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December 2006

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Strategies for Hiring IT Professionals: An Empirical Analysis of Employer and Job Seeker Behavior on the IT Labor Market

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ABSTRACT

Are IT professionals different from other occupational groups concerning their values and goals and ultimately the ways they search for jobs and select employers? And do IT firms vary in their recruiting practices from other industries? In this paper, we empirically reveal that there are differences in employer and job seeker behavior distinguishing the IT and the non-IT world. The analysis explains particularities in job seekers' and firms' preferences and recruiting practices. Based on this, we derive recommendations for HR managers on how to effectively recruit qualified IT professionals and on how IT can assist in creating and maintaining a flexible workforce.

Keywords

Human Resource Management, (E-)Recruitment, Hiring strategies, IT professionals, Empirical research.

INTRODUCTION

Recruiting and retaining qualified staff is vital to the success of many corporations. Even more, intangible assets such as workforce skills, proprietary know-how and intellectual property have even gained importance as key drivers of innovation and economic growth (Eustace, 2000). While information and communication technologies (ICT) are at the origin of this development leading to a commoditization of many tangible assets, they have also changed the ways human capital is acquired and managed by many organizations. For example, ICT in recent years has transformed the ways people find work as well as the ways they effectively work together. Particularly, researchers have observed a persistent trend towards more team- and project-based work structures (Anderson et al., 2004) and even predict the replacement of corporations as the fundamental unit of an economy by temporary networks of electronically connected freelancers (Malone and Laubacher, 1998). In addition to these developments, ICT has changed the power and the behaviors of both labor market parties, employees and employers. With regard to the market for IT professionals, the ICT boom of the 1990s involved a shortage of qualified IT professionals that made employers accord considerable incentives to their employees. However, the New Economy shakedown at the beginning of the century drastically increased the availability of IT workers (Dolan, 2002) and only recently has demand for IT professionals regained dynamics so that the attraction and retention of IT professionals can be found among the top five management concerns of many CIOs again (Luftman and McLean, 2004). However, many employers still receive more applications from qualified IT candidates than they have vacant positions. For HR managers, this is an unsatisfactory situation as they attract candidates today that they might only be able to recruit successfully tomorrow, possibly by again offering considerable incentives due to job market scarcities. Thus, our overall research questions are: *What are the specific behaviors of IT employers and IT professionals compared to other employers and job seekers, e.g. with regard to IT usage in labor market activities? How can employers benefit from the current availability of skilled IT professionals even in case they do not have an immediate need for high-volume recruitment? How can they synchronize short-term availability of skilled IT candidates with mid-term enterprise needs for qualified staff?*

In order to address these questions, the remainder of this paper is as follows. We at first present an empirical model analyzing and explaining job seekers' behavior. We show that there are major differences between the various target groups concerning how relevant vacancies are identified, prioritized and applied for. Using the insights on particularities of IT professionals, we draw intermediary conclusions on how to successfully attract and recruit IT professionals. Switching perspective, we then analyze the firms' recruiting behavior. Using data from an annual survey with the Top-1,000-companies in Germany and a

model of IT diffusion for recruitment processes previously developed, we derive conclusions on how employers can recruit and maintain a highly-qualified and at the same time flexible IT workforce by means of increased IT support.

THE CANDIDATE SIDE: AN EMPIRICAL MODEL EXPLAINING JOB SEEKER BEHAVIOR

In order to investigate specific behaviors on the IT labor market, this section summarizes results from an empirical survey carried out with internet job seekers.

Modeling Job Seeker Behavior: An Empirical Model

In the summer of 2005, we conducted an empirical survey with job seekers. We used an online questionnaire comprising 32 questions with a total of over 200 variables. Within several weeks, over 11,000 job seekers responded to our survey. Data cleansing reduced the number of participants to 10,716 individuals that were included in our analysis (Keim et al., 2005). Broadening the scope of earlier surveys, we also extend an existing model by Kirchgeorg and Lorbeer (2002) to get a more detailed answer of job seekers' attitudes, values and goals to identify, among others, industry specifics. We especially extended the range of target groups and adapted it to the entire job search process that ranges from the identification of relevant jobs over the ways a candidate applies for these jobs to the final decision whether to accept a certain job or not. The model assumes that this behavior is influenced by socio-demographic factors as well as by the candidates' personal values, their courses of study, career status and occupational group. These factors are summarized in Figure 1. Hence, the model captures HR managers' perception that different target groups show different behaviors in their job search activities.
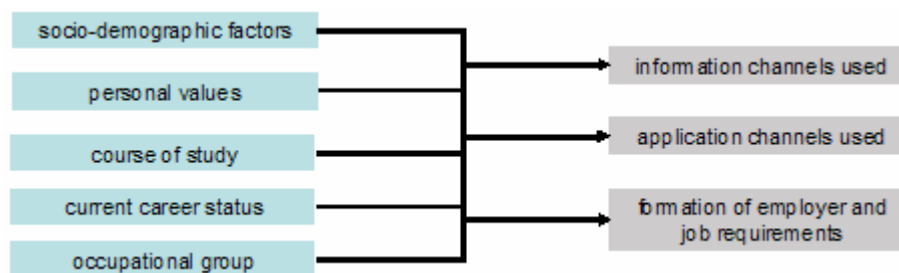

Figure 1. Analytical model explaining job seekers' behaviors

In order to analyze the role of socio-demographic factors and candidates' personal values, a multi-step approach was taken. In a first step, candidates were clustered according to their personal values. Therefore, participants in the questionnaire were confronted with a total of 22 items that by means of an exploratory factor analysis were then reduced into a smaller number of personal value factors. A verification of the applicability of the factor analysis revealed a measure of sampling adequacy (MSA) of 0.849, thus showing the second best data quality possible according to Brosius (1998). Six factors were extracted explaining 57.7% of the total variance. Building on the factor analysis, a cluster analysis was carried out revealing four different candidate clusters within the data set.

