Hoye and Lievens (2003) used a policy-capturing experiment to analyse the impact of the applicant's sexual orientation on the rating of his hirability. They found that

[3]For example, Voeth (2000, p. 32) lists 14 German studies next to marketing using CA, among them six studies in human resources.

[4]A partial replication of Dunn *et al.* (1995)

in their Belgian sample, selection professionals mainly based their hiring decision and applicant evaluation on the applicant's quality rather than on his or her sexual orientation.

Bretz and Judge (1994) used a policy-capturing analysis to investigate whether the information conveyed through human resource systems affected applicant job choices. They proposed that particular systems will be more important to some people than to others depending on their personality and the match of individual characteristics with the content of the system information presented. They found that support for the importance of human resource systems in job choice decisions, and further suggested that the fit between individual characteristics and organisational settings described by these systems may be particularly important determinants of job acceptance. For example, applicants with an internal locus of control were more attracted to organisations with competitive, merit-based promotion systems than their counterparts with an external locus of control.

6.3 Variables and measures

6.3.1 Dependent variable

As described above, the decision maker's judgement represents the dependent variable of a conjoint experiment. In this study it is the candidate's hirability, in other words the likelihood to receive a job-offer, that was used as dependent variable. This allows for analysing the influence that particular applicant attributes exert on the decision making process. Hirability was operationalised by asking the participants to assess the likelihood of offering employment to a hypothetical candidate on a seven-point Likert-type scale ranging from "very unlikely" to "very likely."

6.3.2 Independent variables

The likelihood to receive a job offer depends on specific attributes of the applicant. To test the hypotheses set out in chapter 5, I used the following eight independent variables which stem from the theoretical framework described above. The decision cues be grouped into three categories: five cues describe the applicant's competencies grouped in the clusters described in section 5.2.4 (subject competency, social competency, personal competency, method competency, and entrepreneurial competency), two cues represent different forms of fit (P-O fit and P-J-fit), and the last decision cue indicates the applicant's social capital.

This follows the suggestions of Shepherd and Zacharakis (1997) who suggest that the number of criteria should not exceed eight and that the attributes have to be theoretically justified.[5]

Each decision cue was presented at two levels: high and low. Ones and Viswesvaran (1999) deal with the question whether it is legitimate to present variables that are normally continuous in a dichotomous way. They conclude that although the dichotomisation tends to depress correlations between the independent and dependent variables, this problem is not an issue when the variables are used in conjoint experiments because the goal of the experiment is not to investigate the absolute magnitude of the correlation between the variable and the selection judgement but rather the relative importance of decision cues. Furthermore, using trichotomous cues would have increased the number of profiles needed to an extent that no participant could realistically handle.

6.3.3 Moderating variables

Hypothesis 4 assumed a moderating influence of firm age and size on the relationship between P-O fit and the applicant's hirability. So both age and size were introduced as moderating variables in the experiment. Information about these variables was collected in a post-experiment questionnaire.

6.3.4 Statistical analysis

Within-subject analysis: Regression analysis was used to assess the relative importance of the eight selection criteria on the selection professional's rating of the applicant's hirability. For analysing the individual rating of each participant in the experiment, one regression analysis was calculated per participant. This is a common procedure in policy-capturing analysis (e. g. Graves and Karren, 1992). The regression weights can be taken as indicants of the relative importance that is placed on each decision cue by the individual decision maker (Ones and Viswesvaran, 1999).

Between-Subject analysis: In order to assess the impact of the moderating variables *firm age* and *firm size*, a between-subjects analysis had been conducted. I investigated the impact of these firm characteristics on selection professionals' use of certain main factors and selected two-way interactions for

[5] Of course, there is always the possibility that other variables are used as decision cue—for example the attributes laid out in section 3.6 or the salary demanded by the applicant—but limiting the number of cues is both necessary and legitimate if the chosen cues are theoretically justified.

the assessment to recruit a hypothetical candidate. I used hierarchical linear modelling (HLM, see Bryk and Raudenbush, 1992) to test the impact of these variables.

Although other studies have used meta-analytic approaches in order to test hypotheses about clusters of decision makers (Viswesvaran *et al.*, 1994; Ones and Viswesvaran, 1999), I believe that HLM is a powerful and suitable tool to analyse data which is located in a hierarchy of categories or groups. HLM allows for analysis of multiple levels at the same time, decomposing statistical effects into the individual versus higher levels in order to judge the effects that a particular level has on the variables of interest (Spector, 2001). In our case, the question is which effect demographic characteristics of the decision maker have on the experimental selection decisions.

6.4 Sampling plan and sample

Existing studies (e. g. Latham and Skarlicki, 1996) have shown that using managers as participants in field studies is a means to enhance the study's external validity. Following this thought, I tested the hypotheses on a sample of selection professionals in the IT-industry. This specific industry had been chosen for various reasons.

First, it had a particularly interesting recent labour market history. In the late 1990s, IT firms faced a dramatic labour shortage which lead to fierce competition for skilled employees (Witt and Burke, 2002; Falk, 2003; Gardner, 2005). While the burst of the new economy 'bubble' in 2000 and the following recession certainly changed the situation on the labour market in favour of the industry, German IT companies still face difficulties in finding properly qualified employees (Steedman *et al.*, 2006). Furthermore, since 2005, the labour market has tightened again and the lack of IT specialists is perceived as one of the major threats to growth for German IT companies (BITKOM, 2007). According to Amaram (2005), the skill shortage is due to demographic as well as behavioural reasons: the pool of the knowledge-based workforce will shrink in the next years and the members of this workforce show an increased tendency to job-hopping and less organisational loyalty. In addition to these general reasons, the situation in Germany shows some particularities that are based on the educational system (both in vocational training and higher education), immigration policies and the fact that English speaking countries generally face less difficulties in attracting talent from abroad than other countries (Steedman *et al.*, 2006).

Second, the study is focused on personnel selection decisions in emerging firms, seeking to investigate the impact of firm size and age on the decision makers' behaviour. New technology-based ventures have for long been a major setting for entrepreneurship research (e. g. Tether and Storey, 1998; Koeller and Lechler, 2006) and the computing and software-related companies are a generic part of this type of entrepreneurial firms and usually regarded as a sector with high potential income generation and market opportunities (March-Chorda and Yagüe-Perales, 2000; Engelhardt, 2004) because it is a sector which comprises a large number small, niche market entrepreneurial ventures next to a few major players (Nowak and Grantham, 2000).

Last, many IT professionals allegedly share interesting personality attributes (many people think of an IT professional as a nerdy geek living more in front of his computer than in real life), thus the IT industry gave an interesting background to tests hypotheses on the importance of social and personal competency in selection settings.

As there is neither an exhaustive list of selection professionals in IT-firms nor even a complete directory of all IT-firms in Germany, the basic population for the sample was difficult to establish. I combined several sources to compile the sample: the *Bundesverband der Digitalen Wirtschaft (BVDW)* represents all companies that are part of the digital value chain in the dialogue with politics, the public as well as other professional organisations whereas *BITKOM* is the voice of the IT, telecommunications and new media industry in Germany representing more than 1,100 businesses, 850 of which are members. Most of them are global players; however also 500 mid-sized firms enjoy BITKOM's services.[6] As both associations claim to represent a large proportion of IT-firms, I used the openly accessible registers of members of both associations to comprise a first list of potential participants. Reliance on professional organisations and their directories to form "samples of convenience" has also been applied in other settings when the industry lacks an exhaustive register or database (e. g. Mason and Harrison, 2004).

Additionally, I extracted the addresses of firms that matched the NACE codes[7] for software-development and IT-consulting from the *Hoppenstedt Database of large and medium firms*, a business database that provides information on more than 200,000 companies in Germany. Furthermore and in order to enrich the

[6]Information about BVDW and BITKOM is based on the organisations' web-sites: http://www.bvdw.de and http://www.bitkom.org

[7]NACE is the classification system for economic activities used in the European Union.

sample with participants that have recently been involved in personnel selection, I included firms that had posted vacancies of the relevant type in the two largest on-line recruitment websites (monster.de and jobpilot.de).

Taken together, these sources lead to a preliminary population of *3,967* firms which I believe to be a representative cross-section of the German IT-industry. After removing duplicate entries, i. e. firms that were listed in more than one source, I scrutinised the companies' homepages in order to exclude ventures that have not been suitable for the study for one of the following reasons: (1) they had gone out of business, (2) they had no branch in Germany, (3) no website providing at least minimal contact information was found, (4) they employed less than five employees (these micro-enterprises had been excluded as I assume that their managers will most likely lack the necessary experience with personnel selection), or (5) they were not active in the IT-sector (surprisingly many members of the two trade associations were lawyers, tax advisers, and the like rather than IT companies).

The adjusted population included *673* firms which were initially contacted by telephone. The project was presented to the manager in charge of selecting IT staff. Provided that the company showed interest in the project, an executive summary of the project was sent by e-mail including a link to the start-page of the on-line survey.

6.5 Research instrument

Participants that followed the link in the invitation e-mail were led to a web-based research instrument which consisted of three major parts: an introduction, the candidate profiles, and a post-experiment questionnaire. In this section I will briefly describe the instrument and its major components. The full instrument in its original German version is presented in appendix B (see page LI).

I chose a web-based research approach for various reasons: first, the research dealt with the selection of IT professionals and the participants worked in the IT industry. Consequently, it seemed appropriate to use a medium which is familiar to the participants and resembles their daily work environment. Second, on-line surveys offer a number of advantages, including low costs, easy administration, the possibility to spread the link to the research instrument to other potential participants in the firm (e. g. Ilieva, Baron and Healey, 2002; Evans and Mathur, 2005). These advantages outweigh the potential drawbacks of web-based instruments, such as a lower response rate compared to classical paper-and-pencil surveys (Granello and Wheaton, 2004; Evans and Mathur, 2005).

6.5.1 Task instructions and scenario

On the first page of the research instrument, candidates were informed about the purpose of the study and its procedure. The contents of the instrument as well as the estimated time necessary to complete the on-line questionnaire (based on the pre-test results) were indicated. Candidates were assured that the information given will be treated confidentially and that data will only be published in an anonymised or aggregated way.

Then the scenario of the experimental situation was introduced: the participants want to hire a new senior IT-consultant and placed the following job advertisement for this position (see figure 6.1).

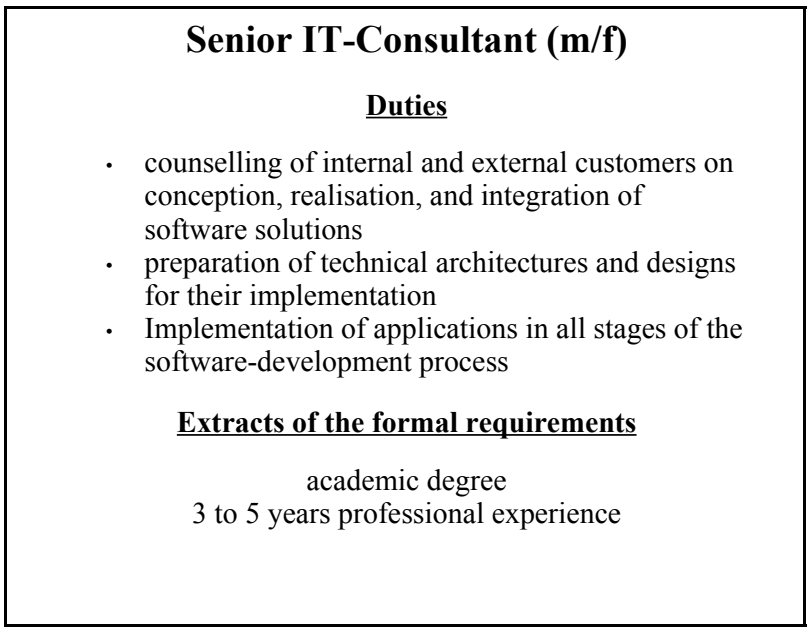

Figure 6.1: Fictitious job advertisement used in the conjoint scenario (translated)

Particular care was taken in modelling the job offer and the target position because the cues used in the selection decision do strongly depend on the type of employee to be hired. Preliminary interviews with HR professionals in the software industry showed that the position of an IT-consultant is particularly interesting and important for the firms. In contrast to a programmer or software engineer, this type of employee usually has a higher responsibility and due to direct customer contact the requirements for the position are generally higher. I searched jobpilot.de, a major on-line job-search engine, for job offers

for senior IT-consultants in order to create the hypothetical job description. This description was discussed with HR professionals in IT firms in order to ensure its authenticity.

The scenario instructed the participants that the advertisement had generated a number of applicants which had been narrowed down using the firm's customary instruments (e. g. analysis of application letters, tests, assessment centres, or job interviews). The final shortlist consisted of 33 candidates who differed on eight aspects, all other things being kept constant.

These eight attributes were described in detail before the profiles were presented in order to convey the meaning of each attribute and its two levels to the participants. For each decision cue, a short verbal description indicated both cue level and operationalisation. The labelling of the cue levels varied according to the cue: levels of network relations were labelled "extensive" and "limited" and in the case of competencies, the high level was labelled "above average" and the low level "average". This followed the notion that the scenario indicated that the applicants had passed initial screening and that candidates with levels of competency below average would not have reached this stage of selection. P-O fit and P-J fit had to be carfully dissociated in this description as Higgins and Judge (2004) stated that recruiters seem to have difficulties with differentiating between both aspects. P-O fit was operationalised as "fit with corporate culture" and given at the levels *high* ("The applicant fits the values of the company very well. He / she will fit excellently into the future team.") and *low* ("The applicant's values do not match the corporate values. There might be friction in the future team."). P-J fit was defined as "fit with the formal job requirements" at the levels *complete* and *partial* (see fig. 6.2 and p. LVI).

The participants had to assess each candidate and indicate the likelihood that he or she will receive a job offer using a seven-point scale ranging from "very unlikely" to "very likely." Following Latham and Skarlicki (1996), candidates were told that the decision to be made was a final selection decision. According to Olian (1986), this means reduces the variability in how respondents frame their decisions and consequently as a way to increase the external validity of the study.

6.5.2 Applicant profiles

The second part of the research instrument contained the set of profiles of the 33 fictitious candidates. As shown in section 6.3.2, the independent variables were represented by eight applicant attributes at two levels each which led to $2^8 = 256$ potential candidate profiles.

I used a fractional factorial design (Hahn and Shapiro, 1966) to reduce this number to 16 profiles which were fully replicated in order to test for internal consistency and reliability of the answers. A dummy profile was added which was not used in the statistical analysis but allowed the participants to get used to the method of rating hypothetical candidates. Alltogether, the participants had to rate 33 hypothetical candidates which all were set up like the example profile shown in figure 6.2 (p. 130). The distribution of the attribute levels over the 16 profiles is depicted in table B.1 in the appendix.

In order to avoid any rank order influences on the decisions, four versions of the set of profiles have been constructed and randomly assigned to the participants. In version A and B the order of the candidate profiles was altered, leaving the order of the attributes identical, while in versions C and D the latter was changed and the first remained stable. The combination of the profiles in the four versions is depicted in table B.2 in the appendix.

6.5.3 Post experiment questionnaire

After the participants had ranked the fictitious candidates, they completed a post-experiment questionnaire which comprised three parts. First, I asked them to assess the importance of each criteria as regarding its impact on their decision. A seven-point scale anchored in 'very important' and 'very unimportant' was used for this assessment. The responses on this questionnaire were used to assess the differences between operative and espoused decision cues. Second, the participants completed a short questionnaire to assess their self-perceived level of competency in the five clusters. This part of the research instrument was used for another study which is not part of this thesis. Thus I will not explain the construction of this part of the instrument in more detail. Third and finally, each participant filled out a short questionnaire gathering demographic information including company size and age, as well as participant age, experience and educational background.

Each candidate was offered an individual feedback on his / her selection behaviour as well as on the quality of introspection. Basic data were benchmarked against the average of similar companies as well as the average of participants of each firm.[8]

[8]This internal benchmarking was only offered in the case of at least five participants per firm, as no usable mean values might be calculated with fewer data.

Applicant 1: dxo

Social competence	average	Average communication skills and interpersonal skills
Fit with corporate culture	low	Little match with corporate values and culture, inharmoniousness with team possible
Methodological competence	average	Average analytical skills, sometimes slightly unstructured methods
Applicant Network	extensive	Holds an extensive network of contacts that are useful for the company
Match with formal job requirements	Complete	Formal job requirements are completely satisfied
Professional Competence	average	Fair amount of professional expertise and average professional commitment
Entrepreneurial Competence	Above average	Strategic thinking in high gear, capable of seeing things in the context of the whole enterprise
Personal Competence	Above average	Realistic self-perception, highly motivated, and confident conduct

Evaluation

If you had to decide on the employment of a new employee, how do you judge the probability that the applicant described above would get a job offer?

Please tick on the following scale:

Very low probability to offer an employment contract — Very high probability to offer an employment contract

1 2 3 4 5 6 7

Figure 6.2: Example of a candidate profile used in the conjoint experiment (translated)

6.6 Research procedure

After having assembled the first version of the research instrument described above, I conducted a first round of six pre-tests with selection professionals and HR officials. In this first phase of pre-testing, not all of the participants

did work in IT-firms, but they had a strong relation to the IT-Sector and were used to recruiting staff similar to the hypothetical candidates described in the experiment.

The first pre-tests were conducted face-to-face with a paper-and-pencil version of the research instrument. Participants have been encouraged to think aloud and comment on the instrument while administering the questionnaire. This method was chosen as it is regarded as one of the bests methods for evaluating concurrent cognitive activities of an individual during a specified activity (Ericsson and Simon, 1980; 1996). Comments and thoughts have been recorded and subsequently used to slightly modify and amend the research instrument. The wording of the instruction and of several items was changed to overcome comprehension difficulties. Additionally, the pre-testes gave several hints on how to make the job description more realistic.

The modified research instrument was transformed from paper to an on-line-version which was then subjected to a second round of pre-tests. This time five selection professionals administered the on-line-questionnaire in order to verify that the change of media did not affect the comprehensibility. No further alterations of the instruments have been necessary.

After the completion of the pre-test phase, I approached the companies on the sample short-list and asked for participation. As Robertson and Smith (2001) pointed out the need for benchmarking selection systems against the systems used by leading organisations, the study was laid out as a benchmarking of decision making in personnel selection. Participants were offered free participation in this study and they received exhaustive feedback comparing their decision making behaviour with the relevant reference group. Free-of-charge participation in this benchmarking study was also set up as an incentive to encourage participation.

7 Analysis and results

7.1 Introduction

In this chapter, I describe the results of the empirical investigation into decision making in personnel selection in German IT companies. After having described the final sample of the survey, I will present the internal validity of the conjoint experiment conducted. Afterwards, the results of the statistical analysis of the data are presented with reference to the hypotheses stated above.

7.2 Sample description

As mentioned in section 6.4, 673 firms have been intially contacted and asked for participation in the experiment. An invitation link leading to the starting page of the web-based questionnaire was sent to a member of the management responsible for personnel selection of IT specialists. Out of those firms, 74 participants fully completed the on-line survey. One participant had to be excluded from further analysis due to a very low and insignificant internal reliability of the answers (see table C.1 on page LXIII). This lead to a final sample of 73 usable questionnaires, representing a response-rate of 10.84 %. Taking into account that web-based surveys tend to yield a significantly lower response rate than their pencil-and-paper counterparts (Gunter, Nicholas, Huntington and Williams, 2002; Granello and Wheaton, 2004; Evans and Mathur, 2005), this response rate is still satisfying and above the baseline of 10 % advocated by Jankowicz (1995, p. 246).

Furthermore, conjoint analysis does not require sample sizes as high as other survey-based methods of investigation in order to provide statistically significant an meaningful results. The fact that each participant rates a number of profiles—in this case 32 as the first profile was used for training purpose only—leads to a high number of data points to be analysed and a repeated measures design provides sufficient degrees of freedom for realistic hypotheses testing with a small sample (Oliphant and Alexander, 1982). The sample size is well above the recommended minimum size of 50 participants (Shepherd and Zacharakis, 1997).

Characteristic	*Min*	*Max*	*Mean*	*SD*
Age	25	54	37.8	6.6
Recruiting Experience (yrs.)	0.5	28	7.8	5.6
Recruiting Experience (Employees)	2	1,600	103.6	219.7
Gender	*Quantity*	*Percentage*		
Male	46	63.0 %		
Female	27	37.0 %		
Corporate Position	*Quantity*	*Percentage*		
CEO / Board Member	24	32.9 %		
Director of HR	11	15.1 %		
HR Manager	27	37.0 %		
Line Manager	11	15.1 %		

Table 7.1: Sample description: participant level

Characteristic	*Min*	*Max*	*Mean*	*SD*
Company Age (yrs.)	1	160	19.0	24.4
Company Size (Employees)	8	10,000	377.4	1,212.9
Age Distribution	*Quantity*	*Percentage*		
5 yrs. or younger	19	26.0 %		
6 to 10 yrs.	15	20.5 %		
11 yrs. or older	39	53.4 %		
Size Distribution	*Quantity*	*Percentage*		
Micro (0–10)	6	8.2 %		
Small (11–50)	23	31.5 %		
Medium (51–250)	28	38.4 %		
Large (251 or more)	16	21.9 %		

Table 7.2: Sample description: company level

The final sample is described in tables 7.1 and 7.2. It consisted of 27 women and 46 men with a mean age of 37.8 years (SD 6.6) and an average experience in personnel selection of 7.8 years (SD 5.6). All participants were involved in personnel selection decisions in their daily business. About one third of the participants (32.9 %) belonged to their company's executive management. 15.1 % were senior HR managers, 37.0 % junior HR managers, and 15.1 % were line managers responsible for personnel selection in their realm. The high percentage of executive managers does certainly account for the proportion of young ventures as in those firms the founders or executive directors themselves are regularly involved in the selection process. More than three quarters of the sample held an academic degree, most of them either in business administration or in computer sciences (see table 7.3).

level & type of education[†]	Quantity	Percentage
non-academic	30	40.5
commercial	22	29.7
technical app.	8	10.8
academic	57	77.0
economy / management	27	36.5
computer sciences	20	27.0
sociology / education	6	8.1
psychology	4	5.4
postgraduate	11	14.9
MBA	3	4.1
PhD	8	10.8

[†] multiple answers possible

Table 7.3: Educational level of participants

Basic characteristics of the participants' companies can be found in table 7.2. The mean company age was 19.0 years (SD 24.4) and nearly half of the sample (46.6 %) was younger than ten years with a quarter of the firms (26.0 %) counting less than five years. The average headcount was 377.4 employees (SD 1,212.9), a number that is biased by seven large companies with thousand or more employees each.

However, nearly four fifths of the sample (78.1 %) counted less than 250 employees and 39.7 % of the participating companies employed less than 50 people. Thus, the majority of participants worked in small or medium-sized enterprises according to the definition of the European Union (The Commission of the European Communities, 2003). Overall, small and large as well as young and established firms are well balanced in the sample which allows good estimations of the moderating influence of firm age and size on the use of selection criteria.

7.3 Internal validity of the study

I tested the internal reliability, i. e. the reliability of each participant's judgement, by replicating the profiles included in the experiment. This allowed the answers to be checked for internal consistency. To ensure that the participants were not aware of the duplication of profiles and thus were able to manipulate the results of the consistency check, I asked each pre-tester whether he or she perceived that each candidate was rated twice. No participant answered this positively.

The test-retest check for internal consistency is done by analysing the correlation between the ratings of the first set of profiles with the ratings of the set of replicated profiles (Shepherd and Zacharakis, 1997). The mean test-retest correlation was .784 which is in line with or slightly above the results of other studies (Shepherd, 1999a: .69). The results for the whole sample can be found in table C.1 in the appendix.

7.4 Hypotheses testing

The hypotheses derived from the theoretical thoughts in chapter 5 can be grouped into four sets that have been investigated differently: (1) direct impact of applicant characteristics on the selection decision, (2) interaction effects between decision cues, (3) moderated impact of applicant characteristics on the selection decision, and (4) introspection into the decision making behaviour. Hypothesis testing led to the following results.

7.4.1 Direct impact of applicant characteristics on the selection decision

Hypotheses 1, 3, and 6 postulated a direct and positive effect of the five facets of applicant competency, the applicant's P-O fit and social capital on the selection decision so that applicants high on one of these factors will have a higher hirability as rated by the participants.

Regression analysis was used to assess the relative importance of the eight decision cues presented in the sample. The results of the aggregated regression analysis are presented in table 7.4. For each decision cue, I report the standardised coefficient, the standard error, the t-ratio, as well as the level of significance.

The results show, that all eight decision cues or selection criteria are significantly used by selection professionals in rating a candidate's hirability. For each criterion, the relationship is positive, i. e. the likelihood to receive a job-offer increases as the applicant's level of competency, P-O fit, and social capital increases. These data provide supporting evidence to hypotheses 1, 3, and 6 which stated that higher competencies, higher P-O fit, and higher social capital will increase the candidate's likelihood to receive a job-offer.

7.4.2 Interaction effects between decision cues

Next to these direct effects of the eight decision cues mentioned above, hypothesis 5 suggested that the applicant's level of P-J fit will interact with the level of the five competency clusters such that the positive impact a competency exerts on the applicant's hirability will be more positive when the level of P-J fit is high than when it is low. This effect is not simply additive but multiplicative in nature. This means that an interaction occurs when the magnitude of the effect of one independent variable (i. e. the applicant's competencies) on a dependent variable (the hirability) varies as a function of another independent variable (i. e. the level of P-J fit, see Aiken and West, 1991).

The results of the analysis of interaction effects are shown in the lower section of table 7.4. The data can be interpreted as follows: the regression coefficient of the interaction represents the amount of change in the slope of the regression of the candidate's hirability on his / her competency when P-J fit changes by one unit. The coefficients indicate that selection professionals are more likely to hire an applicant when his / her competency is well developed and that this relationship is more positive for candidates with high P-J fit.

Selection Criterion	Coefficient	Standard Error	t-ratio
Intercept	3.022	0.064	46.918***
Main effects			
Applicant competencies			
Subject Comp.	1.480	0.080	18.543***
Social Comp.	1.144	0.060	18.344***
Personal Comp.	0.815	0.044	18.429***
Method Comp.	0.937	0.064	14.700***
Entrepreneurial Comp.	0.597	0.042	14.310***
Applicant fit			
P-O fit	0.648	0.059	11.070***
P-J fit	0.163	0.046	3.515**
Applicant Social Capital			
Social Capital	0.097	0.046	2.096*
Interactions between competencies and P-J fit			
P-J fit x Subject Comp.	0.630	0.080	7.919***
P-J fit x Social Comp.	0.404	0.078	5.154***
P-J fit x Personal Comp.	0.427	0.082	5.206***
P-J fit x Method Comp.	0.684	0.080	8.532***
P-J fit x Entrepreneurial Comp.	0.539	0.085	6.319***

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

n=2,336 decisions nested within 73 selection professionals

Table 7.4: Results of multiple regression analysis

This interaction effect is depicted in figure 7.1. In this graph, the dashed and the solid lines represent the relationship of the applicant's hirability and his / her level of competency in one of the five clusters. The solid line shows this relationship in case of low P-J fit and the dashed line in case of high P-J fit. In the figure, α corresponds to the coefficient of the interaction as shown in table 7.4. Because the direction of the interaction effect was the same for all five competency cluster and varied only in the magnitude of the effect, figure 7.1 can represent all five interaction effects.

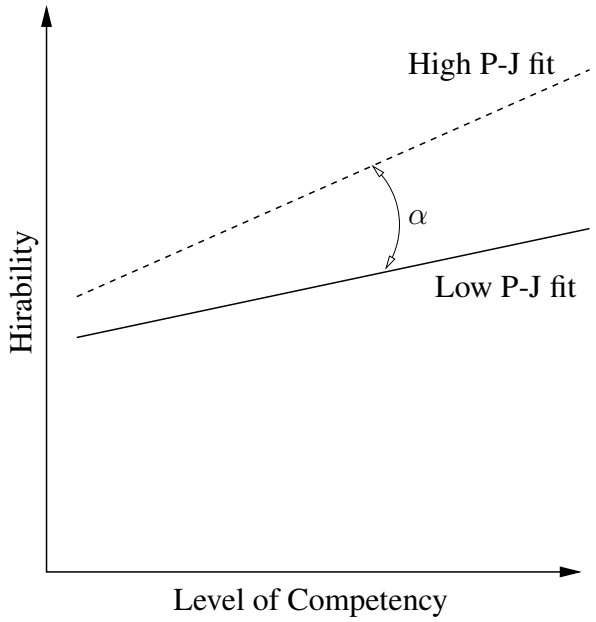

Figure 7.1: Interaction of applicant competencies and P-J fit

The figure shows that the slope of the dashed line is much steeper than the slope of the solid line indicating that although at both levels of P-J fit there is a positive relationship between a candidate's level of competency and the hirability rating of the selection professional, this relationship is stronger if the applicant does also fit particularly well the requirements of the job. The nature of these significant interaction effects provides support for hypothesis 5.

7.4.3 Moderated impact of applicant characteristics on the selection decision

Hypothesis 4 stated that the positive impact a candidate's P-O fit has on the hirability will be moderated by the firm's age and size. In order to test this hypothesis, I used HLM which allows to investigate situations in which lower levels of analysis are nested in higher-level units of analysis (Bryk and Raudenbush, 1992).

In this case, 2,336 selection decisions are nested in 73 decision makers. Thus, on the first level all decisions are treated as independent (within-subject analysis) whereas on the second level additional information about the decision

maker is introduced (between-subject analysis). This allows to test the influence of higher-level criteria (in this case firm age and size) on the relationships at the lower-level. The results of the model are presented in table 7.5.

Selection Criterion	Coefficient	Standard Error	t-ratio
Main effects (level 1) are presented in table 7.4			
Moderating impact of firm age *on*			
Subject Comp.	0.001	0.002	0.550
Social Comp.	0.002	0.002	1.081
Personal Comp.	0.000	0.001	−0.289
Method Comp.	0.001	0.002	0.302
Entrepreneurial Comp.	0.001	0.001	0.572
P-O fit	−0.005	0.002	−2.179*
P-J fit	0.003	0.001	2.232*
Social Capital	−0.001	0.001	−0.373
Moderating impact of firm size *on*			
Subject Comp.	0.000	0.000	−1.105
Personal Comp.	0.000	0.000	3.327**
Social Comp.	0.000	0.000	4.423***
Method Comp.	0.000	0.000	−0.070
Entrepreneurial Comp.	0.000	0.000	−0.800
P-O fit	0.000	0.000	−1.864
P-J fit	0.000	0.000	−1.273
Social Capital	0.000	0.000	0.943

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

n=2,336 decisions nested within 73 selection professionals

Table 7.5: Results of Hierarchical Linear Modelling (HLM) analysis

Results show that firm age had a significant influence both on the relationship between P-O fit as well as P-J fit and the candidate's hirability. More precisely, there is a decrease in the strength of the relationship between P-O fit and hirability for decision makers in older firms relative to those in younger firms. The impact on P-J fit is inverse: the relationship between P-J fit and hirability

is stronger for decision makers from older firms relative to those from young ventures. On the other hand, no moderating influence was found for firm size as all coefficients presented in the second half of table 7.5 are zero.

These results partially support hypothesis 4 with respect to firm age. There is a statistically significant difference in the relationship between P-O fit and a person's hirability across firms of different age: P-O fit is more important for the selection decision in younger firms than in older firms. The moderating effect, however, is only very small.