The results from the factor and cluster analysis are depicted in Figure 2. The illustration shows the 22 items grouped according to their factor loadings into the six different personal value factors. These factors are "*self-actualization*", "*amusement & leisure*", "*sociability*", "*success*", "*social consciousness*" and "*knowledge*". The different curves show the average importance of the different items for the four different value clusters on a 5-point Likert scale ranging from 1=not at all important to 5=very important. The value clusters are the "*reclusive*", the "*success-oriented*", the "*value-oriented*" and the "*social-oriented*". One can see that, for example, "success-oriented" candidates tend to attribute less importance to factors such as social engagement and parsimony. Instead, they think of factors such as social recognition, their appearance, a high standard of living and an enjoyable life to be more important. Similarly, the curve for the "reclusive" candidate cluster shows characteristic patterns for factors like visiting new countries and cosmopolitism. The "social-oriented" candidates are similar to the "reclusive" candidates concerning factors like the standard of living or financial security. However, they show a distinctive profile for factors such as social engagement, solving social conflicts and visiting new countries which are of high absolute and relative importance to this candidate cluster.
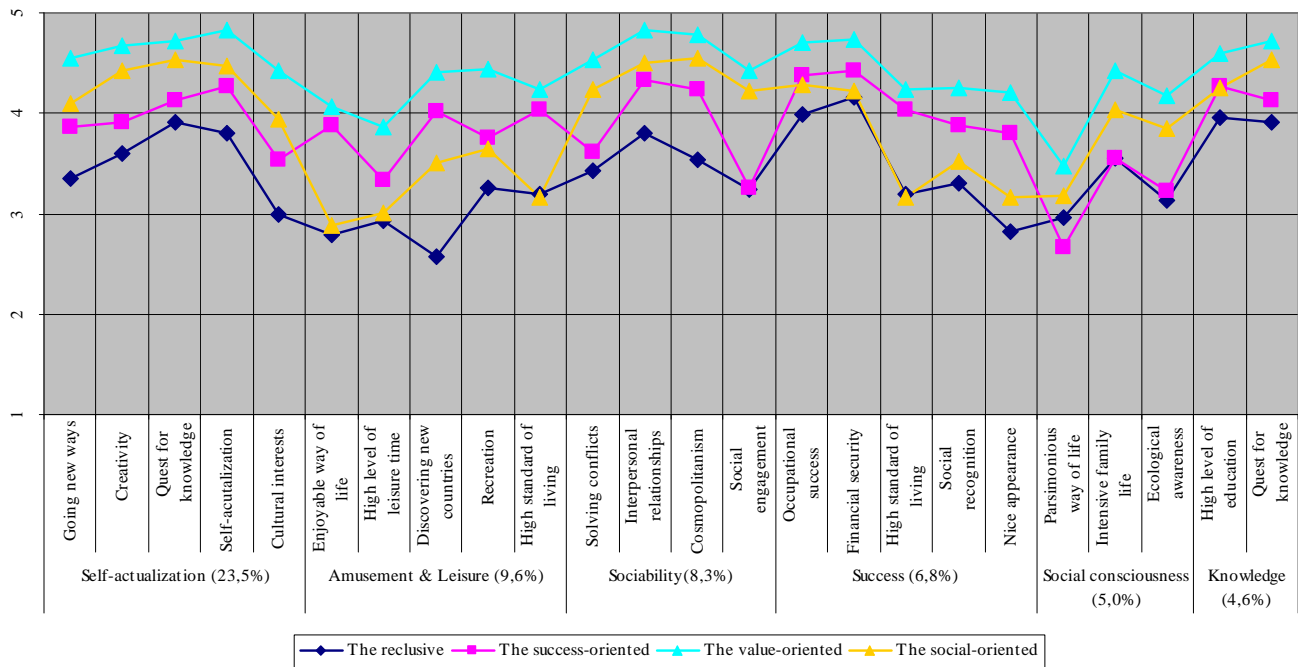
Figure 2. Factors and clusters of personal values