7.4.4 Relative importance of decision cues

Hypothesis 2 referred to the relative importance of the selection criteria, particularly to that of subject competency compared to other competency clusters. For the analysis of the individual rating of each participant in the experiment, one regression analysis was calculated per participant. This is a common procedure in policy-capturing analysis (e. g. Graves and Karren, 1992).

In order to estimate the relative importance of each decision cue in the decision making process, the effect size has to be measured. Pierce, Block and Aguinis (2004) describe several measures of strength of association, including eta-squared (η^2), omega-squared (ω^2), and epsilon-squared (ϵ^2). They strongly recommend the use of ω^2 instead of η^2 as the latter is biased, especially when total sample size is small. On the other hand, ω^2 is unbiased and recommended to be reported if the population strength of association is to be measured. Consequently, I used Hays' (1994) ω^2 to measure the relative importance of selection criteria. ω^2 values are calculated as follows using information that was retrieved from ANOVA in SPSS:

$$\omega^2 = \frac{SS_E - df_E \times MS_E}{SS_T + MS_E} \tag{7.1}$$

SS_E = type III sum of squares for effect (between groups)
df_E = degree of freedom for effect (between groups)
MS_E = standard error of mean square (within groups)
SS_T = corrected total sum of squares (between groups + within groups)

ω^2 values normally range between 0.00 and 1.00. However, if $F < 1$, negative values are possible as the denominator in equation 7.1 is estimated as a function of the difference between the mean square of the effect in question and the mean square of the error term for testing that effect (see Keppel, 1991, p. 223). $F < 1$ implies that this difference is negative, which leads to a negative value of ω^2.

This, in turn, leads to zero as the best estimate of the proportion of variance explained by congruence (Tzelgov, Porat and Henik, 1997, p. 439, 444). The aggregate level ω^2 for each factor are presented in table 7.6, the individual level results for each selection professional are presented in table C.2 in the appendix.

Selection Criterion	ω^2	Rank
Subject Comp.	0.192	1
Social Comp.	0.107	2
Personal Comp.	0.057	4
Method Comp.	0.076	3
Entrepreneurial Comp.	0.030	6
P-O fit	0.036	5
P-J fit	0.002	7
Social Capital	0.001	8

Table 7.6: Factor weights derived from conjoint analysis (aggregate level)

Results indicate that the most important factor for the selection professionals' actual decision to hire a candidate is his / her subject competency which accounted for 19.2 % of the explained variance. Social competency is the second most important criterion accounting for 10.7 % of the explained variance. On ranks three to six follow method competency (7.6 %), personal competency (5.7 %), P-O fit (3.6 %), and entrepreneurial competency (3 % of explained variance). The final tier of importance consists of P-J fit on rank seven and social capital on rank eight which each account for less than one percent of the explained variance, thus having only negligible influence on the selection decision. This does not support hypothesis 2 which stated that the relative importance of subject competency will be lower that that of the other competency clusters.

7.4.5 Introspection into the decision making behaviour

Finally, I hypothesised that there will be a difference between the selection professionals' self-perceived and actual selection policy (hypothesis 7). This was tested by asking each participant to rate the importance of each selection crite-

rion for his / her decision on a seven-point Likert-like scale ranging from "very important" to "absolutely unimportant". These self-perceived weights have then been compared to the ω^2 values derived from the conjoint experiment.

In order to compare the results from the conjoint experiment with results of the self-perception scales, a joint measurement scale had to be used. Therefore, both scales were converted and standardised so that the total score across all eight decision cues equals 100. The relative importance of certain dimensions was then calculated as the percentage influenced by dividing the score for that dimension by the total score across all dimensions for each factor.

Table C.3 in the appendix shows the self-perceived importance of applicant characteristics at the individual level. For each decision cue, the table indicates the weight assigned by the respondent (n. b. that the importance of two or more factors might have been rated identically), the standardised importance and the rank of each cue.

The two different weights for each factor were then compared at the individual as well as the aggregate level. At the individual level, the absolute value of the Δ of the standardised indicators has been calculated for each criterion. The total Δ can be regarded as a measure of the quality of the respondents introspection into his / her decision making behaviour, the lower $\Sigma\Delta$, the better the introspection. The results are presented in table C.4 (Appendix C). Among the respondents of this experiment, $\Sigma\Delta$ ranged from 40.31 to 176.18 (Mean 84.69, SD 28.50).

Furthermore, the correlation between the self-reports of cue importance and the ω^2 values has been calculated. If selection professionals had good introspection into their own selection decision policies, large and significant correlations between both values should be found because both are measures of the same thing. However, table 7.7 shows only moderate correlations thus suggesting that the participants in the experiment had only limited introspection into their selection decisions.

At the aggregate level, the two different weights for each factor have been compared using a paired-sample T-test in order to test the differences for significance, the results of this comparison are represented in table 7.8.[1] The table reveals some interesting results. At the aggregate level, the comparison between the selection-professionals' self-perceived importance of selection criteria and their actual decision policies are significant at least at the .05-level for all but one criterion (method competency).

[1] N. b. that the mean ω^2 values at the individual level vary slightly from those obtained by applying equation 7.1 at the aggregate level. However, using the mean values was necessary in order to apply the t-test.

ω^2 with self reports	1	2	3	4	5	6	7	8
1. Subject C.	.003							
2. Social C.		.415						
3. Personal C.			.300					
4. Method C				.370				
5. Entreprepreneurial C.					.387			
6. P-O fit						.289		
7. P-J fit							.354	
8. Soc. Cap.								.123

all correlations significant at the $p < .001$ level

Table 7.7: Correlation of conjoint and self-perceived importance values

Selection Criterion	Conj. Experiment		Self-Perceived		$\Delta\%$
	Mean ω^2	%	Mean	%	
Subject Comp.	.234	33.822	5.75	15.592	18.230^{***}
Social Comp.	.178	20.623	5.68	15.634	4.989^{**}
Personal Comp.	.069	10.250	5.10	13.971	-3.723^{***}
Method Comp.	.104	15.552	5.32	14.615	0.936
Entrepreneurial Comp.	.040	6.322	3.82	10.572	-4.250^{***}
P-O fit	.061	9.664	4.76	13.055	-3.391^{*}
P-J fit	.013	2.104	3.36	9.250	-7.143^{***}
Social Capital	.011	1.665	2.59	7.313	-5.648^{***}

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

Table 7.8: Comparison of importance of applicant characteristics (aggregate level)

Results indicate that although selection professionals say that they perceive six of the eight decision cues to be equally important (with the exception of P-J fit and social capital), their actual selection decision reveal that they in fact consider some factors to be much more important than others. They tend to underestimate the importance of an applicant's subject competency as well as social competency. On the other hand, personal competency, entrepreneurial competency, P-O as well as P-J fit and social capital are overestimated.

In particular, subject competency was by far the most important selection criterion "in use" followed by social competency at a distance of more than 10 percent-points. In their self-reports on the importance of selection criteria, social competency is indicated to be the most important criterion followed by subject competency at almost the same level of importance.

8 Conclusions and implications

8.1 Summary of results

Linking entrepreneurship and staffing research, the present conjoint analysis investigated the decision policies of selection professionals in German IT firms. Based on the research gaps at the link of both areas of research which have been uncovered in a review of 30 articles published on staffing and selection in young and / or small ventures in the last 20 years (chapter 2), I presented the basal elements of personnel selection theory (chapter 3). An exploratory pilot investigation conducted in five German new technology-based ventures (chapter 4) and further theoretical reflection led to the a set of seven hypotheses considering the role that applicant competencies, applicant fit and applicant networks play in the decision making of selection professionals in IT firms as well as the influence of firm size and age on the use of these decision cues (chapter 5).

The results of the empirical policy-capturing investigation as presented in the last chapter do partially support the hypotheses derived in chapter 5. Table 8.1 summarises which of the hypotheses are (partially) supported by the data gathered in the experiment and which are not.

There was full support for all three hypotheses suggesting a direct impact of applicant competencies, applicant P-O fit and applicant social capital on the assessment of an applicant's hirability by the selection professional (hypotheses 1, 3, and 6). Hypothesis 5 which posited an interaction between the applicant's person-job fit and his / her competencies was equally supported.

On the other hand, I found only partial support of hypothesis 4 which postulated that firm age and size would moderate the impact of the applicant's P-O fit on the hirability rating. The empirical data supported this hypothesis only with respect to firm age but not to firm size. I did not find any support for the supposedly lower relative importance of subject competency as compared to the other clusters of competency (hypothesis 2) but full support for the notion that selection professionals will report an espoused decision policy when directly asked which differs from their policy-in-use as revealed by the conjoint experiment (hypothesis 7).

Hyp.	Description	Support
1	Direct impact of competencies on selection decisions	$\oplus$
2	Relative importance of subject competency	$\ominus$
3	Direct impact of P-O fit on selection decisions	$\oplus$
4	Moderated impact of P-O fit	$\otimes$
5	Interaction effects between P-J fit and applicant competencies	$\oplus$
6	Direct impact of social capital on selection decisions	$\oplus$
7	Decision maker's introspection into selection decisions	$\oplus$

$\oplus$: fully supported, $\otimes$: partially supported, $\ominus$: not supported

Table 8.1: Overview of hypotheses and their empirical support

8.2 Discussion and implications

The full support for hypotheses 1 and 3 suggests that the concepts of competency as well as of P-O are in fact used by selection professionals when deciding which candidate shall receive a job offer. This is important in the light of what has been said about the gap between theory and practice with respect to personality and mental ability in the selection context (e. g. Johns, 1993; Anderson *et al.*, 2001b). Both theory (e. g. Karren, 2001) and anecdotal evidence (see chapter 4) have shown that competency-based approaches are more accepted by practitioners than the more sophisticated and theoretically based approaches offered by many researchers. As applicant competencies are in fact used by selection professionals in real selection decisions, there is a strong need to work on this concept and to broaden its theoretical basis (see also Robertson *et al.*, 2002a; Kurz and Bartram, 2002). Particularly, a common language of competencies is needed which should be accompanied by validation studies investigating the predictive validity of particular competency clusters and the development of valid and reliable measures of competency (Nikolaou, 2003).

I did not find support for hypothesis 2 which suggested that subject competency is less important than other facets of competency because it is as threshold rather than a differentiating competency. Furthermore, in line with hypothesis 5, the results of the experiment revealed that P-J fit is still important to decision makers as the fit with the detailed requirements of the job influences the importance of the applicants competencies in an interactive manner. When these

results are seen from the viewpoint of the propagated "end of the job" (Bridges, 1994), they seem somewhat contradictory. Both the competency approach and the concept of P-O fit are often mentioned together (Nybø, 2004; Bowen *et al.*, 1991). A stress of these concepts might indicate that selection professionals tend to loose the focus on the particular job and look for employees who either fit the culture of the organisation or have more general capabilities. Furthermore, Behling (1998) suggests that in situations when (1) the task requires a great deal of problem solving, (2) the employee will have a high degree of autonomy, (3) the tasks require the incumbent to accumulate new knowledge and the newly learnt aspects are more important than the existing knowledge of the employee, (4) rapid learning and adaption to newly changed job-conditions is needed, or finally (5) a decision has to be made between applicants of equal KSAs, replacing a precise matching of candidate and job-related technical skills with broader aspects such as conscientiousness and GMA can be particularly helpful. These situations are very similar to the typical tasks of employees in the IT industry. However, subject competency, which is the one competency that is closest related to a particular job, proved to be the most important decision cue to selection professionals in the experiment.

This focus on subject competencies is somewhat intriguing but, on the other hand, consistent with previous research. For example, analysing recruitment advertisements in different countries, Barsoux (1993) found that while British recruiters focus their search on the applicants' personal attributes, German managers emphasise technical qualifications. Ahmad and Schroeder (2002) stated that although soft skills are crucial for effective quality management, many organisations focus on applicants' technical skills while neglecting their soft or behavioural skills. Taken together, this might indicate that managers on the one hand try to think beyond jobs when they hire new employees but on the other hand they are still much bound in the old thinking of job-specific KSAs. Their will is beyond but they are limited to the old mental maps that still focus on jobs. This issue certainly requires future research.

Furthermore, these results are in accordance with Hooghiemstra (1992) who stated that in selection, many organisations tend to focus too much on the short-term outcome while neglecting essential qualities that are difficult to develop in some people. The results have shown that selection professions essentially focus on applicants' subject competency which enables the candidate to perform the job-related tasks after a short period of adaption while neglecting other competencies that enable a candidate to adapt to new situation and act in various and changing surroundings. Subject competency is closely related to Smith's (1994) 'occupational' applicant characteristics that have a reasonably strong relationship to work performance in the short run which will weaken over the longer

term. This short-term orientation is not necessarily cost-effective. From this point of view it would be best to hire for core motivation and trait characteristics and develop knowledge and skills. However, most organisations tend to act reversely and hire on the basis of educational credentials (Hooghiemstra, 1992).

Although hypothesis 6 was supported and thus the applicant's network relations were used as decision cue and positively affected the candidate's hirability, the relative importance of this cue (see table 7.6) is very small and close to be neglected. Consequently, the applicant's social capital, i. e. the network relations he has established in his previous career and that are now 'transferred' to his new employer, does only play a minor role in the selection process. Selection professionals do not seem to be aware of the possibility to enhance their firm's social capital basis by hiring people with extensive network relations. Comments of the pre-testers, however, lead us to the conclusion that this importance might be highly dependent on the vacancy that has to be filled. The higher the position of the job to be filled and the more sales-oriented it is, the higher might be the value and importance of the candidate's social capital. These finding justify the focus that entrepreneurship research has been taken when concentrating almost exclusively on the social capital of the founder of a venture instead of taking into account the social capital of the entity as a whole.

With respect to the moderator of the importance of P-O fit, the results confirmed a moderating impact of firm age but not of firm size. This is partially in accordance with theoretical propositions from research on new ventures (e. g. Heneman *et al.*, 2000) and thus an important contribution to entrepreneurship research because it is the first empirical evidence for this proposition. On the other hand, it is stunning that no evidence was found for the moderating impact of firm size as for example Aldrich and Langton (1997) found that it is size rather than age that affect the formalisation of recruiting staffing practices.

The last important finding is the difference between espoused and operative decision cues. In line with the findings of policy-capturing studies in other settings (e. g. Zacharakis and Meyer, 1998; Shepherd, 1999b; Bruns, 2004), decision makers in personnel selection seem to have difficulties in introspecting about their decision processes. This fact should warn against using lists of personnel selection criteria that are based on managerial self-reports without keeping in mind the possible biases that blurred this information.

The cue for which the difference between espoused and operative cues was most obvious is subject competency. Although the results of the conjoint experiment clearly showed that subject competency was far the most important decision cue, decision makers stated that social competency had a slightly greater importance than subject competency and that the other competencies would be of approximately equal importance. This gap between espoused and operative

decision cues suggests that the importance some applicant attributes is viewed as socially desirable. Popular press does not stop to stress the importance of social competency and the thoughts that led to hypothesis 2 do support this notion. Decisions makers do seem to be aware of this point and thus do not dare to admit that they value technical competency higher when asked directly, although they act accordingly. This suggests that they have understood the call for using differentiating competencies instead of threshold competencies in their selection decisions but have, on the other hand, strong inner restrictions against doing so. The reasons for this fact require further investigation.

8.3 Limitations

As every study, this experimental study is not free of limitations. Although policy-capturing has strong advantages, it has also been criticised for its particular drawbacks: the experimental design allows only a limited number of criteria to be used as decision cues in order to keep the number of profiles manageable. The chosen cues might not necessarily reflect all criteria that are used. As described by Van Hoye and Lievens (2003), in every experimental study there exist a number of other factors which have not been included in the experiment and have not been manipulated as decision cues but might also effect the real-live hirability ratings of IT specialists. Due to limitation of space, some of the competency clusters might have been too roughly described and thus, the participants did not catch their full meaning thus influencing the relative importance.

The sample size is rather small. However, for the experimental part of the study, a repeated measures design provides sufficient degrees of freedom for realistic hypotheses testing with a small sample (cf. Oliphant and Alexander, 1982). On the other hand, this does not necessarily apply to the analysis on the aggregate level and a larger sample would allow a better and more significant testing of moderating variables.

The candidate profiles have been created very basically in order to facilitate an easy overview of the 33 profiles and help the participants to administer the experiment. Probably, the use of profiles that resemble more closely candidate summaries that are actually used in real selection situations might have turned the experiment more realistically as it has been described by Van Hoye and Lievens (2003). However, this would have only been possible with a smaller number of candidate profiles, in other words with fewer decision cues to research.

Finally, the experiment does not allow to investigate any trade-off effects. For example, it might have been interesting to find out, how the "price" of the applicant, i. e. the level of salary demanded by the fictitious applicant, interacts with the level of competencies in its influence on the decision to hire. On the one hand, including "pricing information" might have allowed to take a closer look at how selection professionals handle the conflict between cost and quality of an applicant. On the other hand, this would have meant adding an additional factor to the conjoint model and thus an increasing the number of required profiles or having to drop another factor from the given model.

8.4 Hints for future research

This study has indicated some areas of research which seem to be worth further investigation in future research. In the last section I have shown that participants in the study clearly used applicant subject competency as their most important decision cue. As I have elucidated, this competency cluster is closest related to technical skills which facilitate immediate job performance rather than long term adaptability and employability. As Gray (1999, p. 1049) posited that the question of whether the focus in selection is on technical or on interpersonal or personal competencies (such as social, method and personal competencies) does reflect the orientation of selection and distinguished between selectors who select "with an eye to the future or select for the present position," it seems appropriate to investigate this fact from the point of view of Strathman's (1994) concept of differences in the *consideration of future consequences (CFC)*.

The individual level of this aspect of personality reflect "the extent to which people consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes" (p. 743). This implies that people with a high degree of CFC focus their mind on the future and distant consequences of a present decision and less on the immediate consequences. Taking into account what has been said on the long-term outcomes of certain competencies that are very difficult to be developed or changed (see p. 94) and the rather short-term benefit derived from high subject competency and high P-J fit, it would be interesting to study whether decision makers scoring high on CFC would give the first set of criteria a higher relative importance compared to the latter.

The second set of aspects that require further investigation is the role of applicant competencies in scientific research. As laid out earlier (see section 5.2), competencies are a good example of the gap between theory and practice in I/O psychology. They are the preferred jargon of the practitioner but have long time

neglected by theorists. As the experiment has proven that competencies are in fact used as decision cues in selection situations, there is the need for more research on their predictive validity. For example, there is the need to construct valid measures of competency that are able to facilitate their use in the selection context and that can be validated against measures of employee performance.

The need for a clear and generally accepted taxonomy of competencies—like the Big Five in the area of personality—becomes obvious. Without this common understanding of words and their meaning, it is difficult to use concepts across borders. The CCG (Kauffeld and Grote, 2000; Kauffeld, 2006b) might be a good starting point. However, there is the need for more co-operation between researchers in various domains of HRM, I/O psychology, pedagogics, learning and teaching theory, etc. Once a taxonomy is established, valid measures of the competency facets have to be developed which are needed to use competencies to predict job performance and training success. Like Hülsheger *et al.* (2006) have demanded more research into the validity of specific measures of GMA and particular intelligence tests, similar research is needed for the operationalisation of competency constructs.

Finally, it would be an interesting question to analyse how the more practitioner-oriented constructs like applicant competencies are used as decision cues when compared with the more scientific concepts of personality and GMA. A comparing conjoint analysis might shed some light on the different use of predictors by practitioners and give important insights for researcher how to better spread their knowledge among the business world.

A last set of interesting areas of future research is the moderating influence of further characteristics of the decision maker. For example, following the findings of Barsoux (1993), it would be very interesting to analyse the impact of the cultural background of the selection professional on the relative importance of the various decision cues in personnel selection. Furthermore, it would be interesting to test the influence of the industry on the use of selection criteria. For doing so, it would have be necessary to construct a profile that is common in many industries and firm sizes, e. g. controller or HR professional. Then, the experiment could be conducted in firms of different size and industry. Another moderating variable worth consideration is the hierarchical level of the job-holder, as Blanthorne, Bhamornsiri and Guinn (2005) found that the required skills vary with the hierarchical level of the position to be filled, it would be interesting to investigate how the factors used in this study are employed in the selection for different positions, in different industries and at different hierarchical levels.

Alltogether, the results of this thesis offer an interesting contribution to the research on personnel selection. Results show that selection professionals do base their selection decisions on applicant competencies, although they are not aware of the relative importance they ascribe to the various decision cues. The more formal and job-based cue of P-J fit moderates the influence and relative importance of the more person-oriented competencies. On the other hand, the results of the experiment prove that the concept of P-O fit is more important in younger than in established firms and thus provide empirical evidence to an often postulated proposition. As shown in the last section, the results of this thesis do not only contribute to research both in the area of personnel selection as well in entrepreneurship but do also prepare the ground for further promising investigation.

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A Backup tables to chapters 1 to 5

In this section, I present two tables that provide additional information to the content of chapters 1 to 5.

Attribute	Alternative labelling(s) / *Notes*	Source
professional & academic background		
Professional experience	(prior) work experience	Barr and Hitt (1986); Hitt and Barr (1989); Scholarios and Lockyer (1999); Schewe and Lissinna (1993); Van Hoye and Lievens (2003); Trank, Rynes and Bretz (2002); Bauer (2003)
International (work) experience	*might also include international educational experience if graduates or young professionals are selected, very closely related to language skills*	Franke (1999); Segalla *et al.* (2001b); Bauer (2003)
Generalist / specialist	multiskilled workforce, range of experience, specialised job knowledge *might be related to the range of subjects covered during academic education as well as the range of professional experience*	Deshpande and Golhar (1994); Scholarios and Lockyer (1999); Segalla *et al.* (2001a); Zellner and Fornahl (2002)
Person-Job fit		Huo *et al.* (2002)
Academic background	educational degree (bachelor vs. master)	Barr and Hitt (1986); Hitt and Barr (1989); Graves and Karren (1992); Baker and McGregor (2000); Segalla *et al.* (2001b); Van Hoye and Lievens (2003); Bauer (2003)
Academic achievement	GPA, past achievement, graduation rank, scholastic records *might be an indicant of achievement motivation, cognitive ability*	Posner (1981); Pritchard and Fidler (1993); Schewe and Lissinna (1993); Cable and Judge (1997); Franke (1999); Scholarios and Lockyer (1999); Baker and McGregor (2000); Schmidt and Hunter (2000); Segalla *et al.* (2001b); Trank *et al.* (2002); Bauer (2003)

Table A.1: Overview of applicant attributes used as decision cues in personnel selection (continued on next page)

Attribute	Alternative labelling(s) / *Notes*	Source
Duration of study	*might be an indicant of achievement motivation*	Schewe and Lissinna (1993); Bauer (2003)
University		Bauer (2003)
Extracurricular activities	*might be an indicant of interpersonal skills or conscientiousness*	Posner (1981)
Socio-demographic attributes		
Age	*interrelated with duration of professional experience and length of studies*	
Gender		Cable and Judge (1997); Hitt and Barr (1989); Barr and Hitt (1986)
Race	ethnic background	Cable and Judge (1997); Hitt and Barr (1989); Barr and Hitt (1986)
Psychometric attributes		
Interpersonal skills	ability to work in teams, communication skills, social skills, sociability *The skill can as well refer to the interaction with other team members as to the interaction with customers*	Deshpande and Golhar (1994); Huo *et al.* (2002); Baker and McGregor (2000); Graves and Karren (1992); Pritchard and Fidler (1993); Stewart (1988); Scholarios and Lockyer (1999); Posner (1981); Stewart and Knowles (2000)
Motivation	energy, drive, enthusiasm, initiative	Baker and McGregor (2000); Graves and Karren (1992); Deshpande and Golhar (1994); Pritchard and Fidler (1993); Stewart (1988); Scholarios and Lockyer (1999); Stewart and Knowles (2000)

Table A.1: Overview of applicant attributes used as decision cues in personnel selection (continued on next page)

Attribute	Alternative labelling(s) / *Notes*	Source
Will to achieve	work importance, job involvement *This criterion might be the same as achievement motivation (McClelland, 1987)*	Smith (1994)
Organisational ability	Problem solving	Stewart (1988); Stewart and Knowles (2000)
Conscientiousness	Self-Discipline	Van Hoye and Lievens (2003); Lievens *et al.* (2005); Dunn *et al.* (1995); Witt and Burke (2002); Deshpande and Golhar (1994)
Intelligence	Cognitive skills, general mental ability	Schmidt and Hunter (1998; 2000); Lievens *et al.* (2005); Dunn *et al.* (1995); Huffcutt *et al.* (1996); Scholarios and Lockyer (1999)
Quantitative skills	*These skills are probably just a specific form of intelligence*	Deshpande and Golhar (1994)
Miscellaneous attributes		
Person-Organisation Fit	personal impression, fit with organisational values, similarity to future colleagues	Schewe and Dreesen (1994); Scholarios and Lockyer (1999); Huo *et al.* (2002)
Interviewer liking of applicant	sympathy	Adkins *et al.* (1994); Cable and Judge (1997); Wick (2005)
Physical attractiveness	appearance	Campion (1978); Posner (1981); Beehr and Gilmore (1982); Gilmore *et al.* (1986); Raza and Carpenter (1987); Dipboye (1992); Watkins and Johnston (2000)

Table A.1: Overview of applicant attributes used as decision cues in personnel selection (continued on next page)

Attribute	Alternative labelling(s) / *Notes*	Source
Personal referrals	references, recommendations *In this case the delineation between attribute and recruitment source is fuzzy*	Decker and Cornelius (1979); Posner (1981); Aldrich and Langton (1997); Carroll *et al.* (1999); Segalla *et al.* (2001b); Zellner and Fornahl (2002); Rynes *et al.* (2002)
Know who	applicant social capital, networks	Huo *et al.* (2002); Zellner and Fornahl (2002)
Language skills		Bauer (2003); Franke (1999)
Ability to inspect ones work		Deshpande and Golhar (1994)
Worker flexibility		Deshpande and Golhar (1994)
Personal integrity		Baker and McGregor (2000); Scholarios and Lockyer (1999)
Ability to handle SMEs		Segalla *et al.* (2001b)
Sense of humour		Posner (1981)
Good Health		Posner (1981)
Creativity		Stewart and Knowles (2000)
Leadership		Stewart and Knowles (2000)

Source: Compiled by the author

Table A.1: Overview of applicant attributes used as decision cues in personnel selection

Source	Subject cluster	Social cluster	Method cluster	Personal cluster	Entrepreneurial cluster
Greatrex and Phillips (1989)[a]	—	personal orientation	—	Achievement orientation	—
Graf (2002)	subject competency	social competency	method competency	self-competency	—
Erpenbeck (2000)	professional / methodological	social / communicative	action-oriented	personal	—
Cheetham and Chivers (1996; 1998)[b]	functional competence	—	cognitive competence (knowledge)	personal (behavioural) competence	—
Payne *et al.* (1992)	business awareness (knowledge of the industry sector)	interactive awareness (social skills)	work structure (organisation and planning abilities)	drive and enthusiasm (energy levels)	—
Boyatzis *et al.* (2000)	—	interpersonal competencies & socio-emotional maturity	intellectual reasoning	—	entrepreneurial competencies
Goodstein and Davidson (1998)	technical	interpersonal	—	personal	—

Table A.2: Approaches to cluster competencies (continued on next page)

Source	Subject cluster	Social cluster	Method cluster	Personal cluster	Entrepreneurial cluster
Bethell-Fox (1992)	—	helping and service competencies & influencing competencies	cognitive competencies	personal effectiveness competencies & achievement and action competencies	managerial competencies
Dalton (1997)	knowledge of the business (subject competencies)	interpersonal skills (social competencies)	cognitive skills	personal skills (personal competencies)	—
Gray (1999)	technical	interpersonal	intellectual	personal	business
McLagan and Suhadolnik (1989)	technical	interpersonal	intellectual	—	business
Brinckmann *et al.* (2005)	professional and subject competencies	social competencies	—	—	entrepreneurial competencies

Table A.2: Approaches to cluster competencies

[a]the model also included the following clusters: situational flexibility and judgement
[b]The model also included the following clusters: ethical competence (values) and meta competency

B Research instrument

In this section, I present the research instrument as it has been used in the conjoint study in the original German version. As the study had been administered online and computer screenshots are not easily represented on paper, I show the last paper-version that was used in the pre-tests, however, including all amendments that have been made after the pre-tests.

The research instrument comprised 16 profiles and one dummy profile which were combinations of the applicant characteristics according to table B.1.

#	Label	Subject Comp.	Personal Comp.	Social Comp.	Method Comp.	Entrep. Comp.	P-O fit	P-J Fit	Social Cap.
0	dxo[†]	low	high	low	low	high	low	high	high
1	piu	low	high	low	low	low	high	high	high
2	gnz	low	low	high	high	low	low	high	high
3	hae	low	low	low	low	low	low	low	low
4	pdp	high	high	high	low	low	low	low	high
5	rkw	high	low	low	low	high	low	high	high
6	bgm	high	low	low	high	low	high	low	high
7	kjl	low	high	high	low	high	low	high	low
8	whl	high	low	high	high	high	low	low	low
9	smq	low	low	low	high	high	high	high	low
10	wer	low	high	low	high	high	low	low	high
11	xpv	high	high	high	high	high	high	high	high
12	hfa	low	high	high	high	low	high	low	low
13	tbd	low	low	high	low	high	high	low	high
14	hlv	high	low	high	low	low	high	high	low
15	tcy	high	high	low	low	high	high	low	low
16	lop	high	high	low	high	low	low	high	low

[†] This profile was included for training pupose only. It was obmitted in the analysis.

Table B.1: Distribution of attribute levels in the conjoint profiles

In the online experiment, the candidate profiles have been presented in four different versions that have been randomly assigned to the participants. Table B.1 shows how the 16 profiles are combined in four different ways to form the four versions.

	Version			
	A	B	C	D
Criteria Order	Social Comp.	Social Capital	Social Comp.	Social Capital
	P-O Fit	Subject Comp.	P-O Fit	Subject Comp.
	Method Comp.	P-J Fit	Method Comp.	P-J Fit
	Social Capital	Entrep. Comp.	Social Capital	Entrep. Comp.
	P-J Fit	Social Comp.	P-J Fit	Social Comp.
	Subject Comp.	Personal Comp.	Subject Comp.	Personal Comp.
	Entrep. Comp.	P-O Fit	Entrep. Comp.	P-O Fit
	Personal Comp.	Method Comp.	Personal Comp.	Method Comp.
Profile Order	dxo	dxo	dxo	dxo
	piu	piu	bgm	bgm
	gnz	gnz	xpv	xpv
	hae	hae	hae	hae
	pdp	pdp	tcy	tcy
	rkw	rkw	smq	smq
	bgm	bgm	hfa	hfa
	kjl	kjl	kjl	kjl
	whl	whl	pdp	pdp
	smq	smq	piu	piu
	wer	wer	lop	lop
	xpv	xpv	wer	wer
	hfa	hfa	whl	whl
	tbd	tbd	gnz	gnz
	hlv	hlv	rkw	rkw
	tcy	tcy	tbd	tbd
	lop	lop	hlv	hlv
	whl	whl	smq	smq
	xpv	xpv	hfa	hfa
	bgm	bgm	xpv	xpv
	kjl	kjl	pdp	pdp
	tbd	tbd	hae	hae
	rkw	rkw	wer	wer
	pdp	pdp	tbd	tbd
	hae	hae	bgm	bgm
	tcy	tcy	lop	lop
	hlv	hlv	gnz	gnz
	smq	smq	whl	whl
	piu	piu	kjl	kjl
	wer	wer	piu	piu
	lop	lop	rkw	rkw
	hfa	hfa	hlv	hlv
	gnz	gnz	tcy	tcy

Table B.2: Distribution of criteria and profile order in the four versions of the experiment

Ein Programm des Bundesministeriums für Bildung und Forschung

EXIST-High Technology Entrepreneurship Postgraduate Program (EXIST HighTEPP)

Universität Bamberg

Benchmarking

„Personalauswahl von IT-Fachkräften“

Untersuchungsunterlagen

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Zweck der Studie

Die vorliegende Studie untersucht, von welchen Kriterien sich Personalentscheider bei der Auswahl von IT-Fachkräften leiten lassen. Weiterhin wird ermittelt, wie gut die Entscheidungsträger ihr eigenes Entscheidungsverhalten einschätzen können.