The method was again applied for the analysis of the employer requirements. This time, a list of 32 items considered to be relevant when choosing between employers or jobs was used. An MSA of 0.897 indicates an even better data quality than for the analysis of the personal values. Seven factors were extracted explaining 57.5% of the total variance. The cluster analysis reveals five different candidate clusters within the data set. The results are illustrated in Figure 3 below.
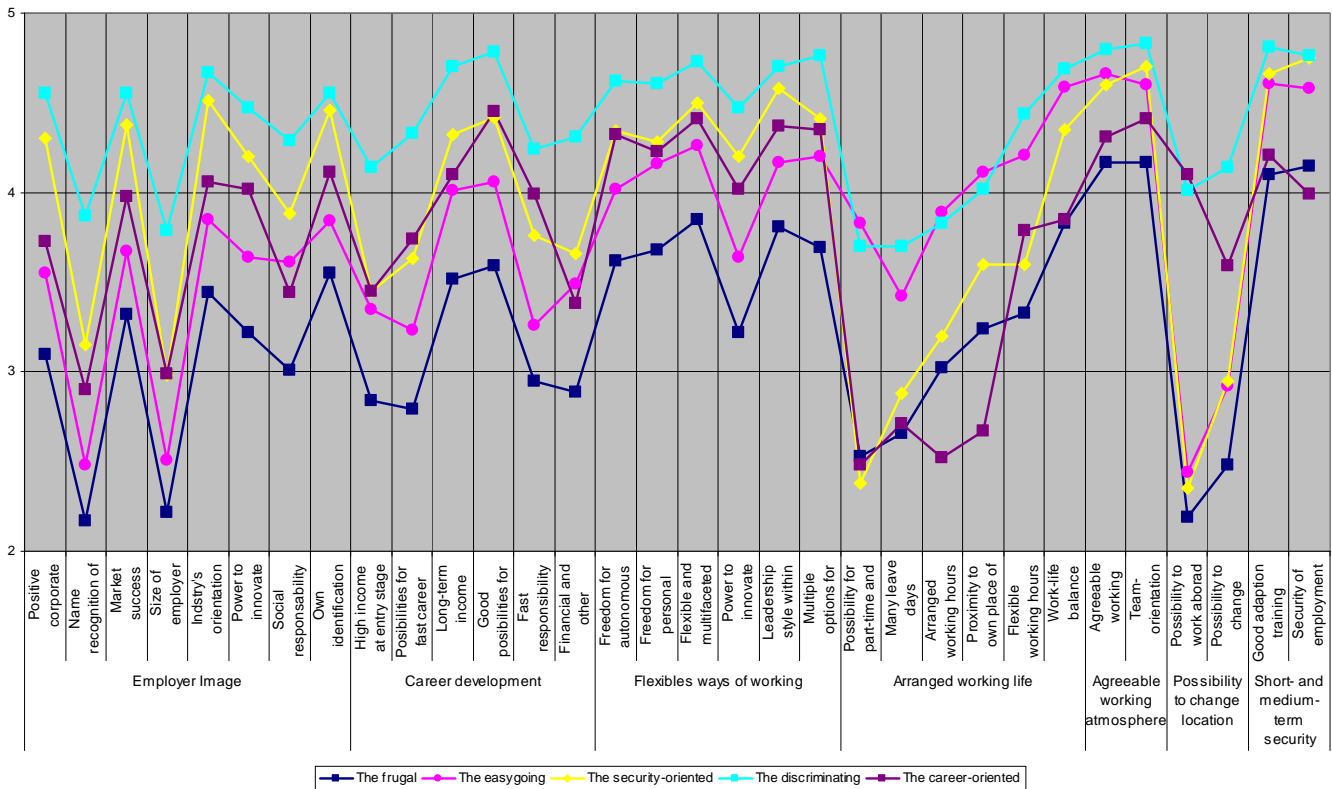

Figure 3. Factors and clusters of employer requirements

The figure illustrates that the ways candidates prioritize between different employers, e.g. in case they need to decide for which job to apply first or in case they received several competing job offers, depend on seven different factors. These factors are the "*employer image*", the "*possibilities for career development*", the "*ways of working & degree of arrangement*", the "*working atmosphere*", the "*possibility to change locations*" and the "*security of the job*" in consideration according to their explicative contribution to the model. Also, the respondents can be grouped into five different clusters of candidates that within each cluster can be considered to be homogeneous. These clusters are the "*frugal*", the "*easygoing*", the "*security-oriented*", the "*discriminating*" and the "*career-oriented*". While "discriminating" candidates have the highest requirements with regard to their future employers and jobs for almost all criteria evaluated, "frugal" candidates attribute on average the least importance to most of the criteria. The remaining clusters show other interesting characteristics. For example, the "easygoing" candidate can be characterized by the high importance attributed to items belonging to the factor "arranged working life", such as the number of leave days or the possibilities for telework. The proximity to the place of living and arranged working hours are even more important than for the "discriminating" candidates. The "career-oriented" candidate in turn shows opposing characteristics. This candidate cluster evaluates working hours and the proximity to the place of living even as less important compared to the "frugal" candidate. The security of the job also is of less importance to these candidates compared to other candidate clusters. Finally, the "career-oriented" candidate rather prioritizes possibilities for fast advancement and development as well as possibilities to work abroad.

In addition to the insights on which personal values and factors drive the candidates in their lives and their job-search behavior, the model presented in Figure 1 assumes that the job requirements are influenced by the candidates' personal values. This interrelation is depicted by mapping the two different groups of candidate clusters as depicted in Figure 4. One can see that with 53.5% more than one out of two "frugal" candidates show the value profile of a "reclusive" job seeker. In strong opposition to this, 61.8% of the candidates with an employer requirements' profile of a "discriminating" candidate in their personal values show the profile of the "value-oriented" candidate. These candidates apparently do not only have high demands with regard to themselves but also with regard to their future employers. Candidates with an employer requirements' profile similar to the "career-oriented" candidate in turn belong to a high percentage to the value cluster of the "success-oriented" candidate. This is obvious, as when comparing the characteristic items underlying these clusters, one perceives a high degree of togetherness: such candidates apparently in their desire for fast career-advancement are highly driven by a desire for social recognition and a high standard of living. Parsimony and social engagement for this segment are rather less important. Finally, the "easygoing" and the "security-oriented" candidates show similar distributions in what concerns their affiliation to the different value clusters. For both types of candidates the percentage of the "socio-oriented" candidates is among the highest compared to the other clusters.
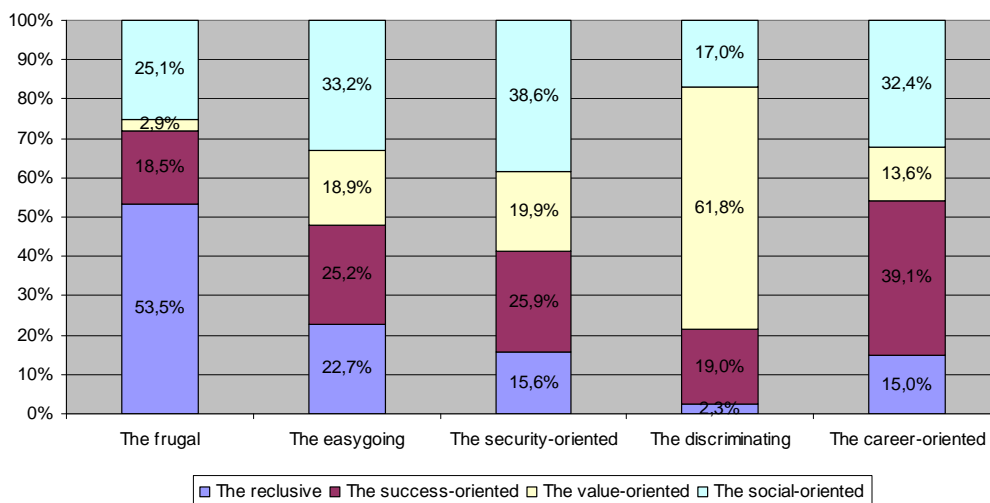