Wichtige Informationen

Dieses Benchmarking besteht aus vier Teilen: Der **erste Teil** enthält die Profile von 33 hypothetischen Bewerbern. Hiermit erfassen wir experimentell, von welchen Kriterien Sie sich bei der Personalauswahl leiten lassen. Im **zweiten Teil** geben Sie an, welche Bedeutung Sie den Kriterien bei der Entscheidung beigemessen haben. Dadurch können wir ermitteln, wie gut Sie sich selbst einschätzen. Im **dritten Teil** bewerten Sie einige Aussagen zum, die Ihren Hintergrund betreffen und die es uns ermöglichen, Ihnen ein noch besseres Feedback zu geben. Im **vierten Teil** schließen einige demographische Angaben zu Ihrer Person und Ihrem Unternehmen den Fragebogen ab.

Bitte beantworten Sie alle Fragen der Studie, da wir unvollständig ausgefüllte Fragebögen nicht in der statistischen Analyse berücksichtigen können. Eine individuelle Auswertung ist dann leider nicht möglich. Vorausgehende Test haben ergeben, dass die meisten Teilnehmer nicht mehr als **25-30 Minuten** für eine komplette Bearbeitung benötigen.

Alle Informationen werden streng vertraulich behandelt! Die Ergebnisse dieses Benchmarkings werden nur in aggregierter Form veröffentlicht, so dass keine Rückschlüsse auf Ihr individuelles Entscheidungsverhalten gezogen werden können.

Bei Fragen zu diesem Benchmarking stehen wir Ihnen gerne zur Verfügung.

Szenario

Stellen Sie sich bitte vor, in Ihrem Unternehmen sei die folgende Stelle zu besetzen:

Senior IT-Consultant (m/w)

Aufgaben

- Beratung interner und externer Kunden bei der Konzeption, Realisierung sowie Integration von Software-Lösungen
- Erstellung technischer Architekturen und Designs für die Implementierung
- Umsetzung der Applikationen in allen Phasen der Software-Entwicklung

Auszüge aus dem Anforderungsprofil)

- Hochschulstudium
- 3-5 Jahre einschlägige Berufserfahrung

Mit den in Ihrem Hause üblichen Auswahlverfahren (z. B. Analyse der Bewerbungsunterlagen, Tests, Interviews) haben Sie einen Pool von in Betracht kommenden Kandidaten ermittelt. Diese Kandidaten unterscheiden sich durch bestimmte Eigenschaften, die jeweils in einem Kurzprofil dargestellt sind. Auf der nächsten Seite werden sie noch weiter erläutert. Um Ihnen die Bewertung mehrerer Kandidaten in einer experimentellen Situation zu ermöglichen, haben wir die Zahl der Kriterien stark eingeschränkt. Uns ist bewusst, dass Sie in der Praxis noch zahlreiche andere Faktoren zu berücksichtigen haben. Bitte gehen Sie bei diesem Experiment davon aus, dass sich die Kandidaten nur hinsichtlich der aufgeführten Kriterien unterscheiden.

Anleitung

Bitte bewerten Sie nun die auf den folgenden Seiten dargestellten hypothetischen Kandidaten und geben Sie jeweils an, wie wahrscheinlich es ist, dass Sie dem einzelnen Kandidaten einen Arbeitsvertrag anbieten werden. Bitte antworten Sie für jedes Szenario, indem Sie auf der entsprechenden Skala die Zahl ankreuzen, die Ihrer Beurteilung am nächsten kommt. Nutzen Sie dabei möglichst die volle Bandbreite der Skala aus.

Manche der Kandidatenprofile auf den folgenden Seiten werden Ihnen vertraut vorkommen, andere werden Ihnen eher unwahrscheinlich erscheinen. Bitte treffen Sie Ihre Entscheidung bestmöglich anhand der zur Verfügung gestellten Informationen für **alle Kandidaten** und gehen Sie davon aus, dass nicht beschriebene Charakteristika der Kandidaten sowie alle übrigen Faktoren für alle Kandidaten **konstant** sind.

Bitte **blättern** Sie **nicht** zu bereits beurteilten Kandidaten **zurück**.

Situationsparameter

Die fiktiven Kandidaten unterscheiden sich durch die folgenden acht Kriterien, die jeweils zwei Ausprägungen annehmen können. Sie können diese Seite heraustrennen, um sich bei der Bewertung der Kandidaten darauf zu beziehen.

Parameter	Ausprägung	Beschreibung
Sozialkompetenz	überdurchschnittlich	Der Kandidat kann sehr gut mit anderen Menschen umgehen. Er arbeitet gerne im Team und hat ausgeprägte kommunikative Fähigkeiten.
	durchschnittlich	Der Kandidat kann mit anderen Menschen umgehen, arbeitet aber lieber allein. Seine Kommunikationsfähigkeit ist durchschnittlich ausgeprägt.
Übereinstimmung mit Unternehmenskultur	hoch	Der Kandidat passt sehr gut zu den Werten und der Kultur ihres Unternehmens. Er wird sich sehr gut in sein künftiges Team einfügen.
	gering	Die Wertvorstellungen des Kandidaten passen nicht zu denen Ihres Unternehmens. In seinem künftigen Team könnten Reibungen entstehen.
Methodische Kompetenz	überdurchschnittlich	Die Problemlösungs- und Analysefähigkeiten des Kandidaten sind stark ausgeprägt. Er zeichnet sich durch gutes Projektmanagement, Organisations- und Delegationsfähigkeit aus.
	durchschnittlich	Die analytischen Fähigkeiten des Kandidaten mittelmäßig ausgeprägt, sein Vorgehen ist leicht unstrukturiert.
Netzwerk des Kandidaten	ausgeprägt	Der Kandidat verfügt über ein ausgedehntes Netzwerk an Beziehungen, die für ihr Unternehmen nützlich sein können.
	eingeschränkt	Das Netzwerk des Kandidaten erscheint wenig ausgeprägt.
Übereinstimmung mit den formellen Stellenanforderungen	vollständig	Der Kandidat erfüllt alle formellen Anforderungen der Stellenbeschreibung.
	teilweise	Der Kandidat erfüllt die formellen Anforderungen der Stellenbeschreibung nur teilweise.
Fachkompetenz	überdurchschnittlich	Der Kandidat verfügt über ausgezeichnetes Fachwissen und kann dieses situationsgerecht einsetzen und ist fachlich sehr engagiert.
	durchschnittlich	Der Kandidat verfügt über ein gesundes Maß an Fachwissen und zeigt fachliches Engagement.
Unternehmerische Kompetenz	überdurchschnittlich	Der Kandidat denkt und handelt strategisch und ist engagiert. Er hat einen Blick für die unternehmerischen Zusammenhänge und richtet sein Handeln am Wohl der gesamten Unternehmung aus.
	durchschnittlich	Der Kandidat denkt und handelt eher operativ. Er richtet den Blick nicht unbedingt auf die unternehmerische Gesamtzusammenhänge.
Persönliche Kompetenz	überdurchschnittlich	Der Kandidat hat ein realistisches Selbstbild, ist hoch motiviert und tritt sehr sicher auf.
	durchschnittlich	Der Kandidat kann sich selbst recht gut einschätzen, ist aber in seinem auftreten leicht unsicher. Die Motivation erscheint durchschnittlich.

Kandidat 1: dxo

Sozialkompetenz	durchschnitt-lich	Durchschnittliche Kommunikations- und Kontaktfähigkeit
Übereinstimmung mit Unternehmenskultur	gering	Geringe Übereinstimmung von Werten & Kultur von Kandidat und Unternehmen, ggf. Reibung im künftigen Team
Methodische Kompetenz	durchschnitt-lich	Durchschnittliche analytische Fähigkeiten, teils leicht unstrukturiertes Vorgehen
Netzwerk des Kandidaten	ausgedehnt	Ausgedehntes und für das Unternehmen nützliches Netzwerk
Übereinstimmung mit formellen Stellenanforderungen	vollständig	Die formellen Stellenanforderungen werden voll erfüllt
Fachkompetenz	durchschnitt-lich	Gesundes Maß an Fachwissen und durchschnittliches fachliches Engagement
Unternehmerische Kompetenz	überdurch-schnittlich	Hohes strategisches Handeln, Blick für unternehmerische Zusammenhänge
Persönliche Kompetenz	überdurch-schnittlich	Realistisches Selbstbild, hoch motiviertes und sehr sicheres Auftreten

Beurteilung

Wenn Sie über die Auswahl eines neuen Mitarbeiters zu befinden hätten, wie beurteilen Sie die Wahrscheinlichkeit, dass Sie dem oben beschriebenen Kandidaten einen Arbeitsvertrag anbieten würden?

Bitte kreuzen Sie Ihre Antwort auf der folgenden Skala an:

Sehr geringe Wahrschein-lichkeit, einen Arbeitsver-trag anzubieten						Sehr hohe Wahrschein-lichkeit, einen Arbeitsver-trag anzubieten
1	2	3	4	5	6	7

Ihre Selbsteinschätzung zur Bedeutung der einzelnen Kriterien

Bitte geben Sie im Folgenden an, wie wichtig die einzelnen Kriterien für Sie bei der soeben durchgeführten Beurteilung der Kandidaten gewesen sind. Bitte schöpfen Sie die gesamte Bandbreite der Skala aus, damit auch Nuancen der Abstufung deutlich werden.

Kriterium	Ganz unwichtig 1	2	3	4	5	6	Ganz wichtig 7
Fachkompetenz	☐	☐	☐	☐	☐	☐	☐
Sozialkompetenz	☐	☐	☐	☐	☐	☐	☐
Persönliche Kompetenz	☐	☐	☐	☐	☐	☐	☐
Unternehmerische Kompetenz	☐	☐	☐	☐	☐	☐	☐
Methodische Kompetenz	☐	☐	☐	☐	☐	☐	☐
Übereinstimmung mit Unternehmenskultur	☐	☐	☐	☐	☐	☐	☐
Übereinstimmung mit Stellenanforderungen	☐	☐	☐	☐	☐	☐	☐
Netzwerk des Kandidaten	☐	☐	☐	☐	☐	☐	☐

Ihr Profil als Entscheider

Nun noch einige Fragen zu Ihrer Person und Ihrem Verhalten. Ihre Antworten helfen uns, Ihr Feedback noch genauer zu konkretisieren. Bitte geben Sie an, wie sehr die folgenden Aussagen auf Sie persönlich zutreffen.

	Die Aussage trifft für mich ...	gar nicht zu	überwiegend nicht zu	eher nicht zu	eher zu	überwiegend zu	völlig zu
1.	Um mich über das Thema „Personalauswahl“ auf dem Laufenden zu halten, lese ich regelmäßig Literatur zu diesem Thema (z. B. Fachbücher, Fachaufsätze o.ä.).	☐	☐	☐	☐	☐	☐
2.	Ich kann auf andere zugehen.	☐	☐	☐	☐	☐	☐
3.	Bei Problemen suche ich stets nach Lösungsstrategien, die gesamtunternehmerisch vorteilhaft sind.	☐	☐	☐	☐	☐	☐
4.	Durch den Besuch von Vorträgen und Seminaren bilde ich mich als Personalentscheider weiter.	☐	☐	☐	☐	☐	☐
5.	Ich erarbeite Lösungsalternativen.	☐	☐	☐	☐	☐	☐
6.	Ich habe mich im Rahmen meiner Ausbildung vertieft mit dem Themenkomplex Personalwirtschaft auseinander gesetzt.	☐	☐	☐	☐	☐	☐
7.	Ich kann meine Anliegen anderen Menschen verständlich machen.	☐	☐	☐	☐	☐	☐
8.	Ich prüfe im Nachhinein mein Vorgehen in einer Problemsituation, um meine Strategie zu verbessern.	☐	☐	☐	☐	☐	☐
9.	Ich strukturiere komplexe Sachverhalte besser als andere Menschen in vergleichbarer Position.	☐	☐	☐	☐	☐	☐
10.	Ich erarbeite Lösungsansätze, durch die gleichzeitig mehrere Probleme gelöst werden.	☐	☐	☐	☐	☐	☐
11.	Ich weiß, wie ich in einer schwierigen Situation meinen Blickwinkel ändern kann.	☐	☐	☐	☐	☐	☐
12.	Ich tausche mich mit anderen Menschen (Kollegen, Mitarbeitern, Personalernetzwerke, etc.) über Themen der Personalauswahl aus.	☐	☐	☐	☐	☐	☐

Die Aussage trifft für mich ...	gar nicht zu	überwiegend nicht zu	eher nicht zu	eher zu	überwiegend zu	völlig zu
13. Ich verknüpfe häufig Analysen, die mehrere Probleme betreffen.	☐	☐	☐	☐	☐	☐
14. Ich kann meine eigenen Überzeugungen auch gegenüber anderen vertreten, ohne dabei autoritär zu werden.	☐	☐	☐	☐	☐	☐
15. Ich bin meiner Umwelt gegenüber aufgeschlossen.	☐	☐	☐	☐	☐	☐
16. Um als Personalentscheider die richtigen Entscheidungen treffen zu können, nutze ich ein individuelles Coaching.	☐	☐	☐	☐	☐	☐
17. Ich habe Freude am Umgang mit anderen Menschen.	☐	☐	☐	☐	☐	☐
18. Ich übernehme gerne Verantwortung.	☐	☐	☐	☐	☐	☐
19. Ich bin belastbarer als andere.	☐	☐	☐	☐	☐	☐
20. Andere beneiden mich um mein sicheres Auftreten.	☐	☐	☐	☐	☐	☐
21. Positiv zu denken ist für mich selbstverständlich.	☐	☐	☐	☐	☐	☐
22. Ich bin Neuerungen gegenüber stets aufgeschlossen.	☐	☐	☐	☐	☐	☐
23. Ich bewältige Probleme, die mein Fachgebiet betreffen, ohne Schwierigkeiten.	☐	☐	☐	☐	☐	☐
24. Ich erkenne meist die Ursache eines Problems meines Fachgebiets.	☐	☐	☐	☐	☐	☐
25. Ich schaffe es besser als andere, Beiträge zu klären und zu konkretisieren.	☐	☐	☐	☐	☐	☐
26. Probleme zu durchdenken und Lösungen dafür zu suchen, ist nicht meine Stärke.	☐	☐	☐	☐	☐	☐
27. In meinem Aufgabenbereich berücksichtige ich stets auch die Arbeitgeberposition.	☐	☐	☐	☐	☐	☐
28. Ich würde mich gerne intensiver mit dem Thema „Personalauswahl“ beschäftigen, z. B. Bücher dazu lesen oder Seminare besuchen. Dies ist jedoch aus Zeit- / Kostengründen nicht möglich.	☐	☐	☐	☐	☐	☐

Demographische Angaben zu Ihnen und zu Ihrem Unternehmen

Zum Schluss des Fragebogens bitten wir Sie noch um einige Angaben zu Ihrer Person und zu dem Unternehmen, in dem Sie tätig sind. Diese Angaben benötigen wir, um die Ergebnisse des Experiments in einen Gesamtzusammenhang einzuordnen und zur Ermittlung der passenden Vergleichspersonen für das Benchmarking.

1. Vor- und Zuname: _____ e-mail: _____
2. Falls Sie auch ein unternehmensinternes Benchmarking wünschen, geben Sie bitte den Name Ihres Unternehmens an. _____.
3. Wie viele Mitarbeiter beschäftigt Ihr Unternehmen? _____ Mitarbeiter
4. Seit wie vielen Jahren besteht Ihr Unternehmen? _____ Jahre
5. Ihr Geschlecht: ☐ weiblich ☐ männlich
6. Ihr Alter _____ Jahre
7. Welche Position haben Sie inne? _____
8. Seit wie vielen Jahren sind Sie insgesamt (nicht nur in Ihrem jetzigen Unternehmen) an Personalauswahlentscheidungen im Rahmen von Einstellungen beteiligt? _____ Jahre
9. An wie vielen Personaleinstellungen waren Sie bisher in Ihrem Berufsleben beteiligt? Bitte geben Sie eine möglichst enge Bandbreite an: Zwischen _____ und _____ Entscheidungen
10. Wie groß ist der Anteil der Mitarbeiter, an deren Auswahl Sie in den letzten 2 Jahren beteiligt waren, mit deren Einstellung sie im Nachhinein zufrieden sind: _____ %
11. Wie viele Einstellungen wurden in Ihrem Verantwortungsbereich/mit Ihrer Beteiligung in den vergangenen 2 Jahren durchgeführt? _____ Einstellungen
12. Gelegentlich kommt es vor, dass sich ein Unternehmen bereits nach relativ kurzer Zeit von einem Mitarbeiter trennt. Bitte geben Sie an, von wie vielen der in Nr. 11 genannten Mitarbeiter sich Ihr Unternehmen inzwischen getrennt hat, weil die Erwartungen nicht erfüllt wurden: _____ MA
13. Wie viele der in Nr. 11 genannten Mitarbeiter haben Ihr Unternehmen inzwischen aus eigenen Antrieb wieder verlassen? _____ Mitarbeiter
14. Über welche Berufsausbildung verfügen Sie (Mehrfachnennungen möglich)?

☐ Kaufmännische Ausbildung	☐ Technische Ausbildung
☐ Wirtschaftswissenschaftliches Studium	☐ Informatik-Studium
☐ Pädagogisches / soziologisches Studium	☐ Psychologiestudium
☐ Sonstiges (bitte angeben:	_____)
☐ MBA	☐ Promotion

C Statistical analysis

P	r	P	r	P	r	P	r
1	.905**	20	.917**	39	.821**	58	.901**
2	.798**	21	.771**	40	.793**	59	.903**
3	.722**	22	.776**	41	.930**	60	.858**
4	.686**	23	.835**	42	.709**	61	.618*
5	.824**	24	.922**	43	.778**	62	.710**
6	.730**	25	.491	44	.952**	63	.827**
7	.921**	26	.941**	45	.803**	64	.852**
8	.892**	27	.785**	46	.836**	65	.733**
9	.868**	28	.734**	47	.534*	66	.848**
10	.763**	29	.605*	48	.763**	67	.799**
11	.881**	30	.878**	49	.651**	68	.758**
12	.660**	31	.793**	50	.810**	69	.796**
13	.876**	32	.750**	51	.773**	70	.761**
14	.833**	33	.699**	52	.529*	71	.898**
15	.699**	34	.924**	53	.731**	72	.771**
16	.404	35	.850**	54	.863**	73	.763**
17	.702**	36	.885**	55	.859**	74	.913**
18	.711**	37	.922**	56	.883**		
19	.836**	38	.835**	57	.254†		

*$p < .05$; **$p < .01$; ***$p < .001$; P = Participant, r = Pearson's correlation

† Due to the very low internal validity, this participant was excluded from the further analysis.

Table C.1: Test-retest reliability

P	Subj. Comp.		Pers. Comp.		Soc. Comp.		Meth. Comp.		Entrep. Comp.		P-O fit		P-J fit		Soc. Cap.		$\Sigma\omega^2$
	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	
1	0.004	5	0.152	2	0.469	1	0.099	3	0.025	4	0.004	5	0.004	5	$0.000^{\dagger}$	8	0.757
2	0.133	1	0.058	5	0.105	4	0.133	1	$0.000^{\dagger}$	7	0.133	1	$0.000^{\dagger}$	7	0.010	6	0.572
3	0.204	1	0.167	2	0.133	3	0.075	4	0.004	7	0.016	5	0.016	5	$0.000^{\dagger}$	8	0.615
4	0.057	3	0.057	3	0.057	3	0.267	1	0.057	3	0.112	2	$0.000^{\dagger}$	7	$0.000^{\dagger}$	7	0.607
5	0.303	1	0.032	5	0.255	2	0.032	5	0.052	3	0.052	3	0.004	7	$0.000^{\dagger}$	8	0.730
6	0.527	1	0.007	3	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	0.007	3	$0.000^{\dagger}$	6	0.191	2	0.007	3	0.739
7	0.466	1	$0.000^{\dagger}$	6	0.192	2	0.074	3	$0.000^{\dagger}$	6	0.008	5	$0.000^{\dagger}$	6	0.074	3	0.814
8	0.227	1	0.048	4	0.048	4	0.141	2	0.048	4	0.141	2	$0.000^{\dagger}$	7	$0.000^{\dagger}$	7	0.653
9	0.178	2	0.065	3	0.382	1	0.022	5	0.004	7	0.034	4	0.004	7	0.022	5	0.711
10	0.019	5	0.080	4	0.300	1	0.139	2	0.019	5	0.139	2	$0.000^{\dagger}$	7	$0.000^{\dagger}$	7	0.696
11	0.424	1	0.089	3	0.047	4	0.245	2	0.000	6	0.007	5	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	0.812
12	0.321	1	$0.000^{\dagger}$	5	$0.000^{\dagger}$	5	0.280	2	$0.000^{\dagger}$	5	$0.000^{\dagger}$	5	0.031	4	0.048	3	0.680
13	0.253	1	0.016	5	0.148	2	0.148	2	0.031	4	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	0.596
14	0.506	1	0.016	4	0.183	2	$0.000^{\dagger}$	6	0.028	3	0.006	5	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	0.739
15	0.050	4	0.015	6	0.196	1	0.196	1	0.050	4	0.098	3	$0.000^{\dagger}$	8	0.003	7	0.608
16	0.024	5	0.099	2	0.056	4	0.326	1	0.076	3	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	0.581
17	0.110	2	0.110	2	$0.000^{\dagger}$	6	0.413	1	0.028	4	$0.000^{\dagger}$	6	$0.000^{\dagger}$	6	0.017	5	0.678

Table C.2: Relative Importance and Ranking of Selection Criteria—Individual Level analysis (continued on next page)

P	Subj. Comp.		Pers. Comp.		Soc. Comp.		Meth. Comp.		Entrep. Comp.		P-O fit		P-J fit		Soc. Cap.		$\Sigma\omega^2$
	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	
18	0.044	4	0.061	3	0.311	1	0.240	2	0.000†	7	0.000†	7	0.007	5	0.007	5	0.670
19	0.062	3	0.062	3	0.392	1	0.062	3	0.011	6	0.142	2	0.000†	7	0.000†	7	0.731
20	0.080	2	0.381	1	0.080	2	0.080	2	0.027	5	0.027	5	0.000†	8	0.027	5	0.702
21	0.513	1	0.000	6	0.074	4	0.095	2	0.000	6	0.095	2	0.007	5	0.000	6	0.784
22	0.066	3	0.026	5	0.090	1	0.066	3	0.090	1	0.010	6	0.000†	7	0.000†	7	0.348
23	0.098	1	0.050	3	0.098	1	0.001	5	0.001	5	0.000†	7	0.000†	7	0.050	3	0.298
24	0.367	1	0.046	4	0.000†	8	0.228	2	0.068	3	0.014	6	0.028	5	0.003	7	0.754
25	0.143	2	0.030	5	0.000†	7	0.067	3	0.173	1	0.047	4	0.000†	7	0.004	6	0.464
26	0.654	1	0.083	2	0.060	3	0.001	5	0.010	4	0.000†	7	0.000†	7	0.001	5	0.809
27	0.234	1	0.127	2	0.127	2	0.006	6	0.099	5	0.127	2	0.000†	7	0.000†	7	0.720
28	0.680	1	0.006	4	0.031	3	0.000†	5	0.000†	5	0.048	2	0.000†	5	0.000†	5	0.765
29	0.409	1	0.013	6	0.025	3	0.123	2	0.025	3	0.025	3	0.000†	7	0.000†	7	0.620
30	0.182	3	0.091	4	0.220	2	0.260	1	0.091	4	0.000†	7	0.006	6	0.000†	7	0.850
31	0.066	3	0.131	2	0.452	1	0.049	4	0.021	6	0.011	7	0.034	5	0.000†	8	0.764
32	0.623	1	0.000†	5	0.029	2	0.000†	5	0.002	4	0.029	2	0.000†	5	0.000†	5	0.683
33	0.160	2	0.049	4	0.003	6	0.236	1	0.127	3	0.030	5	0.000†	7	0.000†	7	0.605
34	0.297	1	0.108	3	0.191	2	0.002	8	0.065	5	0.108	3	0.032	6	0.010	7	0.813

Table C.2: Relative Importance and Ranking of Selection Criteria—Individual Level analysis (continued on next page)

P	Subj. Comp.		Pers. Comp.		Soc. Comp.		Meth. Comp.		Entrep. Comp.		P-O fit		P-J fit		Soc. Cap.		$\Sigma\omega^2$
	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	
35	0.470	1	0.133	2	0.080	3	0.039	4	0.039	4	0.000†	6	0.000†	6	0.000†	6	0.761
36	0.414	1	0.068	4	0.121	3	0.187	2	0.047	5	0.000†	6	0.000†	6	0.000†	6	0.837
37	0.057	5	0.143	3	0.179	1	0.082	4	0.000†	7	0.179	1	0.000†	7	0.006	6	0.646
38	0.394	1	0.001	6	0.250	2	0.058	4	0.000†	7	0.108	3	0.000†	7	0.010	5	0.821
39	0.235	1	0.035	6	0.101	4	0.076	5	0.129	3	0.000†	8	0.020	7	0.197	2	0.793
40	0.559	1	0.000†	6	0.012	4	0.023	3	0.000†	6	0.091	2	0.003	5	0.000†	6	0.688
41	0.231	1	0.072	2	0.049	3	0.014	6	0.000†	8	0.001	7	0.030	4	0.030	4	0.427
42	0.185	1	0.150	3	0.118	4	0.000	7	0.185	1	0.000†	7	0.011	5	0.011	5	0.660
43	0.485	1	0.101	2	0.044	3	0.007	5	0.007	5	0.017	4	0.000†	7	0.000†	7	0.661
44	0.225	1	0.019	5	0.183	2	0.019	5	0.005	8	0.019	5	0.083	3	0.036	4	0.589
45	0.154	1	0.019	6	0.119	2	0.019	6	0.087	3	0.061	5	0.087	3	0.005	8	0.551
46	0.543	1	0.019	4	0.009	5	0.137	2	0.000†	7	0.066	3	0.001	6	0.000†	7	0.775
47	0.044	3	0.000†	6	0.027	4	0.086	2	0.027	4	0.236	1	0.000†	6	0.000†	6	0.420
48	0.166	2	0.055	3	0.055	3	0.435	1	0.055	3	0.000†	7	0.000†	7	0.020	6	0.786
49	0.363	1	0.136	3	0.166	2	0.000†	6	0.026	4	0.000†	6	0.013	5	0.000†	6	0.704
50	0.063	5	0.088	4	0.150	1	0.118	2	0.041	6	0.118	2	0.000†	7	0.000†	7	0.578
51	0.000†	6	0.000†	6	0.029	3	0.094	2	0.002	5	0.470	1	0.014	4	0.000†	6	0.609

Table C.2: Relative Importance and Ranking of Selection Criteria—Individual Level analysis (continued on next page)

P	Subj. Comp.		Pers. Comp.		Soc. Comp.		Meth. Comp.		Entrep. Comp.		P-O fit		P-J fit		Soc. Cap.		$\Sigma\omega^2$
	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	
52	0.000	4	0.000	4	0.277	1	0.000†	4	0.049	3	0.098	2	0.000†	4	0.000†	4	0.424
53	0.304	1	0.197	2	0.001	5	0.000†	6	0.000†	6	0.095	3	0.000†	6	0.026	4	0.623
54	0.079	3	0.079	3	0.105	2	0.000†	5	0.000†	5	0.424	1	0.000†	5	0.000†	5	0.687
55	0.074	4	0.049	5	0.313	1	0.174	2	0.174	2	0.003	7	0.003	7	0.014	6	0.804
56	0.078	3	0.054	6	0.174	1	0.078	3	0.000†	7	0.078	3	0.106	2	0.000†	7	0.568
57	Participant excluded from analysis																
58	0.196	1	0.155	2	0.155	2	0.038	6	0.061	5	0.155	2	0.000†	7	0.000†	7	0.760
59	0.189	1	0.020	6	0.189	1	0.086	3	0.086	3	0.038	5	0.006	7	0.000†	8	0.614
60	0.079	4	0.149	1	0.079	4	0.111	2	0.052	7	0.111	2	0.012	8	0.079	4	0.672
61	0.061	4	0.082	2	0.082	2	0.256	1	0.003	6	0.000†	7	0.027	5	0.000†	7	0.511
62	0.198	1	0.094	2	0.094	2	0.025	6	0.094	2	0.025	6	0.044	5	0.000†	8	0.574
63	0.259	2	0.030	3	0.030	3	0.348	1	0.005	6	0.000†	8	0.005	6	0.030	3	0.707
64	0.339	1	0.042	4	0.297	2	0.129	3	0.000†	6	0.006	5	0.000†	6	0.000†	6	0.813
65	0.046	4	0.116	3	0.297	1	0.029	5	0.029	5	0.146	2	0.000†	8	0.004	7	0.667
66	0.160	2	0.028	5	0.262	1	0.106	3	0.082	4	0.005	6	0.005	6	0.000†	8	0.648
67	0.173	2	0.065	5	0.142	3	0.207	1	0.113	4	0.029	6	0.016	7	0.000†	8	0.745
68	0.094	3	0.006	6	0.217	2	0.018	5	0.050	4	0.255	1	0.000†	7	0.000†	7	0.640

Table C.2: Relative Importance and Ranking of Selection Criteria—Individual Level analysis (continued on next page)

P	Subj. Comp.		Pers. Comp.		Soc. Comp.		Meth. Comp.		Entrep. Comp.		P-O fit		P-J fit		Soc. Cap.		$\Sigma\omega^2$
	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	ω^2	*Rk*	
69	0.366	1	0.039	4	0.124	2	0.039	4	0.057	3	0.000†	6	0.000†	6	0.000†	6	0.625
70	0.108	3	0.108	3	0.312	1	0.271	2	0.000†	6	0.000†	6	0.000†	6	0.006	5	0.805
71	0.129	2	0.042	5	0.167	1	0.067	3	0.042	5	0.067	3	0.042	5	0.022	8	0.578
72	0.346	1	0.041	6	0.061	3	0.061	3	0.061	3	0.010	7	0.085	2	0.000	8	0.665
73	0.297	1	0.072	3	0.100	2	0.049	6	0.072	3	0.072	3	0.000†	7	0.000†	7	0.662
74	0.432	1	0.227	2	0.135	3	0.000†	5	0.009	4	0.000†	5	0.000†	5	0.000†	5	0.803