Figure 4. Characterization of employer requirement clusters by personal value clusters

Understanding the behavior of IT professionals

Beyond these relationships, the model presented in Figure 1 assumes that there are other factors than the candidates' personal values that influence their job requirements. It is also assumed that these factors influence other phases of the job search process such as the usage of information and application channels. Figures 5 and 6 therefore illustrate the relationship between the affiliation to a certain occupational group and the candidates' personal values as well as their preference for paper-based or electronic applications. This allows us to derive conclusions on the specific labor market behavior of IT professionals.
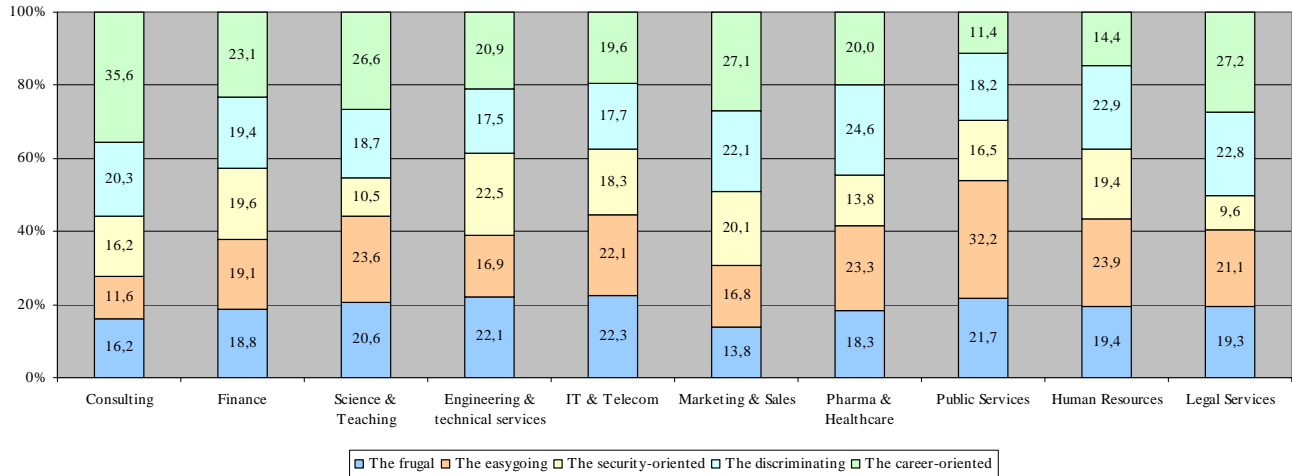

Figure 5. Occupational groups by personal value cluster

Figure 5 shows that the different occupational groups are to a different degree composed of the personal value clusters identified before. For example, the highest percentages of career-oriented candidates can be found within the consulting, marketing & sales and the legal services areas. The IT professionals, however, are almost equally distributed over the five different value clusters with each cluster achieving values between 17.7 and 22.3%. Thus, the IT professionals show a similar pattern as the overall sample but differ considerably from many other segments or occupational groups. Figure 6 illustrates the preference for online versus paper-based applications for the same occupational groups. Already at first glance one perceives major differences in the behavior of these occupational groups. For example, two out of three consultants and IT professionals in our survey said they preferred online applications to paper-based applications. This is a clear distinction not only with regard to other occupational groups such as public services employees showing almost the inverted preference structure, but also with regard to total average of 53% of the candidates preferring online applications. Even though differences for the information phase are less pronounced, Figures 5 and 6 show that there exist differences in IT professionals' behavior that have implications on what channels and what tonality to use when approaching this target group.
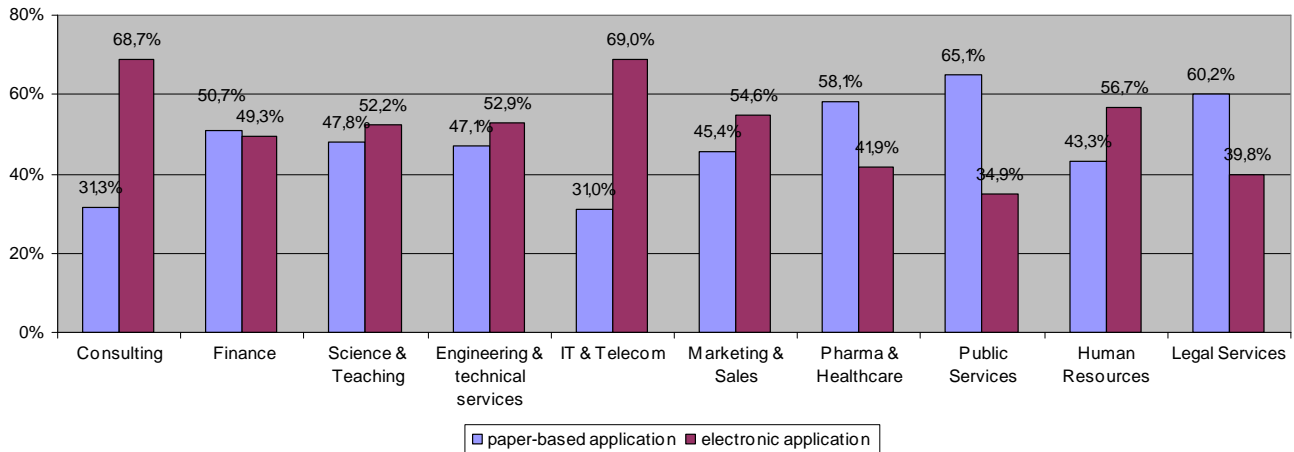