P = Participant, Rk = Ranking of criterion

Table C.2: Relative importance and ranking of selection criteria—individual level analysis

†Negative values of ω^2 are reported as zero (see explanation on page 141)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.		
	I	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*
1	4	11.43	5	6	17.14	2	7	20.00	1	5	14.29	3	4	11.43	5	5	14.29	3	2	5.71	7	2	5.71	7
2	5	13.89	3	6	16.67	1	5	13.89	3	5	13.89	3	3	8.33	7	6	16.67	1	4	11.11	6	2	5.56	8
3	6	16.22	2	5	13.51	3	4	10.81	6	5	13.51	3	3	8.11	7	7	18.92	1	5	13.51	3	2	5.41	8
4	3	11.11	5	3	11.11	5	4	14.82	2	4	14.82	2	4	14.82	2	5	18.52	1	2	7.41	7	2	7.41	7
5	7	17.95	1	5	12.82	4	6	15.39	2	6	15.39	2	4	10.26	6	5	12.82	4	4	10.26	6	2	5.13	8
6	7	17.95	1	5	12.82	4	6	15.39	2	5	12.82	4	4	10.26	6	2	5.13	8	6	15.39	2	4	10.26	6
7	1	5.00	8	2	10.00	5	2	10.00	5	3	15.00	2	3	15.00	2	2	10.00	5	4	20.00	1	3	15.00	2
8	7	17.50	1	7	17.50	1	6	15.00	4	7	17.50	1	4	10.00	6	6	15.00	4	1	2.50	8	2	5.00	7
9	6	19.36	3	4	12.90	4	7	22.58	1	3	9.68	5	2	6.45	6	7	22.58	1	1	3.23	7	1	3.23	7
10	6	15.79	1	6	15.79	1	5	13.16	5	6	15.79	1	2	5.26	7	6	15.79	1	5	13.16	5	2	5.26	7
11	7	24.14	1	2	6.90	6	5	17.24	3	6	20.69	2	3	10.35	5	4	13.79	4	1	3.45	7	1	3.45	7
12	6	15.00	1	6	15.00	1	6	15.00	1	5	12.50	4	4	10.00	7	5	12.50	4	5	12.50	4	3	7.50	8
13	7	20.00	1	5	14.29	4	6	17.14	2	6	17.14	2	3	8.57	6	2	5.71	7	4	11.43	5	2	5.71	7
14	6	18.18	2	6	18.18	2	7	21.21	1	4	12.12	4	1	3.03	7	4	12.12	4	4	12.12	4	1	3.03	7
15	5	12.20	5	7	17.07	1	7	17.07	1	6	14.63	3	5	12.20	5	6	14.63	3	2	4.88	8	3	7.32	7
16	4	11.43	5	3	8.57	7	5	14.29	3	6	17.14	2	5	14.29	3	7	20.00	1	1	2.86	8	4	11.43	5
17	7	20.59	1	5	14.71	3	5	14.71	3	7	20.59	1	3	8.82	5	3	8.82	5	2	5.88	7	2	5.88	7

Table C.3: Self-perceived importance and ranking of selection criteria—individual level analysis (continued on next page)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.		
	I	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*
18	7	18.42	1	6	15.79	2	6	15.79	2	4	10.53	5	4	10.53	5	5	13.16	4	4	10.53	5	2	5.26	8
19	7	17.95	1	7	17.95	1	7	17.95	1	5	12.82	5	4	10.26	6	6	15.39	4	1	2.56	8	2	5.13	7
20	7	18.92	1	7	18.92	1	6	16.22	3	5	13.51	4	3	8.11	6	4	10.81	5	3	8.11	6	2	5.41	8
21	7	23.33	1	5	16.67	3	3	10.00	5	6	20.00	2	1	3.33	7	2	6.67	6	5	16.67	3	1	3.33	7
22	7	16.67	1	6	14.29	3	7	16.67	1	5	11.91	5	5	11.91	5	6	14.29	3	4	9.52	7	2	4.76	8
23	7	17.07	1	6	14.63	3	7	17.07	1	4	9.76	7	5	12.20	4	5	12.20	4	5	12.20	4	2	4.88	8
24	7	20.00	1	3	8.57	6	6	17.14	3	7	20.00	1	4	11.43	4	4	11.43	4	3	8.57	6	1	2.86	8
25	7	17.95	1	6	15.39	2	5	12.82	5	6	15.39	2	2	5.13	7	5	12.82	5	6	15.39	2	2	5.13	7
26	6	20.69	1	5	17.24	2	3	10.35	5	5	17.24	2	3	10.35	5	2	6.90	7	4	13.79	4	1	3.45	8
27	5	14.29	3	5	14.29	3	6	17.14	2	5	14.29	3	4	11.43	6	7	20.00	1	2	5.71	7	1	2.86	8
28	1	4.76	8	3	14.29	1	3	14.29	1	3	14.29	1	3	14.29	1	3	14.29	1	2	9.52	7	3	14.29	1
29	7	18.92	1	5	13.51	4	6	16.22	3	7	18.92	1	3	8.11	6	3	8.11	6	4	10.81	5	2	5.41	8
30	7	17.50	1	5	12.50	5	6	15.00	3	7	17.50	1	5	12.50	5	6	15.00	3	2	5.00	7	2	5.00	7
31	3	8.82	6	7	20.59	1	7	20.59	1	4	11.77	5	5	14.71	3	5	14.71	3	1	2.94	8	2	5.88	7
32	1	3.13	8	5	15.63	4	3	9.38	5	2	6.25	7	6	18.75	1	6	18.75	1	3	9.38	5	6	18.75	1
33	4	11.77	5	3	8.82	7	5	14.71	2	6	17.65	1	5	14.71	2	5	14.71	2	4	11.77	5	2	5.88	8
34	7	18.92	1	5	13.51	4	7	18.92	1	6	16.22	3	3	8.11	6	5	13.51	4	1	2.70	8	3	8.11	6

Table C.3: Self-perceived importance and ranking of selection criteria—individual level analysis (continued on next page)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.		
	I	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*
35	7	17.07	1	6	14.63	3	7	17.07	1	6	14.63	3	4	9.76	5	4	9.76	5	4	9.76	5	3	7.32	8
36	7	18.42	1	6	15.79	3	4	10.53	5	7	18.42	1	6	15.79	3	3	7.90	6	2	5.26	8	3	7.90	6
37	4	12.12	4	5	15.15	3	6	18.18	2	4	12.12	4	3	9.09	6	7	21.21	1	2	6.06	7	2	6.06	7
38	7	19.44	1	4	11.11	5	6	16.67	3	7	19.44	1	2	5.56	7	5	13.89	4	3	8.33	6	2	5.56	7
39	5	12.50	5	4	10.00	6	7	17.50	1	7	17.50	1	6	15.00	3	6	15.00	3	2	5.00	8	3	7.50	7
40	7	14.89	1	5	10.64	6	6	12.77	4	7	14.89	1	5	10.64	6	7	14.89	1	4	8.51	8	6	12.77	4
41	7	15.91	1	6	13.64	2	6	13.64	2	6	13.64	2	4	9.09	7	6	13.64	2	6	13.64	2	3	6.82	8
42	5	11.63	4	5	11.63	4	5	11.63	4	6	13.95	1	5	11.63	4	6	13.95	1	6	13.95	1	5	11.63	4
43	7	18.92	1	6	16.22	2	5	13.51	5	6	16.22	2	4	10.81	6	6	16.22	2	2	5.41	7	1	2.70	8
44	7	17.07	1	5	12.20	4	6	14.63	2	5	12.20	4	3	7.32	8	5	12.20	4	6	14.63	2	4	9.76	7
45	7	17.07	1	6	14.63	3	6	14.63	3	5	12.20	5	5	12.20	5	7	17.07	1	2	4.88	8	3	7.32	7
46	7	18.42	1	4	10.53	6	6	15.79	3	7	18.42	1	1	2.63	8	6	15.79	3	5	13.16	5	2	5.26	7
47	1	6.67	6	2	13.33	2	2	13.33	2	1	6.67	6	2	13.33	2	1	6.67	6	2	13.33	2	4	26.67	1
48	7	17.50	1	7	17.50	1	4	10.00	5	7	17.50	1	5	12.50	4	4	10.00	5	2	5.00	8	4	10.00	5
49	7	20.00	1	5	14.29	2	5	14.29	2	4	11.43	5	2	5.71	8	5	14.29	2	4	11.43	5	3	8.57	7
50	7	16.28	1	7	16.28	1	6	13.95	4	7	16.28	1	5	11.63	5	5	11.63	5	4	9.30	7	2	4.65	8
51	5	14.71	3	4	11.77	4	4	11.77	4	3	8.82	7	4	11.77	4	6	17.65	1	6	17.65	1	2	5.88	8

Table C.3: Self-perceived importance and ranking of selection criteria—individual level analysis (continued on next page)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.		
	I	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*
52	6	15.39	2	5	12.82	4	7	17.95	1	6	15.39	2	5	12.82	4	2	5.13	8	4	10.26	6	4	10.26	6
53	6	15.79	2	7	18.42	1	6	15.79	2	5	13.16	4	5	13.16	4	5	13.16	4	1	2.63	8	3	7.90	7
54	5	11.91	4	6	14.29	3	7	16.67	1	5	11.91	4	4	9.52	6	7	16.67	1	4	9.52	6	4	9.52	6
55	6	15.00	3	4	10.00	5	7	17.50	1	6	15.00	3	7	17.50	1	3	7.50	7	4	10.00	5	3	7.50	7
56	5	11.63	4	6	13.95	2	7	16.28	1	5	11.63	4	4	9.30	8	6	13.95	2	5	11.63	4	5	11.63	4
57	Participant excluded from analysis																							
58	6	15.39	2	5	12.82	4	7	17.95	1	5	12.82	4	3	7.69	7	6	15.39	2	4	10.26	6	3	7.69	7
59	7	20.59	1	5	14.71	3	7	20.59	1	4	11.77	5	2	5.88	7	5	14.71	3	3	8.82	6	1	2.94	8
60	7	14.89	1	5	10.64	6	7	14.89	1	7	14.89	1	6	12.77	4	6	12.77	4	5	10.64	6	4	8.51	8
61	7	20.00	1	5	14.29	4	6	17.14	2	5	14.29	4	3	8.57	6	6	17.14	2	2	5.71	7	1	2.86	8
62	7	16.67	1	4	9.52	7	5	11.91	4	5	11.91	4	6	14.29	2	5	11.91	4	6	14.29	2	4	9.52	7
63	7	17.07	1	6	14.63	3	6	14.63	3	7	17.07	1	3	7.32	7	3	7.32	7	5	12.20	5	4	9.76	6
64	5	17.86	2	4	14.29	4	7	25.00	1	5	17.86	2	2	7.14	5	2	7.14	5	2	7.14	5	1	3.57	8
65	3	8.82	6	6	17.65	2	7	20.59	1	4	11.77	5	5	14.71	3	5	14.71	3	2	5.88	7	2	5.88	7
66	7	19.44	1	5	13.89	3	7	19.44	1	5	13.89	3	5	13.89	3	3	8.33	6	2	5.56	7	2	5.56	7
67	5	13.16	4	6	15.79	2	7	18.42	1	6	15.79	2	4	10.53	6	5	13.16	4	3	7.90	7	2	5.26	8
68	5	15.15	4	4	12.12	5	6	18.18	1	6	18.18	1	3	9.09	6	6	18.18	1	1	3.03	8	2	6.06	7

Table C.3: Self-perceived importance and ranking of selection criteria—individual level analysis (continued on next page)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.		
	I	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*	*I*	*St.*	*Rk*
69	1	4.17	8	2	8.33	6	3	12.50	4	2	8.33	6	4	16.67	2	4	16.67	2	3	12.50	4	5	20.83	1
70	5	16.13	3	5	16.13	3	6	19.36	2	7	22.58	1	4	12.90	5	2	6.45	6	1	3.23	7	1	3.23	7
71	6	15.79	1	6	15.79	1	6	15.79	1	5	13.16	5	3	7.90	7	4	10.53	6	6	15.79	1	2	5.26	8
72	7	15.91	1	6	13.64	2	6	13.64	2	6	13.64	2	5	11.36	6	4	9.09	7	6	13.64	2	4	9.09	7
73	6	16.67	1	5	13.89	3	5	13.89	3	6	16.67	1	4	11.11	5	4	11.11	5	3	8.33	7	3	8.33	7
74	6	15.39	1	6	15.39	1	6	15.39	1	6	15.39	1	4	10.26	5	4	10.26	5	4	10.26	5	3	7.69	8

P = Participant. I = self-perceived importance of criterion. St. = idem. standardised. Rk = Ranking of criterion

Table C.3: Self-perceived importance and ranking of selection criteria—individual level analysis

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.			Σ∆
	Exp.	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	
1	0.53	11.43	10.90	20.08	17.14	2.94	61.96	20.00	41.96	13.08	14.29	1.21	3.30	11.43	8.13	0.53	14.29	13.76	0.53	5.71	5.19	0.00	5.71	5.71	89.78
2	23.25	13.89	9.36	10.14	16.67	6.53	18.36	13.89	4.47	23.25	13.89	9.36	0.00	8.33	8.33	23.25	16.67	6.59	0.00	11.11	11.11	1.75	5.56	3.81	59.56
3	33.17	16.22	16.96	27.15	13.51	13.64	21.63	10.81	10.82	12.20	13.51	1.32	0.65	8.11	7.46	2.60	18.92	16.32	2.60	13.51	10.91	0.00	5.41	5.41	82.82
4	9.39	11.11	1.72	9.39	11.11	1.72	9.39	14.82	5.43	43.99	14.82	29.17	9.39	14.82	5.43	18.45	18.52	0.07	0.00	7.41	7.41	0.00	7.41	7.41	58.35
5	41.51	17.95	23.56	4.38	12.82	8.44	34.93	15.39	19.55	4.38	15.39	11.00	7.12	10.26	3.13	7.12	12.82	5.70	0.55	10.26	9.71	0.00	5.13	5.13	86.21
6	71.31	17.95	53.36	0.95	12.82	11.87	0.00	15.39	15.39	0.00	12.82	12.82	0.95	10.26	9.31	0.00	5.13	5.13	25.85	15.39	10.46	0.95	10.26	9.31	127.65
7	57.25	5.00	52.25	0.00	10.00	10.00	23.59	10.00	13.59	9.09	15.00	5.91	0.00	15.00	15.00	0.98	10.00	9.02	0.00	20.00	20.00	9.09	15.00	5.91	131.67
8	34.76	17.50	17.26	7.35	17.50	10.15	7.35	15.00	7.65	21.59	17.50	4.09	7.35	10.00	2.65	21.59	15.00	6.59	0.00	2.50	2.50	0.00	5.00	5.00	55.90
9	25.04	19.36	5.68	9.14	12.90	3.76	53.73	22.58	31.15	3.09	9.68	6.58	0.56	6.45	5.89	4.78	22.58	17.80	0.56	3.23	2.66	3.09	3.23	0.13	73.65
10	2.73	15.79	13.06	11.49	15.79	4.30	43.10	13.16	29.95	19.97	15.79	4.18	2.73	5.26	2.53	19.97	15.79	4.18	0.00	13.16	13.16	0.00	5.26	5.26	76.62
11	52.22	24.14	28.08	10.96	6.90	4.06	5.79	17.24	11.45	30.17	20.69	9.48	0.00	10.35	10.35	0.86	13.79	12.93	0.00	3.45	3.45	0.00	3.45	3.45	83.25
12	47.21	15.00	32.21	0.00	15.00	15.00	0.00	15.00	15.00	41.18	12.50	28.68	0.00	10.00	10.00	0.00	12.50	12.50	4.56	12.50	7.94	7.06	7.50	0.44	121.76
13	42.45	20.00	22.45	2.69	14.29	11.60	24.83	17.14	7.69	24.83	17.14	7.69	5.20	8.57	3.37	0.00	5.71	5.71	0.00	11.43	11.43	0.00	5.71	5.71	75.66
14	68.47	18.18	50.29	2.17	18.18	16.02	24.76	21.21	3.55	0.00	12.12	12.12	3.79	3.03	0.76	0.81	12.12	11.31	0.00	12.12	12.12	0.00	3.03	3.03	109.20
15	8.22	12.20	3.97	2.47	17.07	14.61	32.24	17.07	15.16	32.24	14.63	17.60	8.22	12.20	3.97	16.12	14.63	1.48	0.00	4.88	4.88	0.49	7.32	6.82	68.50
16	4.13	11.43	7.30	17.04	8.57	8.47	9.64	14.29	4.65	56.11	17.14	38.97	13.08	14.29	1.21	0.00	20.00	20.00	0.00	2.86	2.86	0.00	11.43	11.43	94.87
17	16.22	20.59	4.36	16.22	14.71	1.52	0.00	14.71	14.71	60.91	20.59	40.33	4.13	8.82	4.69	0.00	8.82	8.82	0.00	5.88	5.88	2.51	5.88	3.38	83.69
18	6.57	18.42	11.85	9.10	15.79	6.69	46.42	15.79	30.63	35.82	10.53	25.30	0.00	10.53	10.53	0.00	13.16	13.16	1.05	10.53	9.48	1.05	5.26	4.22	111.85
19	8.48	17.95	9.47	8.48	17.95	9.47	53.63	17.95	35.68	8.48	12.82	4.34	1.51	10.26	8.75	19.43	15.39	4.04	0.00	2.56	2.56	0.00	5.13	5.13	79.43
20	11.40	18.92	7.52	54.27	18.92	35.36	11.40	16.22	4.82	11.40	13.51	2.12	3.85	8.11	4.26	3.85	10.81	6.97	0.00	8.11	8.11	3.85	5.41	1.56	70.71
21	65.43	23.33	42.10	0.00	16.67	16.67	9.44	10.00	0.56	12.12	20.00	7.88	0.00	3.33	3.33	12.12	6.67	5.45	0.89	16.67	15.77	0.00	3.33	3.33	95.10
22	18.97	16.67	2.30	7.47	14.29	6.82	25.86	16.67	9.20	18.97	11.91	7.06	25.86	11.91	13.96	2.87	14.29	11.41	0.00	9.52	9.52	0.00	4.76	4.76	65.03
23	32.89	17.07	15.81	16.78	14.63	2.15	32.89	17.07	15.81	0.34	9.76	9.42	0.34	12.20	11.86	0.00	12.20	12.20	0.00	12.20	12.20	16.78	4.88	11.90	91.34
24	48.67	20.00	28.67	6.10	8.57	2.47	0.00	17.14	17.14	30.24	20.00	10.24	9.02	11.43	2.41	1.86	11.43	9.57	3.71	8.57	4.86	0.40	2.86	2.46	77.82
25	30.82	17.95	12.87	6.47	15.39	8.92	0.00	12.82	12.82	14.44	15.39	0.95	37.28	5.13	32.16	10.13	12.82	2.69	0.00	15.39	15.39	0.86	5.13	4.27	90.05
26	80.84	20.69	60.15	10.26	17.24	6.98	7.42	10.35	2.93	0.12	17.24	17.12	1.24	10.35	9.11	0.00	6.90	6.90	0.00	13.79	13.79	0.12	3.45	3.32	120.30
27	32.50	14.29	18.21	17.64	14.29	3.35	17.64	17.14	0.50	0.83	14.29	13.45	13.75	11.43	2.32	17.64	20.00	2.36	0.00	5.71	5.71	0.00	2.86	2.86	48.77
28	88.89	4.76	84.13	0.78	14.29	13.50	4.05	14.29	10.23	0.00	14.29	14.29	0.00	14.29	14.29	6.28	14.29	8.01	0.00	9.52	9.52	0.00	14.29	14.29	168.26
29	65.97	18.92	47.05	2.10	13.51	11.42	4.03	16.22	12.18	19.84	18.92	0.92	4.03	8.11	4.08	4.03	8.11	4.08	0.00	10.81	10.81	0.00	5.41	5.41	95.94
30	21.41	17.50	3.91	10.71	12.50	1.79	25.88	15.00	10.88	30.59	17.50	13.09	10.71	12.50	1.79	0.00	15.00	15.00	0.71	5.00	4.29	0.00	5.00	5.00	55.76
31	8.64	8.82	0.19	17.15	20.59	3.44	59.16	20.59	38.57	6.41	11.77	5.35	2.75	14.71	11.96	1.44	14.71	13.27	4.45	2.94	1.51	0.00	5.88	5.88	80.17

Table C.4: Individual level analysis of introspection (continued on next page)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.			Σ∆
	Exp.	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	
32	91.22	3.13	88.09	0.00	15.63	15.63	4.25	9.38	5.13	0.00	6.25	6.25	0.29	18.75	18.46	4.25	18.75	14.50	0.00	9.38	9.38	0.00	18.75	18.75	176.18
33	26.45	11.77	14.68	8.10	8.82	0.73	0.50	14.71	14.21	39.01	17.65	21.36	20.99	14.71	6.29	4.96	14.71	9.75	0.00	11.77	11.77	0.00	5.88	5.88	84.66
34	36.53	18.92	17.61	13.28	13.51	0.23	23.49	18.92	4.57	0.25	16.22	15.97	8.00	8.11	0.11	13.28	13.51	0.23	3.94	2.70	1.23	1.23	8.11	6.88	46.84
35	61.76	17.07	44.69	17.48	14.63	2.84	10.51	17.07	6.56	5.13	14.63	9.51	5.13	9.76	4.63	0.00	9.76	9.76	0.00	9.76	9.76	0.00	7.32	7.32	95.06
36	49.46	18.42	31.04	8.12	15.79	7.67	14.46	10.53	3.93	22.34	18.42	3.92	5.62	15.79	10.17	0.00	7.90	7.90	0.00	5.26	5.26	0.00	7.90	7.90	77.78
37	8.82	12.12	3.30	22.14	15.15	6.98	27.71	18.18	9.53	12.69	12.12	0.57	0.00	9.09	9.09	27.71	21.21	6.50	0.00	6.06	6.06	0.93	6.06	5.13	47.16
38	47.99	19.44	28.55	0.12	11.11	10.99	30.45	16.67	13.78	7.07	19.44	12.38	0.00	5.56	5.56	13.16	13.89	0.73	0.00	8.33	8.33	1.22	5.56	4.34	84.66
39	29.63	12.50	17.13	4.41	10.00	5.59	12.74	17.50	4.76	9.58	17.50	7.92	16.27	15.00	1.27	0.00	15.00	15.00	2.52	5.00	2.48	24.84	7.50	17.34	71.49
40	81.25	14.89	66.36	0.00	10.64	10.64	1.74	12.77	11.02	3.34	14.89	11.55	0.00	10.64	10.64	13.23	14.89	1.67	0.44	8.51	8.08	0.00	12.77	12.77	132.71
41	54.10	15.91	38.19	16.86	13.64	3.23	11.48	13.64	2.16	3.28	13.64	10.36	0.00	9.09	9.09	0.23	13.64	13.40	7.03	13.64	6.61	7.03	6.82	0.21	83.24
42	28.03	11.63	16.40	22.73	11.63	11.10	17.88	11.63	6.25	0.00	13.95	13.95	28.03	11.63	16.40	0.00	13.95	13.95	1.67	13.95	12.29	1.67	11.63	9.96	100.31
43	73.37	18.92	54.46	15.28	16.22	0.94	6.66	13.51	6.86	1.06	16.22	15.16	1.06	10.81	9.75	2.57	16.22	13.64	0.00	5.41	5.41	0.00	2.70	2.70	108.91
44	38.20	17.07	21.13	3.23	12.20	8.97	31.07	14.63	16.44	3.23	12.20	8.97	0.85	7.32	6.47	3.23	12.20	8.97	14.09	14.63	0.54	6.11	9.76	3.64	75.12
45	27.95	17.07	10.88	3.45	14.63	11.19	21.60	14.63	6.96	3.45	12.20	8.75	15.79	12.20	3.59	11.07	17.07	6.00	15.79	4.88	10.91	0.91	7.32	6.41	64.69
46	70.07	18.42	51.64	2.45	10.53	8.07	1.16	15.79	14.63	17.68	18.42	0.74	0.00	2.63	2.63	8.52	15.79	7.27	0.13	13.16	13.03	0.00	5.26	5.26	103.29
47	10.48	6.67	3.81	0.00	13.33	13.33	6.43	13.33	6.90	20.48	6.67	13.81	6.43	13.33	6.90	56.19	6.67	49.52	0.00	13.33	13.33	0.00	26.67	26.67	134.28
48	21.12	17.50	3.62	7.00	17.50	10.50	7.00	10.00	3.00	55.34	17.50	37.84	7.00	12.50	5.50	0.00	10.00	10.00	0.00	5.00	5.00	2.55	10.00	7.46	82.93
49	51.56	20.00	31.56	19.32	14.29	5.03	23.58	14.29	9.29	0.00	11.43	11.43	3.69	5.71	2.02	0.00	14.29	14.29	1.85	11.43	9.58	0.00	8.57	8.57	91.78
50	10.90	16.28	5.38	15.23	16.28	1.05	25.95	13.95	12.00	20.42	16.28	4.14	7.09	11.63	4.54	20.42	11.63	8.79	0.00	9.30	9.30	0.00	4.65	4.65	49.84
51	0.00	14.71	14.71	0.00	11.77	11.77	4.76	11.77	7.00	15.44	8.82	6.61	0.33	11.77	11.44	77.18	17.65	59.53	2.30	17.65	15.35	0.00	5.88	5.88	132.28
52	0.00	15.39	15.39	0.00	12.82	12.82	65.33	17.95	47.38	0.00	15.39	15.39	11.56	12.82	1.26	23.11	5.13	17.99	0.00	10.26	10.26	0.00	10.26	10.26	130.73
53	48.80	15.79	33.01	31.62	18.42	13.20	0.16	15.79	15.63	0.00	13.16	13.16	0.00	13.16	13.16	15.25	13.16	2.09	0.00	2.63	2.63	4.17	7.90	3.72	96.60
54	11.50	11.91	0.41	11.50	14.29	2.79	15.28	16.67	1.38	0.00	11.91	11.91	0.00	9.52	9.52	61.72	16.67	45.05	0.00	9.52	9.52	0.00	9.52	9.52	90.10
55	9.20	15.00	5.80	6.10	10.00	3.91	38.93	17.50	21.43	21.64	15.00	6.64	21.64	17.50	4.14	0.37	7.50	7.13	0.37	10.00	9.63	1.74	7.50	5.76	64.43
56	13.73	11.63	2.10	9.51	13.95	4.45	30.63	16.28	14.36	13.73	11.63	2.10	0.00	9.30	9.30	13.73	13.95	0.22	18.66	11.63	7.03	0.00	11.63	11.63	51.19
57	Participant excluded from analysis																								
58	25.79	15.39	10.40	20.40	12.82	7.57	20.40	17.95	2.45	5.00	12.82	7.82	8.03	7.69	0.33	20.40	15.39	5.01	0.00	10.26	10.26	0.00	7.69	7.69	51.54
59	30.78	20.59	10.19	3.26	14.71	11.45	30.78	20.59	10.19	14.01	11.77	2.24	14.01	5.88	8.13	6.19	14.71	8.52	0.98	8.82	7.85	0.00	2.94	2.94	61.51
60	11.76	14.89	3.14	22.17	10.64	11.54	11.76	14.89	3.14	16.52	14.89	1.62	7.74	12.77	5.03	16.52	12.77	3.75	1.79	10.64	8.85	11.76	8.51	3.25	40.31
61	11.94	20.00	8.06	16.05	14.29	1.76	16.05	17.14	1.10	50.10	14.29	35.81	0.59	8.57	7.98	0.00	17.14	17.14	5.28	5.71	0.43	0.00	2.86	2.86	75.15
62	34.50	16.67	17.83	16.38	9.52	6.85	16.38	11.91	4.47	4.36	11.91	7.55	16.38	14.29	2.09	4.36	11.91	7.55	7.67	14.29	6.62	0.00	9.52	9.52	62.49

Table C.4: Individual level analysis of introspection (continued on next page)

P	Subj. Comp.			Pers. Comp.			Soc. Comp.			Meth. Comp.			Entrep. Comp.			P-O fit			P-J fit			Soc. Cap.			Σ∆
	Exp.	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	*Exp.*	*Self.*	∆	
63	36.63	17.07	19.56	4.24	14.63	10.39	4.24	14.63	10.39	49.22	17.07	32.15	0.71	7.32	6.61	0.00	7.32	7.32	0.71	12.20	11.49	4.24	9.76	5.51	103.42
64	41.70	17.86	23.84	5.17	14.29	9.12	36.53	25.00	11.53	15.87	17.86	1.99	0.00	7.14	7.14	0.74	7.14	6.41	0.00	7.14	7.14	0.00	3.57	3.57	70.74
65	6.90	8.82	1.93	17.39	17.65	0.26	44.53	20.59	23.94	4.35	11.77	7.42	4.35	14.71	10.36	21.89	14.71	7.18	0.00	5.88	5.88	0.60	5.88	5.28	62.25
66	24.69	19.44	5.25	4.32	13.89	9.57	40.43	19.44	20.99	16.36	13.89	2.47	12.65	13.89	1.24	0.77	8.33	7.56	0.77	5.56	4.78	0.00	5.56	5.56	57.41
67	23.22	13.16	10.06	8.73	15.79	7.06	19.06	18.42	0.64	27.79	15.79	12.00	15.17	10.53	4.64	3.89	13.16	9.27	2.15	7.90	5.75	0.00	5.26	5.26	54.68
68	14.69	15.15	0.46	0.94	12.12	11.18	33.91	18.18	15.72	2.81	18.18	15.37	7.81	9.09	1.28	39.84	18.18	21.66	0.00	3.03	3.03	0.00	6.06	6.06	74.77
69	58.56	4.17	54.39	6.24	8.33	2.09	19.84	12.50	7.34	6.24	8.33	2.09	9.12	16.67	7.55	0.00	16.67	16.67	0.00	12.50	12.50	0.00	20.83	20.83	123.47
70	13.42	16.13	2.71	13.42	16.13	2.71	38.76	19.36	19.40	33.67	22.58	11.08	0.00	12.90	12.90	0.00	6.45	6.45	0.00	3.23	3.23	0.75	3.23	2.48	60.98
71	22.32	15.79	6.53	7.27	15.79	8.52	28.89	15.79	13.10	11.59	13.16	1.57	7.27	7.90	0.63	11.59	10.53	1.07	7.27	15.79	8.52	3.81	5.26	1.46	41.40
72	52.03	15.91	36.12	6.17	13.64	7.47	9.17	13.64	4.46	9.17	13.64	4.46	9.17	11.36	2.19	1.50	9.09	7.59	12.78	13.64	0.85	0.00	9.09	9.09	72.24
73	44.86	16.67	28.20	10.88	13.89	3.01	15.11	13.89	1.22	7.40	16.67	9.27	10.88	11.11	0.24	10.88	11.11	0.24	0.00	8.33	8.33	0.00	8.33	8.33	58.83
74	53.80	15.39	38.41	28.27	15.39	12.88	16.81	15.39	1.43	0.00	15.39	15.39	1.12	10.26	9.14	0.00	10.26	10.26	0.00	10.26	10.26	0.00	7.69	7.69	105.45
																								Min	40.31
																								Max	176.18
																								Mean	84.31
																								SD	28.50

P = Participant. Exp = Relative importance of criterion. Experiment (standardised ω^2). Self = self-perceived importance of criterion (standardised)

Table C.4: Individual level analysis of introspection