Figure 6. Preference for different application channels by occupational group

THE EMPLOYER SIDE: A COMPARATIVE ANALYSIS OF CORPORATE RECRUITMENT STRATEGIES

In order to reflect the observations made for the candidate side in the context of the labor market demand side, we are now going to shift our perspective to the recruitment behavior applied by employers of different size or industry. Therefore, we at first present the recruitment function together with its current forms of IT support. We then briefly summarize a model of IT diffusion for recruitment processes before going into results from the empirical surveys. We conclude by linking the empirical results obtained to the theoretical considerations made before.

The Recruitment Function and its Forms of IT Support

Recruiting qualified staff is a core function of human resources management (HRM) which can be decomposed into several phases and activities. The recruitment stage as the second phase of HRM follows the personnel planning phase and precedes the employee development and retention phase. Also, it can be decomposed into the attraction and the selection of candidates for each of which planning and execution activities can be separated (Figure 7).
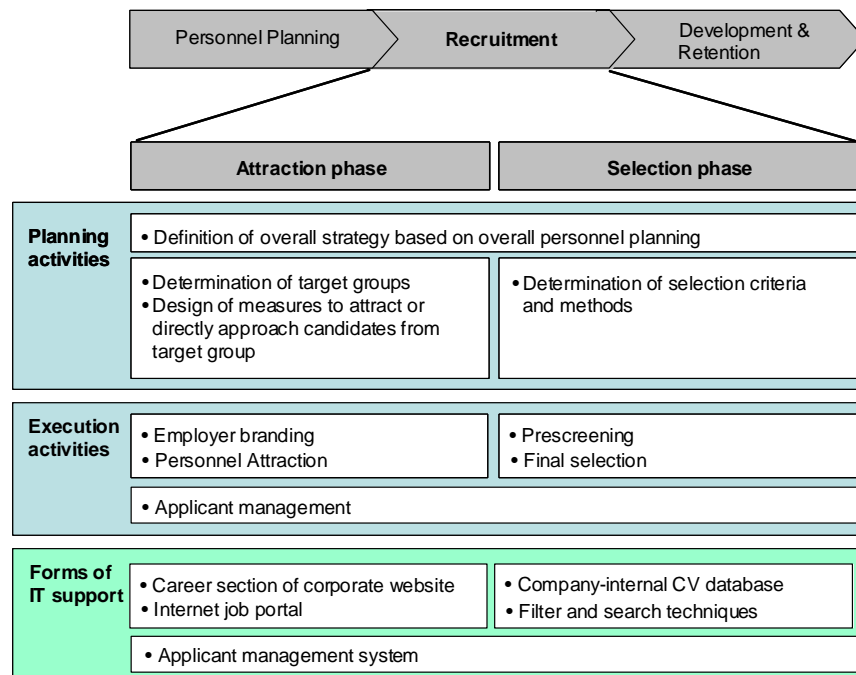

Figure 7. The recruitment function, its activities and forms of IT support

Within the execution activities, *employer branding* comprises all long-term marketing measures to establish an attractive employer image for potential candidates. In contrast to this long-term approach to personnel marketing, *personnel attraction* includes all activities used to directly attract candidates in order to make them apply for a specific open position (Beck, 2002). After the applications are retrieved, an internal workflow is started as part of the *candidate pre-screening and selection activities.* Different selection instruments and methods are used to assess the applicants and to filter out only those candidates that might fit the job (Armstrong, 1995).

While IT has a long tradition of supporting HRM in fields such as payroll and attendance management, its application within the recruitment function is a rather young discipline. Basically, this development can be traced back to when the Internet in the 1990s emerged as a channel to attract high volumes of candidates at low cost. Since then, multiple forms of software support have emerged and the evolution towards more integrated solutions covering the entire recruitment process has not yet come to a standstill. As shown in the above figure 7, currently three different categories of IT support can be identified within the recruitment process:

- The *career sections of corporate websites* as well as *internet job portals* not only serve as a channel (1) to attract candidates, but also provide a means for candidates (2) to apply for relevant jobs either via E-Mail or via application forms.

- The incoming applications in many cases are stored in *CV databases* or corporate skill pools that by means of search and filter techniques assist HR managers in identifying and selecting relevant candidates.

- Providing interfaces to both of the before mentioned categories, *applicant management systems* emerged that are invisible to candidates and that support internal workflows such as the posting of job ads, response and status management as well as the communication between the HR and specialized departments.

A Model of IT Diffusion for Recruitment Processes

In order to get a more concise picture of how the above elements of IT support link to corporate practices within the recruitment function, we built a model of IT diffusion for recruitment processes. The model combines factor-driven approaches to individual innovation adoption such as Rogers' (1983) framework of diffusion of innovation (DOI) and the Technology Acceptance Model (TAM) by Davis, Bagozzi and Warshaw (1989) with stage models on organizational technology adoption such as Kwon and Zmud (1987) and Leonard, Barton and Deschamps (1988). As Figure 8 illustrates, the model separates five different stages of IT diffusion for recruitment processes (Keim et al., 2005a):

- Stage 0: The HR department makes the decision to post job ads online. Also, these passive ways of candidate attraction over the internet are complemented by active ways of approaching candidates such as searching the online resume databases of internet job portals. For both ways, the adoption and diffusion of IT are limited to a single organizational unit.

- Stage 1: A database is built up in which all incoming *structured digital* applications are stored such as applications sent via the various online application forms. Only the HR department is given access to this database.

- Stage 2: In order to implement a company-wide internal candidate pool for external candidates, *all* incoming applications are stored in this database. This implies that incoming paper-based and E-Mail applications are digitalized and then at least partly indexed. As now all external candidates are stored in the same system, access to the database is also granted to managers from specialized departments thus enabling an IT supported company-internal workflow.

- Stage 3: The database is extended in a way to also represent employees or *internal candidates* that wish to change their position within the company. While this might look as a minor step at first, consequences are of high importance as the locus of impact passes from the HR department over specialized departments to the entire workforce.

- Stage 4: In this final scenario not only all internal members of the company do have different rights to access the system, but also *external partners* are granted such rights thus allowing for inter-organizational collaboration. The system now integrates personnel marketing agencies, executive searchers and others into the business process thus extending the locus of impact from the entire workforce to external recruitment partners.
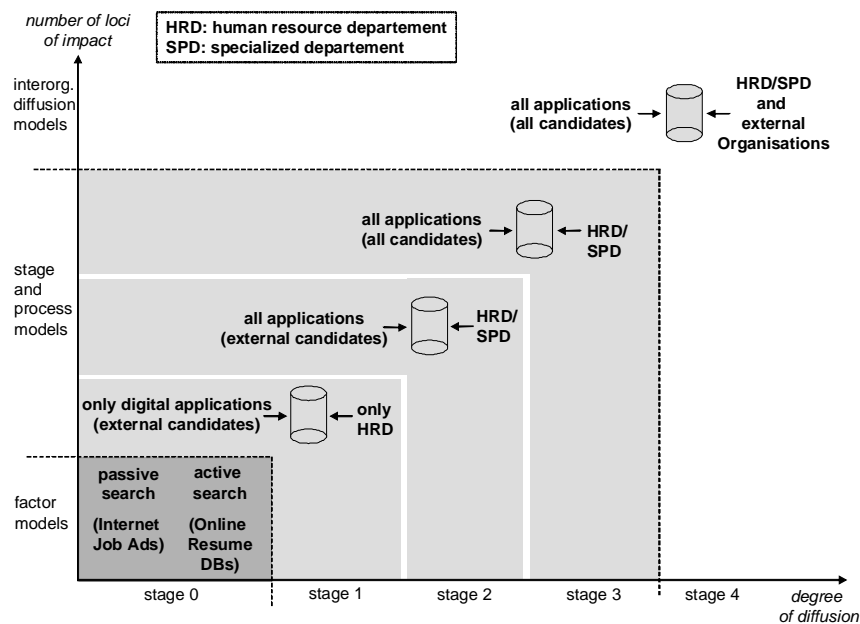

Figure 8. E-HR-diffusion and locus of impact

Detecting Specific Behaviors on the IT Labor Market: A Comparative Empirical Survey with Multiple Employer Groups

Building on the above theoretical considerations as well as intensive empirical research we are now going to address the question of whether IT employers similar to IT professionals show a distinct behavior on the labor market. The results are then going to be merged into guidelines for HR managers as part of the following section.

Research Method

In 2002, our Institute first started an empirical survey with the Top-1,000-companies in Germany on their recruitment practices and the different forms of IT support within the recruitment function. Since then, the survey has been repeated on a yearly basis and successively extended. In 2003, the survey was complemented by the above-presented surveys with job seekers as well as by a survey with 1,000 small and medium-sized enterprises. In 2005, surveys with the Top-300-enterprises from three different industries were added[1]. These industries are the IT industry, the automotive and the banking sector. The quantitative research was extended by a total of over 20 case studies with employers from each of the five different data sets. While for the surveys a paper-based questionnaire was used that was sent out to the recruiting managers previously identified by telephone calls, the interviews were based on questions and protocols that were chosen, elaborated and refined based on Eisenhardt (1989) and Yin (2003). The objective of both approaches is to understand the adoption and diffusion of IT within the recruitment function and even more to detect differences according to company size or industry within this diffusion process.

Research Results

A comparison of the results from the five different surveys shows that IT employers have a recruitment behavior different from other employers. This is true with regard to the personnel marketing mix that strongly focuses on internet channels, but also with regard to the ratio of the vacancies filled over the internet as well as the ratio of electronic application generated. This latter statement is consistent with above insights from the candidate survey.

As Figure 9 illustrates, employers from the IT industry already today post on average a higher ratio of their vacancies on their corporate website as well as on internet job portals than all other groups of employers analyzed. IT employers in 2005 on average posted 89.2% of their vacancies on their own corporate website. 60.5% were published in internet job portals. For less than every fourth vacancy print media were used. Thus, the substitution from jobs ads in print media towards job ads in online channels for IT employers is much more advanced than for any other industry analyzed and also compared to Germany's large employers that show a lead of about four years compared to the e-recruitment adoption within medium-sized employers.
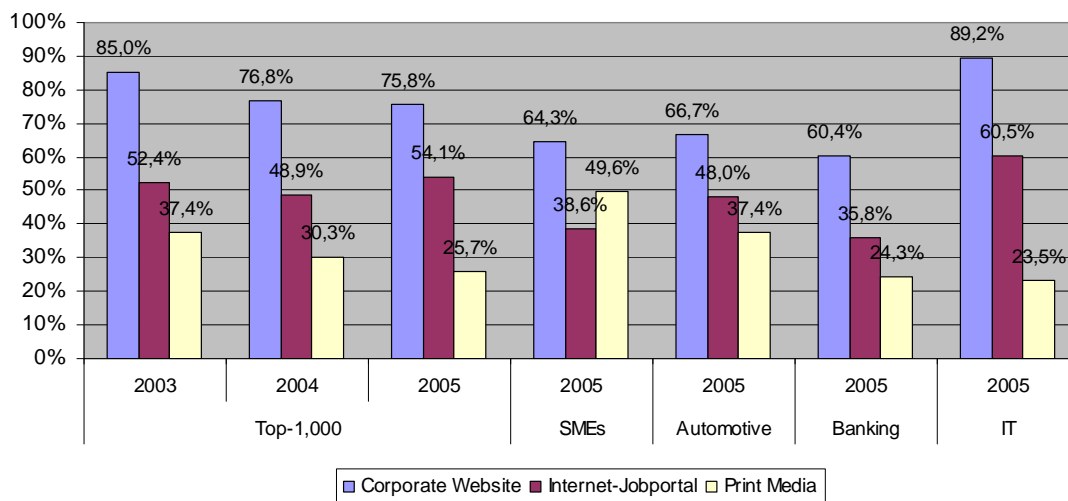

Figure 9. Ratio of vacancies published in personnel marketing channels

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[1] The respective response rates for the five different data sets for 2005 are as follows. German Top-1,000-companies: 15.4%; 1,000 SMEs: 15.5%; Top-300-Automotive: 15.3%; Top-300-Banking: 15.0%; Top-300-IT: 10.0%;

The high ratio of jobs posted on the internet is not without consequences for the question of how these vacancies are effectively filled. Figure 10 shows that for almost three out of four jobs filled in IT companies, the initial contact with the candidate goes back to an internet job ad. The reference value for large employers is of 57.9%, for medium-sized employers of 40.8%. This is even more astonishing as large employers since 2003 have progressed considerably with regard to the effective use of online personnel marketing channels as the 12 percentage point slump for the ratio of vacancies filled via print media indicates. Also, when looking at the ratio of vacancies posted on the corporate website, large employers were only 4.2pp behind IT employers and 8.1pp behind for the jobs posted on internet job portals. However, the difference for the ratio of vacancies filled is of about 16pp compared to large employers and even 33pp compared to medium-sized employers. These figures show that IT employers are more effective in attracting qualified staff over the internet and this, compared to any other employer data set analyzed.
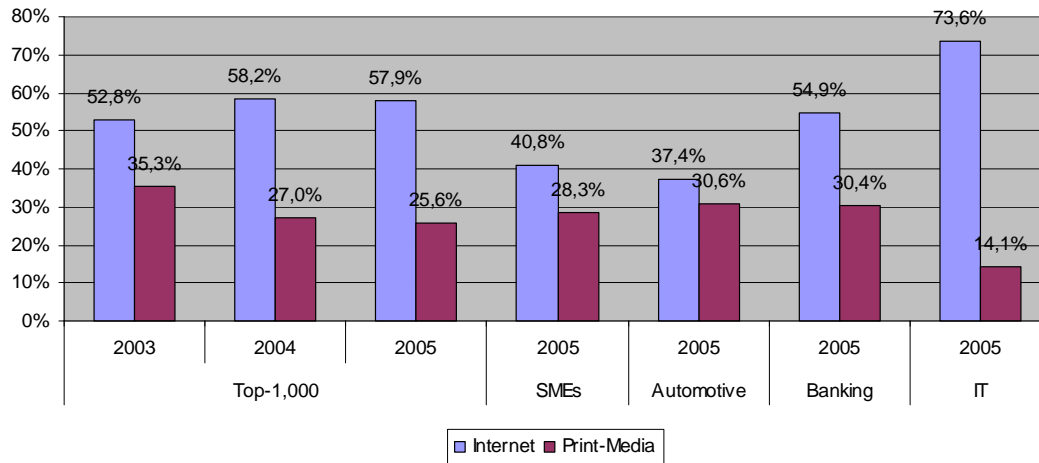
Figure 10. Ratio of job fillings generated by personnel marketing channels

The high ratio of vacancies posted on the internet in addition to the high ratio of jobs filled over the internet also influences the ratio of electronic applications generated. This however, is only true for IT employers. Figure 11 shows that IT employers with 64.3% of incoming electronic applications in 2005 were the only employers that on average generated more electronic than paper-based applications. This value therefore reaches a level that large employers expect to reach by 2008/09. This difference is even more astonishing as large employers expect a complete shift in the ratio between paper-based and electronic applications within only eight years from 2002 on thus indicating a IT driven major shift in current recruitment practices.
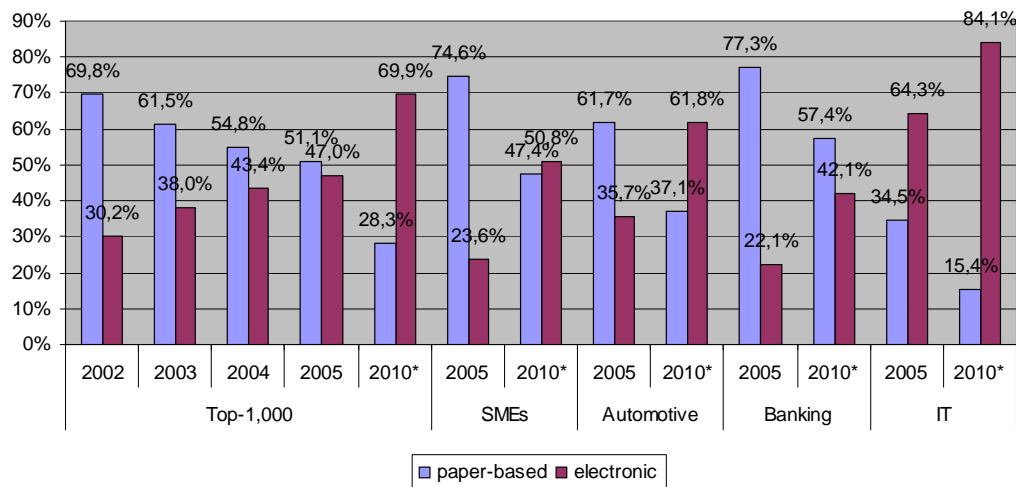
Figure 11. Ratio of paper-based and electronic applications generated
(* values are employers' expectations for a 5-year perspective considered from 2005)

LINKING IT PROFESSIONALS' AND IT EMPLOYERS' PREFERENCES: GUIDELINES FOR HR-MANAGERS

The results show that both, IT professionals and IT employers, do exhibit different labor market behaviors compared to other candidate target groups and employers. The consequences for employers are multiple:

- For all employers it becomes obvious that the natural domain where IT professionals can be attracted is the internet. While this is common knowledge for the information phase, this might not be as expected for the application stage in the job seeking process. As the aggregated figures show, reluctance to use electronic applications and especially structured online applications via webforms still is high. However, while still true at an aggregated level this no longer holds for IT professionals.

- Thus, offering electronic application channels to candidates is a logical next step. But what electronic application channels should be opened and whether paper-based application channels in turn should no longer be offered or at least promoted needs to be discussed according to the specific situation of the enterprise. From the perspective of the internal workflow and the presented IT diffusion model, structured electronic applications via webforms should be preferred as this channel avoids transferring paper-based or unstructured electronic documents into a structured digital format. However, the positioning of the employer or its dependency on certain target groups might play in favor of another decision.

- Increasing the ratio of structured electronic applications in turn offers many possibilities. With regard to *external candidates*, we saw employers that build up profiles databases based on which talent relationship services are offered to highly qualified candidates. This is especially important when the short-term supply with qualified candidates is larger than the immediate demand. Then, relationship services can be a major element synchronizing short-term supply with mid-term demand. With regard to the *internal candidates*, company-internal skill pools can be used as an instrument to support internal applications. By this means, one can enhance not only internal transparency and mobility but also employee motivation and retention.

- Finally, employers need to invest into employer branding instruments that might not necessarily take place on the internet. From the experience of our case studies, such activities when recruiting IT professionals are especially important for non-IT employers that often have difficulties to communicate what makes their job offer attractive to the IT candidate compared to an offer made by an IT employer. Also, this is an issue for IT employers as soon as they decide to start cross-border recruitment or in case they need to recruit local staff in foreign countries. Then, analyzing one's perception as an employer among the major target groups and adapting and transferring the local employer brand to a foreign country becomes a major issue.

CONCLUSION

In this paper, we raised the research question of whether and what behaviors specific to actors on the IT labor market exist and of what consequences HR managers should draw from the increased availability of skilled IT professionals in order to maintain a flexible and motivated IT workforce? Based on several consecutive surveys with the Top-1,000-companies in Germany and four comparative surveys with employers of different size and industry as well as based on a survey with over 10,000 internet job seekers, we can give the following answers: (1) Job seekers in recent years tend to increasingly use the internet as a medium to search for and to apply for jobs. However, despite the growing figures reluctance for using online applications still is high. This in turn is not true for IT professionals as these job seekers show a strong preference for online applications. Thus, IT professionals show a distinct labor market behavior compared to candidates from other target groups. (2) Also, it was shown that job seekers in their job search behavior are influenced by socio-demographic factors and personal values. Again, IT professionals showed characteristic patterns in this context. This has implications for they ways employers communicate their job offers, e.g. with regard to the tonalities and channels used and the job characteristics promoted. (3) Similar to the development on the candidate side, employers also make increasingly use of IT in order to support their recruitment processes. While large companies can be considered to be at the forefront of this development compared to medium-sized enterprises, IT employers show even greater tendencies to enhance their recruitment processes by the various forms of software support. Hence, not only IT professionals but also IT employers show a characteristic pattern in their labor market behavior. (4) Thus, for both market sides we can observe behaviors specific to the IT labor market separating IT employers and IT professionals from other enterprises and job seekers. On the IT labor market, both market sides tend towards an increased digitalization of the recruitment or job search process that together drive a development towards higher stages of the IT diffusion model for recruitment processes. This in turn by means of candidate databases or corporate skill pools opens possibilities for candidate relationship management activities synchronizing short and medium-term supply and demand as well as for eased cross-border recruitment and higher internal mobility and flexibility.

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